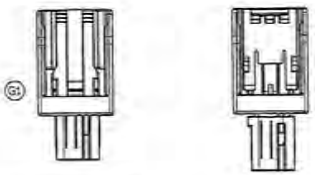
APPLICABLE COMPONENTS						
ITEM	DESCRIPTION	MANDATORY (YES/NO)	TERMINAL CAVITY MIN/MAX QD	PLATING/MATERIAL	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.
1	TRC 8837/1.2mm (CAVITIES 1-2)	NO	0/3.5X4.5	REFERENCE TRC	N/A	N/A
2	WIRE SEAL	NO	N/A	SILICONE	HU5T-10C930-JA	A-0611-H
3	WIRE SEAL	NO	N/A	SILICONE	HU5T-10C930-HA	A-0611-G
4	WIRE SEAL	NO	N/A	SILICONE	HU5T-10C930-GA	A-0611-F
5	SEAL PLUG	NO	N/A	SILICONE	AU5T-10C930-CA	A0412

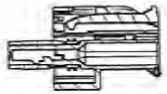
CAVITY IDENTIFICATION (REAR VIEW)

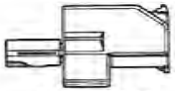

ISOMETRIC VIEW SCALE 1:1

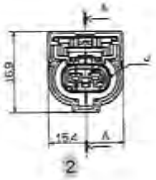
CONNECTOR ASSEMBLY CHART					
ASSEMBLY PART NO'S				MATING COMPONENT	
FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	MAX TEMP	VIBRATION CLASS	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.
EU5T-14A464-TB	6189-7456	150°C	V3	TBD	TBD
FU5T-14A464-DAB	6189-7457	150°C	V3	TBD	TBD
EU5T-14A464-ADA	6189-7673	150°C	V3	TBD	TBD
EU5T-14A464-AEA	6189-7674	150°C	V3	TBD	TBD
JU5T-14A464-BPA	6189-7909	150°C	V3	TBD	TBD
JU5T-14A464-BRA	6189-7910	150°C	V3	TBD	TBD

ITEM	EIA DESCRIPTION	COLOR	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	MATERIAL/SPEC NO.	RECYCLING CODE	WEIGHT	NUMBER OF ITEMS REQUIRED					
1	FEMALE HOUSING KEY A	BLACK	N/A	6185-5159	PBT/WSS-M99P23-B	PBT	2.2g	1	1				
1	FEMALE HOUSING KEY B	BLACK	N/A	6185-5163	PBT/WSS-M99P23-B	PBT	2.2g		1	1			
1	FEMALE HOUSING KEY E	TBD	N/A	6185-5514	PBT/WSS-M99P23-B	PBT	2.2g				1	1	
2	FEMALE TPA KEY A	NATURAL	N/A	6910-7258	PBT/WSS-M99P23-B	PBT	0.23g	1	1				
2	FEMALE TPA KEY B	LIGHT GRAY	N/A	6910-7262	PBT/WSS-M99P23-B	PBT	0.23g		1	1			
2	FEMALE TPA KEY E	TBD	N/A	6910-7889	PBT/WSS-M99P23-B	PBT	0.23g				1	1	
3	PERIMETER SEAL	BROWN	N/A	7135-0698	HSI-30	VMQ	0.05g	1	1	1	1	1	1
4	CPA	NATURAL	N/A	6910-7263	PBT/WSS-M99P23-B	PBT	0.52g	1	1			1	1


OPTION WITHOUT CPA


VIEW SHOWN WITH TPA IN LOCKED POSITION


VIEW SHOWN WITH TPA IN PRE-STAGE POSITION



DETAIL J SCALE 10:1

NOTE:

1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION (SDS) REV.21, DATED JUN 2011.
2. PARTS CONFORM TO THE LATEST LEVEL OF USCAR 2, REVS DATED NOV 2007. FOR COMPONENT TEMPERATURE CLASS 4. FOR PERFORMANCE CRITERIA AND EXCEPTIONS, SEE SUMITOMO DVP&R.
3. MAXIMUM MATING FORCE FULLY POPULATED WITH Sn TERMINALS IS 147N Ag TERMINAL IS 105N.
4. TERMINAL EXTRACTION TOOLS: 23730003
5. SEALING SURFACES AS IDENTIFIED ON THIS DRAWING ARE SMOOTH AND FREE OF PARTING LINES.
6. CONNECTOR IS RATED AS ERGONOMIC CLASS 2 (HAND GRASP) BASED ON USCAR-25 REV 1. CONNECTOR PUSH SURFACE AREA IS 1925mm².
7. N/A
8. FOR INTERFACE VIEWS PLEASE SEE EWCAP 120-S-002-1-Z01 120-S-002-1-Z02 FOR HEADER BLADE INFORMATION SEE EWCAP DRAWING EWCAP-001.
9. ---REMOVED---
10. ---REMOVED---
11. "2" PPAP SUBMISSION APRIL 2012

GENERAL TOLERANCES		
OVER	LESS THAN	
	10	±0.2
10	50	±0.3

KEY A
EU5T-14A464-TB
EU5T-14A464-ADA

KEY B
EU5T-14A464-DAB
EU5T-14A464-AEA

KEY E
JU5T-14A464-BPA
JU5T-14A464-BRA

LTR	REVISIONS			
	ORIGINATOR	CHECKER	ENGR APP	MATL APP
A	RELEASED ARLE-E-11789390-999			20121026
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
	RELEASED FU5T-14A464-DAA ARLE-E-11789390-997			20130425
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
C1 C2 C3 C4	REMOVED EU5T-14A464-TA, FU5T-14A464-DAA UPDATED SUMITOMO PART NUMBERS UPDATED TEMPERATURE CLASS REMOVED NOTE ADDED NOTE RELEASED EU5T-14A464-TB, FU5T-14A464-DAB ARLE-E-11789390-304			20131113
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
D1 D2	UPDATED NOTE 2 CORRECTED PERIMETER SEAL COLOR ARLE-E-11789390-317			20140220
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
E1	UPDATED TITLE BLOCK NOTES, WAS PROTOTYPE ARLE-E-11789390-328			20140314
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
F1 F2 F3 F4 F5 F6	WAS 2.4Ω WAS 0.25g WAS 0.5g WAS 0.5g WAS 3.05g ARLE-E-11789390-329			20140418
	J. LANZOTTI	M. SPENCER	J. PITTENGER	SUMITOMO
G1 G2 G3 G4	RELEASED EU5T-14A464-ADA, -AEA ADDED VIEW REMOVED NOTE WEIGTH WAS 50g ADDED NOTE 11 ARLE-E-11789390-338			20140730
	J. SANKAR	M. SPENCER	J. PITTENGER	SUMITOMO
H1 H2 H3	WAS TAN WAS 6189-7473 WAS 6189-7474 ARLE-E-11789390-345			20141007
	J. SANKAR	M. SPENCER	J. PITTENGER	SUMITOMO
J1	ADDED VIEW TO SHOW LATEST REVISION ARLE-E-11789390-353			20150422
	J. KIM	B. NAGY	J. PITTENGER	SUMITOMO
K1	WAS AU5T-14A464-EA ARLE-E-11789390-378			20151002
	J. KIM	B. NATTER	J. PITTENGER	SUMITOMO
L1 L2 L3 L4	RELEASED JU5T-14A464-BPA, -BRA WAS DEC 2014 WAS DU5T-10D930-GAA WAS DU5T-10C930-YA WAS AU5T-10C930-BA ARLE-E-11789390-470			20151109
	R.THOMAS	W. LYONS	J. PITTENGER	SUMITOMO

SEWS

SEWS RELEASE LEVEL: PRODUCTION (E1)
APPLICATION

SEWS DRAWING / PART NUMBER: SEE CHART
WEIGHT (G) (G3): SEE CHART (F5)

REFERENCE: 2WAY SEALED FEMALE 1.2mm

PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P9999-A3 TO HELP SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT

DRAFTED IN ACCORDANCE WITH FORD MOTOR COMPANY ENGINEERING CAD AND DRAFTING STANDARDS CURRENT AT INITIAL RELEASE

3RD ANGLE PROJ. DIMENSIONS ARE IN MILLIMETERS

CAD TYPE	CAD CONF.	CAD FILE	DTMC
CATIA	METAPHASE	PRT EU5T-14A464-TB DWG EU5T-14A464-TB	IS MASTER

OPER. NO.	UNIT	DRAWING	EU5T-14A464-TB
-----	mm		
DESIGN	DETAIL	TITLE	SHT 1 OF 1
J.L.	J.L.	SLV ASY WR CONN FEM	
CHECKED	SAFETY		
M.S.	-----		
SCALE	DATE	DIVISION	
2:1	20121012	PLANT	

Ford Motor Company

±2	JU5T-14A464-BRA
±2	JU5T-14A464-BPA
	EU5T-14A464-AEA
	EU5T-14A464-ADA
	FU5T-14A464-DAB

DRW SIZE A1/A

DaimlerChrysler Ford GM

Production Part Approval
Dimensional Test Results

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS
SUPPLIER/VENDOR COI
NAME OF INSPECTION FACILITY:
Sumitomo Electric Wiring Systems Plt. 5

PART NUMBER: 6189-7456, 6189-7673
PART NAME: FOW120A02FA-B
DESIGN RECORD CHANGE LEVEL: EU5T-14S464-TB L4 11/09/16
ENGINEERING CHANGE DOCUMENTS: NA

ITEM	DIMENSION / SPECIFICATION		SPECIFICATION / LIMITS		TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)								OK	NOT OK
							M25	M26	M27	M28	M29	M30	M31	M32		
1	16.90		-0.30	0.30	6/7/18	8	16.86	16.87	16.85	16.86	16.86	16.86	16.86	16.87	O	
2	15.40		-0.30	0.30			15.43	15.41	15.39	15.43	15.44	15.39	15.39	15.42	O	
3											correct					
4											correct					
5											correct					
6											correct					
7											correct					
8											correct					
9											na					
10											correct					
11											na					
12											na					
13											correct					

NOTE:

1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION (SDS) REV.21, DATED JUN 2011.
2) 2. PARTS CONFORM TO THE LATEST LEVEL OF USCAR 2, REV5 DATED NOV 2007, FOR COMPONENT TEMPERATURE CLASS 4.
   FOR PERFORMANCE CRITERIA AND EXCEPTIONS, SEE SUMITOMO DVP&R.
3. MAXIMUM MATING FORCE FULLY POPULATED WITH Sn TERMINALS IS 14.7(N)
   Ag TERMINAL IS 10.5(N)
4. TERMINAL EXTRACTION TOOLS: 23730003
5. SEALING SURFACES AS IDENTIFIED ON THIS DRAWING ARE SMOOTH AND FREE OF PARTING LINES.
6. CONNECTOR IS RATED AS ERGONOMIC CLASS 2 (HAND GRASP) BASED ON USCAR-25 REV 1. CONNECTOR PUSH SURFACE AREA IS 1925mm^2.
7. N/A
3) 8. FOR INTERFACE VIEWS PLEASE SEE EWCAP
   120-S-002-1-Z01
   120-S-002-1-Z02
   FOR HEADER BLADE INFORMATION SEE EWCAP DRAWING EWCAP-001
) 9. ---REMOVED---
10. ---REMOVED---
) 11. "s2" PPAP SUBMISSION APRIL 2018

s2 EU5T-14A464-BB

Blanket statements of conformance are unacceptable for any test results.

MARCH 2006

CFG-1003

SIGNATURE	TITLE	DATE
Mary Jo Mackin	PPAP Operator	6/7/2018

'TORAY'

Innovation by Chemistry

Toray Resin Company, 821 W. Mausoleum Road, Shelbyville, Indiana 46176

Grade:	5108X01B BLACK
Lot:	R29098
Date:	06/05/18

Certification of Properties

Test	Method	Unit	Specification	Result
Visual	.	.	Same as Std.	Good
Color	.	.	Same as Std.	Good
MFR	ISO 1133	g/10 min.	8~14	12.4
Tensile strength	ISO 527	MPa	Min. 42	50.2
Tensile elongation	ISO 527	%	Min. 14	33.8
Flex strength	ISO 178	MPa	Min. 70	74.8
Flex modulus	ISO 178	MPa	Min. 1,700	2,122
Charpy - notched	ISO 179	kJ/m2	Min. 5	7.5

For the ship date, please see the BOL. For the ship quantity, please see the BOL.

Original Lot# R28977

Toray Resin Company certifies the above results are in accordance with our ISO/TS 16949:2009 certificate.

PROCESS FLOW DIAGRAM

KEY CONTACT/DEPT. LOC. Debbie Gillenwater /-QA Dept

PRODUCT : Molded Component Parts

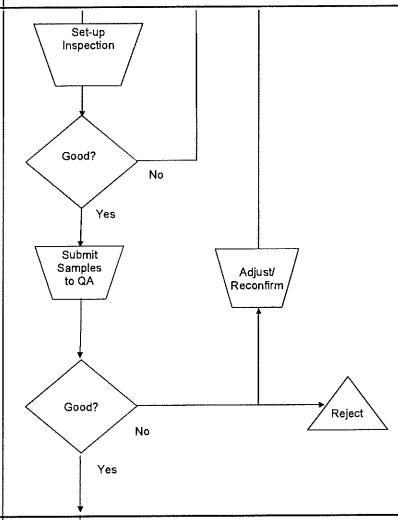
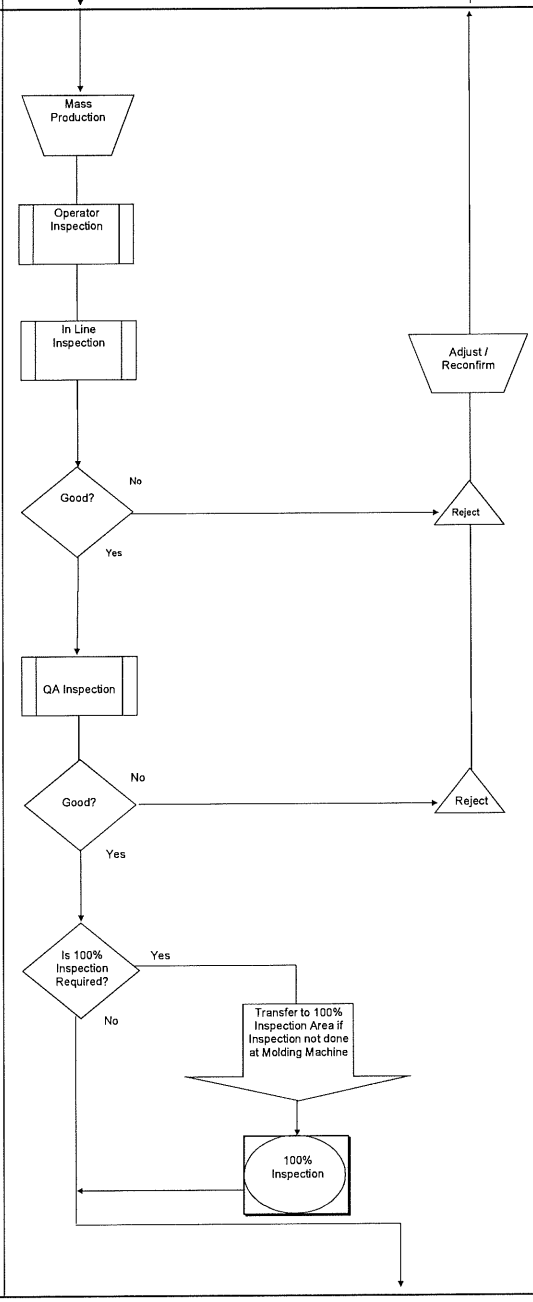
PROCESS: Injection Molding Group 1 FRANKLIN
Supplier/Loc. SEWS-Scottsville#5 / Franklin
Mfg. Sup.: John Saylors
Prepared By: Ricardo Gonzalez

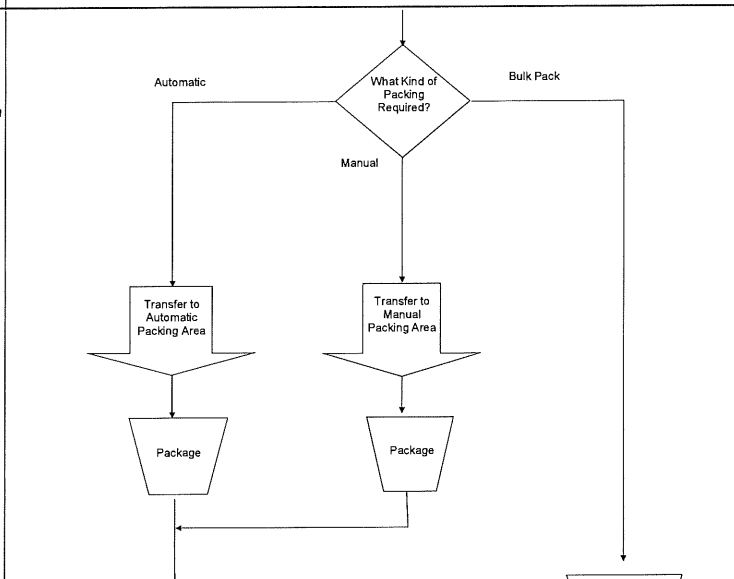
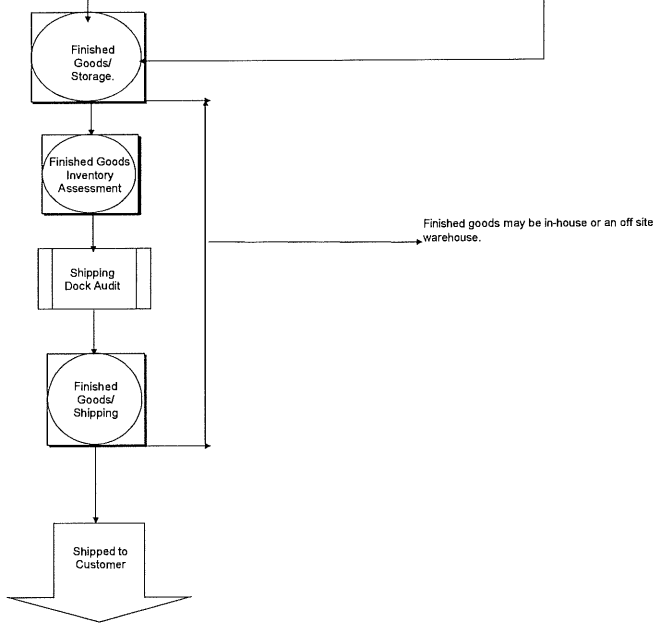
DATE	CHANGE POINTS	CORE / DEVELOPMENT TEAM
4/27/2017	Change wording to better match CP.	J Fraim
1/11/2017	Initial	R. Gonzalez

ISSUE/REVISION HISTORY

SUPPLIER APPROVALS:
General Plant Manager
Quality Manager
Other Approvals
CUSTOMER APPROVALS:(IF REQUIRED)

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
010	Receive Raw Material	Purchased Raw Material	Visual Comparison Against Packing List Shipping-Receiving
	Reject for non-conformance	Good? No → Reject; Yes	Notify Quality Assurance Red Tag Procedure & Return to Vendor
0020	Quality Assurance Receiving Inspection	QA Receiving Inspection	
	Packaging, Identification, Visual Inspection, # Characteristics		Per QA Inspection Instruction Sheet-Receiving
	Reject for non-conformance	Good? No → Reject; Yes	Red Tag Procedure/Return to Vendor
0030	Raw Material Storage (Resin and Raw Materials)	Material Storage	
	Resin storage for Silo (pending installation) and bag material.		
	Raw Material Inventory Assessment (non silo material)	Raw Material Inventory Assessment	
0050	Material Delivery to Manufacturing	Deliver to Raw Material Staging Area,or Silo surge bin assignmnet.	Electronic Scan to confirm material part number.
	Raw Material Loading	MATERIAL LOADING	Injection Molding Machine
		Machine side drying (when applicable).	
0060	Set-up Injection Molding Machine	Machine Set-Up	
	Raw Material Mold Numbers Process Parameters Regrind Ratio Raw Material Dryers	Safety Checks	Per Shop Order Per Applicable Standard
		Correct Mold	
		Automatic Reject	

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
			Set Up Validation # Part Dimension / Function Make Adjustments, Reverify Parts, Mold Sent to Maintenance or Stop Production if applicable
	Reject for non-conformance		
0070	Mass Production Injection Molding		Per Shop Order Per Applicable Standard
0080	Quality Assurance Inspection		# Part Dimension / Function / Visual Reject for non confirmance, notify Manufacturing Leader /QA Eng. Reject Tag Procedure
	Material Staging for Inspection		
	100% Inspection (when applicable)		Visual Inspection

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0090	Automatic / Manual Bulk Packaging and Labeling.		Per Packaging Style and Shop Order for parts to be shipped to customer.
			Per Packaging Style and Shop Order
0100	Packaging and Labeling at Machine.		Per Packaging Style and Shop Order for parts to be assembled internally.
	Material Staging for Non Bulk Packaging / Labeling		
0110	Transfer Packaged Parts to Storage		
0120	Finished Goods Storage		
0130	Finish Goods Inventory Assessment		
0140	Shipping Product Audit (S/R)		Quantity Identification
0150	Finished Goods Shipping		Shipping Label

SUMITOMO ELECTRIC WIRING SYSTEMS, INC. PROCESS F.M.E.A

PROCESS RESPONSIBILITY: Alan Bomar, John Saylors

ITEM: *INJECTED MOLDING COMPONENTS*
MODEL / VEHICLE: *All*
F.M.E.A. # *SV5 #1 / FRANKLIN*
PREPARED BY: *RICARDO GONZALEZ*

DATE ISSUE/REVISION HISTORY	CHANGE POINTS	CROSS FUNCTIONAL TEAM
4.27.17	Update wording to better match CP	J Fraim
1/11/2017	Initial	D. Gillenwater, J. Fraim, L. Roth, D. Duncan, A. Davidson, N. Hagiwara, J. Saylors

SUPPLIER APPROVALS;
Division Manager : A. Bomar 4.27.17
Quality Manager: L. Roth 4.27.17
Other Approvals:

CUSTOMER APPROVALS:(IF REQUIRED)

Other Approvals:

CUSTOMER APPROVALS:(IF REQUIRED)

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
0010	Raw Material Receiving	1. Incorrect Raw Material Quantity Received	Raw Material shortage causing interruption to Inj. Molding scheduled production, leading to: *Parts shortage *Customer part delivery performance degraded.	4		Incorrect quantity shipped by Supplier	2	P-Supplier confirms material quantity or weight, and creates packing list. D - Receiving Associate confirms BOL against Packing List (confirms each unit). Material is barcode scanned into system against open Purchase Order	6	48	NONE						
		2. Incorrect Raw Material Part Number Received	Raw Material shortage causing interruption to Inj. Molding scheduled production, leading to: *Parts shortage *Customer part delivery performance degraded.	4		Incorrect material part number shipped by Supplier	2	P-Supplier confirms material quantity or weight, and creates packing list. D - Receiving Associate confirms BOL against Packing List (confirms each unit). Material is barcode scanned into system against open Purchase Order	6	48	NONE						
		2. Damaged Containers	Material rejected, insufficient material for production. Component produced from contaminated material. * Quality problem * Customer complaint	4		Improper Handling at point of origin and / or transportation. Improper Packaging	2	P- Packaging is designed to prevent damage. D -Receiving associate visually confirms container for damage.	6	48	NONE						
0020	Quality Assurance Receiving Inspection	1. Raw Material Out of Specification	* Delay Scheduled Production * Brittle Parts * Customer part delivery performance degraded. * Customer compliant	7	IC	Insufficient Supplier Process Controls	2	P- Supplier tests each lot of material for proper mechanical and chemical properties. D- *SQA Receiving associate verifies Material cert to standard, and test Melt Flow each PBT lot. **(IC)** * Molding machine monitors detect process variation *QA Lab verifies product function each run.	5	70	Raw Material is confirmed to meet spec by material supplier and Melt Flow testing. QA Receiving Inspection. Molding Machine monitors will detect material variations, and QA tests the function of each part to confirm it meets the specification. No other correction action needed.						
		2. Incorrect Raw Material Color	* Delay Scheduled Production * Customer part delivery performance degraded. * Customer compliant	3		Mislabeled Raw Material Container	2	P- Supplier confirms and matches color per their in process controls. D- QA Receiving associate visually confirms per shipment / lot referencing master samples.	7	42	NONE						
0030	Material Storage	1. Improper storage	*Difficulty in locating raw material *Raw material degradation	2		*Incorrect storage location *Improper storage method	2	Scanning system assign each part number to a specific warehouse location, controlling inventory and FIFO	5	20	NONE						

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
0050	Raw Material Loading	1. Incorrect Raw Material	* Discoloration of Parts * Brittle Parts * Impaired function of Part * Customer Complaint	7		Material handler selected incorrect raw material Mislabeled material Mixed material	2	P- Shop order specifies required raw material. Barcode system confirms raw material part number when assigned to machine. Material received COA is confirmed to material spec. D- * Barcode system * Visual confirmation of Raw Material ID against shop order each Set-up and Each shift.	2	28	Barcode system 100% confirms that the correct material is loaded at the machine and visual material ID checks are conducted each set-up and shift start. No other action is needed.						
	Material Drying (if required)	Material not dried correctly	* Burn mark, or weld line * Brittle Parts-Part breakage * Parts out of dimension	3		Set-up operator failed to set correct process parameters : Oven Temp. Moisture Content Drying time	2	P- 1. Machine is interlocked not to operate if dryer is off. P - 2. Central Feed Dryer will alarm if power goes off (currently N/A). P - 3. Set-up operator verifies and visually confirms correct process parameters. D - 1. Parameters are reconfirmed by coordinator/leader and operator.	4	24	NONE						
0060	Set-up Injection Molding Machine	1. Incorrect Raw Material	* Parts out-of-specification * Discoloration of Parts * Brittle Parts * Impaired function of Part * Customer Complaint	5		Set-up Associate used incorrect raw material.	2	P- 1. Barcode system confirms raw material matches shop order. Any mismatch prevents printing of labels. D -1. Barcode system will detect wrong material . 2. Verify against Mold Book Condition Sheet & record on Condition Sheet Form and P chart. Confirmed with Material color codes & barrel colors.	5	50	NONE						
		2. Incorrect Mold placed in Machine	Incorrect Part Manufactured	2		Set-up Associate failed to use correct Mold	2	P-1. Barcode scan mold book to machine, any mismatch prevents printing of labels. 2.Set-up Associate instructions (shop order) & visual confirmation. D - Verify against Mold Book Condition Sheet & record on Condition Sheet Form, Mold set up book and Critical check sheet	5	20	NONE						
		3. Improper Machine Process Parameters	Parts out-of-specification (Dim. & appearance) Short Shot Discoloration of Parts Brittle Parts Impaired function of Part Customer Complaint	4		Set-up Associate failed to set correct process Parameters	3	P-1. Engineering established parameters selected by setup and automatically uploaded to machine. 2. Set-up Associate instructions (shop order) & visual confirmation. D - 1. Setup verify against Mold Book Condition Sheet & record on Condition Sheet Form 2. Leader/coordinator reverifies machine screen conditions match set up conditions.	5	60	NONE						

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
		4. Parts out-of-specification (Set-Up appearance checks): Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2.Engineering validation of injection function changes per internal robust test procedure.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition.						
				3		Improper Robot settings	3	P-1. Setup confirms robot setting per condition sheet. 2.Utilize soft drop conveyors. 3.Confirmation of Set-up of auxiliary equipment. 4.PM for robot clamp. 5.Utilization of pick and place robots where applicable. D-1. Set-up operator visual confirms first 10 shots. 2.Molding operator checks last shot each basket and QA check at each SOP per GA003 & Inspection Standard. 3.Leader/ coordinator reverification of robot settings.	5	45	NONE						
				3		Machine Wear Improper cleaning at changeover or machine PM.	2	D- Set-up operator verifies & visually confirms machine clean each Mold change/Set-up per work instructions. Maintenance PM Mold Schedule	6	36	NONE						
				5		Damaged or broken pins due to Age/condition of Mold	2	P- Maintenance PM Mold, QA Confirmation function SOP/EOP, Operator each lot visual check, Mold condition settings.	5	50	SEWS maintains molds and follows strict PM schedule. Parts are also confirmed functionally to detect for out of spec parts due to broken molds.						
		5. Parts out-of-specification (QA appearance checks) Broken pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines and other visual defects	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3	IC / SWS / IM	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at SOP per GA003 & Inspection Standard. 3.Engineering validation of injection function changes per internal robust test procedure.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
		6. Parts out-of-specification (QA function checks) : terminal insertion, terminal retention, retainer insertion, retainer retention, engagement with mating parts (clip, etc.). Hinge, Clip/lock, or Lance damage-(where Applicable)	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3	IC / SWS / IM	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel, screw, nozzle type,etc)	2	P- 1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters. D-1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2.QA Functional testing each SOP per GA003 & Inspection Standard 3. Engineering validation of injection function changes per internal robust test procedure.	5	30	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		7. Parts out-of-specification (QA Dimension Checks)	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Complaint / Dissatisfaction	4	C# / SWS	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design	2	P- Confirmation system for molding set-up parameters. Set-up Operator instructions (shop order) & visual confirmation per CPC. D- Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2. QA Dimensional measurement each SOP per GA003 & Inspection Standard	6	48	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		8. Mixed Parts	**Mixed Parts delivered to the customer Customer Complaint / Dissatisfaction**	**5**		**Trapped or scattered parts / start-up shots remaining in molding machine.**	**3**	**P - 1: Process Change System for evaluating chute/conveyor changes for potentially scattered parts. D -1: Set up checks at each change over.**	**5**	**75**	**SEWS performs checks of each machine prior to each SOP to ensure start up shots/previous product is not scattered in machine.**						
0070	Mass Production Injection Molding	4. Parts out-of-specification (Operator appearance checks): Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify parts against CPC.	6	54	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
	Inline Inspection	1. Parts out-of-specification (In-Line Roving Patrol) Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify parts against CPC.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
0080	Quality Assurance Inspection Injection Molding	5. Parts out-of-specification (QA appearance checks) Broken pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines and other visual defects	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3	IC / SWS / IM	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at MOP/EOP per GA003 & Inspection Standard. 3.Engineering validation of injection function changes per internal robust test procedure.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		6. Parts out-of-specification (QA function checks) : terminal insertion, terminal retention, retainer insertion, retainer retention, engagement with mating parts (clip, etc.). Hinge, Clip/lock, or Lance damage-(where Applicable)	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3	IC / SWS / IM	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel, screw, nozzle type,etc)	2	P- 1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters. D-1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2.QA Functional testing each MOP/EOP per GA003 & Inspection Standard 3. Engineering validation of injection function changes per internal robust test procedure.	5	30	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		7. Parts out-of-specification (QA Dimension Checks)	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Complaint / Dissatisfaction	4	C# / SWS	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design	2	P- Confirmation system for molding set-up parameters. Set-up Operator instructions (shop order) & visual confirmation per CPC. D- Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2. QA Dimensional measurement each MOP/EOP per GA003 & Inspection Standard	6	48	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
	Material Staging for 100% Inspection (where applicable)	1. Incorrect Storage Location	Wrong Part/Mixed Parts delivered to customer Compliant/Dissatisfaction	3		Material Handler failed to place product in correct location.	2	P- Material Handler verifies correct location per electronically scanning Part number into system (BPCS)	5	30	NONE						
	100% Inspection (where applicable)	1. Parts out-of-specification (Sorter) Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	P- 1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear D- 1.Verify parts against CPC / TWI.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
0090	Automatic Bulk Packaging / Labeling	1. Incorrect Bag / Box Label	Wrong Part delivered to customer Customer Complaint / Dissatisfaction	5		Packaging operator failed to place correct label on bag / box	3	P- Barcode packing and labeling system. D - QA operator visually confirms once per shift per check sheet.	5	75	NONE						

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSE(S)/ MECHANISM(S) OF FAILURE	OCCUR	CURRENT PROCESS CONTROLS	DETEC	R.P.N.	RECOMMENDED ACTION(S)	RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	R.P.N.
		2. Mixed Parts	Mixed Parts delivered to the customer Customer Complaint / Dissatisfaction	5		Packing operator error when pulling partials and overage from bins and placing into bag / box.	3	Partials and overage are scanned to the box being packed to confirm the correct part is packed.	5	75	NONE						
		3. Incorrect Quantity	Wrong quantity delivered to customer Customer Complaint / Dissatisfaction	3		Incorrect set up or bag count.	3	P- Parts are 100% counted by machine. D - Operator weighs 100% of bags. Each bag scanned to box to confirm correct quantity of bags.	5	45	NONE						
0100	Packaging and labeling at Machine	1. Incorrect Bag / Box Label	Wrong Part delivered to customer Customer Complaint / Dissatisfaction	5		Packaging operator failed to place correct label on bag / box	3	P- Barcode packing and labeling system, QA operator visually confirms once per shift per check sheet. D- Bags are 100% weighed by machine.	5	75	NONE						
	Material Staging for non bulk Packaging / Labeling	1. Incorrect Storage Location	Delay in locating material, possible delay of shipment.	3		Material Handler failed to place product in correct location.	2	P- Each part is assigned to a specific location though barcode scan system.	5	30	NONE						
0110	Transfer packaged parts to storage	1. Incorrect Storage Location	Delay in locating material, possible delay of shipment.	3		Material Handler failed to place product in correct location.	2	D - Material Handler verifies correct location per electronically scanning Part number into system (BPCS)	5	30	NONE						
0120	Finished Goods Storage	1. Incorrect Storage Location	Wrong Part delivered to customer Customer Complaint / Dissatisfaction	3		Material Handler failed to place product in correct location.	2	D - Material Handler verifies correct location per electronically scanning Part number into system (BPCS)	5	30	NONE						
		2. Deterioration of packaging.	Damaged to box, potential delay of shipment.	3		Environmental conditions, handling errors.	2	P- Climate controlled warehouse, FIFO barcode controlled, monthly shelf life assessment. D- Weekly audit and inventory assessment.	5							
0130	Finished Goods Inventory Assessment	1. Finished Goods Shortage	Inj. Molding scheduled production interrupted & intermittent leading to: *Parts shortage *Customer part shortage & assembly line shutdown *Customer part delivery performance degraded. * Customer complaint	3		BPCS SYSTEM not 100% dependable	2	P- Inventory Control System. D - Manual inventory taken, Operator manual / visual inventory.	5	30	NONE						
0140	Shipping Product Audit (S/R)	1. Incorrect Part in box.	Customer Complaint / Dissatisfaction	3		Operator failed to verify shipping label present, clear, correct and legible	2	P- Packing Barcode Scanning operation, confirming inventory label to shipping label. D - Operator visually confirms per instructions	5	30	NONE						
		2. Incorrect Quantity in box and / or Damaged Box	Customer Complaint / Dissatisfaction	3		Shipping Operator failed to verify no damaged boxes & correct quantity shipped.	2	D - Operator visually checks for damage & scans label / verifies correct quantity acceptance.	5	30	NONE						
		3. Incorrect AIAG Label (where Applicable)	Customer Complaint / Dissatisfaction	3		Operator failed to verify AIAG label present, clear, correct and legible	4	D - Operator electronically scans Box Label number to Print AIAG part number, includes cross verification system	5	60	NONE						
0150	Shipping Finished Goods	1. Missing Box Label	Possible delayed shipment or shortage or parts.	3		Operator failed to verify shipping label is present, clear, correct and legible	2	D - Operator visually checks for damage & scans label / verifies correct quantity acceptance.	5	30	NONE						

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		2. Damaged Boxes	Customer Complaint / Dissatisfaction	3		Shipping Operator failed to verify no damaged boxes shipped.	2	D - Operator visually checks for damage & scans label / verifies correct quantity acceptance.	5	30	NONE						
		3. Incorrect AIAG Label (where Applicable)	Customer Complaint / Dissatisfaction	3		Operator failed to verify AIAG label present, clear, correct and legible	3	P - Operator electronically scans Box Label number to Print AIAG part number.	5	45	NONE						

☐ Prototype ☐ Pre-Launch ☑ Production

CONTROL PLAN

Control Plan Number Connector Manufacturing Group (CMG / FRANKLIN)		Key Contact/Phone L. Roth / D. Gillenwater (270) 237-5419 x 8555 or 8563	Date (Orig.) 1/11/2017	Date (Rev.) 7/20/2017
Part Number/Latest Change Level Various		Core Team L. Roth, P. Keith, J. Fraim, A. Davidson	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description Various, Connector Molding		Supplier/Plant Approval/Date L. Roth 1.11.16 8/8/17	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant Sumitomo Electric Wiring Systems	Supplier Code	Other Approval/Date (If Req'd.) A. Bomar 8/8/17	Other Approval/Date (If Req'd.)	
Revision History:		1/11/17: Initial 4/27/2017: updated of wording in section 0090 to better match PF. 7/20/17: Revised processes; 1) Identify processes that are not performed at Franklin facility. 2) In Quality Assurance inspection process, remove Profile and add Keyence device. 3) Remove SILO process.		

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE SIZE	SAMPLE FREQ.	CONTROL METHOD	
0010	Raw Material Receiving	N/A	10	Plastic Resin	Material Receiving **(SCOTTSVILLE SV5)**		Correct color & type No Damage Dry Material Correct Part Number & all appropriate documentation	Visual Inspection & comparison to packing list	Per container	Each Receipt	* SRW-RECFLOW * Electronic Data Scan	Notify S&R Coordinator, Q.A.
0020	Quality Assurance Receiving Inspection		20	Plastic Resin	Receiving Inspection **(SCOTTSVILLE SV5)**	IC	* Correct color & type * Correct Part Number * No Damage * No contamination * Material Certification	* Visual comparison to box/skid label * Visual check of packaging * Review of Material Cert.	Per QRW-RAINBOW SQA Sample Plan	Each Incoming Shipment	Q.A. Inspection Instruction Sheet, Material Certifications	* Notify SQA Coordinator, QA Leader or QA Manager. * Return to Supplier * Issue PIR to Supplier * Reject / Hold Procedure
		Melt Flow Tester				IC	* Melt Flow (As applicable per IISRP)	* MFR Test	Each Lot	Each Lot		
0030	Material Storage (Resin & Raw Materials)	N/A	30	Correct Location	Material Storage **(SCOTTSVILLE SV5)**		* Correct Location	* Electronic Label Scan	Each Container	Each Receipt	Electronic Label Scan	Notify Leader, Q.A., Coordinator as needed Reject / Hold Procedure
	Inventory Assessment Audit (Non-Silo material)			Material Condition, Location	Inventory Assessment Audit		No Damage, No missing labels, Proper storage condition, FIFO	Visual Inspection	Sample of raw material in warehouse	Weekly	Weekly Stock Assessment Sheet, SQA Inventory Audit	Notify: Shipping Receiving Leader, Supervisor & Q.A. If needed Reject / Hold Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0050	Material Delivery to Manufactuing (Assign Gaylord / Bags)	Fork Truck	50	Correct Material	Assign Gaylord / bag to Hopper / Surge Bin		Correct Location / Loader (as applicable)	Compare raw material RPN # to RPN # on Loader (scan)	Each Container	Each material transfer	* Electronic scan, * Material Handling Log	Notify: Mfg. Coor., Supervisor & Q.A. if needed Reject / Hold Procedure
	Material Pre-drying (as applicable)	Off-line Loader / Pre-dryer		Dried Material	Pre-Drying (When applicable)		Drying Temperature set correctly.	Visual	Each unit	Monthly	PM Record	Notify Maintenance Manager
	Loading Material (To transport barrel/buggy)	Material Barrel / Buggy		Correct Material	Raw Material Loading to Barrel / Buggy		(Barrel/Buggy): Per Shop Order Match Raw Material RPN number to appropriate barrel / buggy.	* Verify per shop order. * Per applicable Work Instruction	Each container	Material Change / Each material transfer	* Electronic scan, * Material Handling Log	Notify: Mfg. Coor., Supervisor & Q.A. if needed Reject / Hold Procedure
	Move Material to Molding Machine			Correct Material	Transfer Raw Material to Molding Machine		Correct Material Part Number/Type per scan	Scan Shop Order against material tag per applicable work instruction.	Each container	Each Mold Set-up / Material transfer	* Electronic Scan, * P- Chart	Notify Leader / Coordinator
	Machine Side Drying (where applicable)	Machine Resin Dryers		Dry Material	Drying (When applicable)		Set temperature per condition sheet.	Visual	Once	Each Mold Set-up / Each Shift	* Controller Condition Check sheet * P - Chart	Adjust Dryer, dry material and requalify.
								Dewpoint meter	Each unit	Monthly	Monthly PM	
0060	Set-Up Injection Molding Machine	Molding Machine	60		Set Machine Parameters		Process Parameters	Per Mold # Condition	Each Mold Set-up	Each Mold Set-up	Controller Check Sheet, Set-Up Operator Check Sheet	Notify Leader / Coordinator
	Safety Checks				Safety Checks		Complete Safety Checks	Per Mold # Condition	Each Mold Set-up	Each Mold Set-up	Setup Operator Checksheet	Notify Leader / Coordinator
	Correct Mold	Mold			Correct Mold		Per Shop Order	Visual per Shop Order	Each Mold Set-up	Each Mold Set-up	Setup Operator Checksheet	Notify Leader / Coordinator

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
	Add Regrind Material to Virgin Material	Regrind Material (when applicable)			Add Regrind Material to Virgin Material		Set Mix Ratio per Mold # Condition Sheet.	Per Mold # Condition	Each Mold Start-up	Each Mold Start-up	Operator Daily Checksheet	Notify Leader / Coordinator
	Automatic Machine Reject	Machine			Automatic Machine Reject		First 8 Shots for Molding Machines	Per Restart Verification Procedure Work Instruction & Machine Automatic Count Setting	Each Mold Start-up	Each Mold Start-up	Controller Check Sheet	Notify Leader / Coordinator
	Set-up Validation				Set-up Inspection		No Weld Line, Short Shot, Broken Mold Pin Damage, Excessive flash	Per Critical Check Sheet / Applicable Work Instruction	10 Shots	Each Mold Start-up	Process Sheet	Notify Leader / Coordinator
	Engineering Validation				Validation of injection function process		Engineering validation of any change to machine injection function (barrel/screw/ nozzle type / etc)	Per QAW - ROBUSTTEST	20 shots	Each change	QAF-RobustTest	Notify QA Leader, Coordinator / Above
	Start Up Samples				Collect QA Start-up Samples		One shot	Per GA-003	One shot	Each Mold Start-up	GA-003, QA Inspection Data Sheet.	Notify Leader / Coordinator
	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Caliper, Keyence, Micrometer, Force Gage, Mating Parts, Vario us jigs as required	60	Connector Visual, Fit & Function	Quality Assurance Inspection	C (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checks Per QAW - GA003	Q.A. Inspection Instruction Sheet, Data Sheets, Electronic Data Entry	Notify Leader, Coordinator / Above Manufacturing Coordinator
				Dimensional		C, C# (IC, SWS)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checksPer QAW - GA003		Reject Tag Procedure **QA Hold Procedure**
0070	Mass Production Inj. Molding	Mold, Machine	70	Molded Parts	Mass Production Inj. Molding		Per Mold Condition Sheet	Visual	Each Lot	Each lot	Process Sheet	Notify Leader / Coordinator
	Operator Inspection			Molded Parts	Operator Inspection		Per Critical Position Checksheet	Visual	1 shot per lot	Each lot	Process Sheet	Notify Leader / Coordinator / Q.A. Leader / Above
	Inline Inspection			Molded Parts	100% Roving Inspection		No Short Shot, Weld Line, Flash, Damage, Broken pin or other defects	Visual per Critical Position Checksheet and / or applicable Work Instruction	1 shot per machine	Roving Floor Patrol	Process Sheet	Notify Coordinator / Leader, QA Leader. Follow Reject Tag Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0080	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Caliper, Keyence, Micrometer, Force Gage, Mating Parts, Vario us jigs as required	80	Connector Visual, Fit & Function	Quality Assurance Inspection	C (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003	Q.A. Inspection Instruction Sheet, Data Sheets, Electronic Data Entry	Notify QA Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure **QA Hold Procedure**
				Dimensional		C, C# (IC, SWS)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003		
	Material Staging for 100% Inspection (Where Applicable)	Cart		Molded Parts	Material Staging for 100% Inspection		Correct Location	Visual	Each Container	As needed / required	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	100% Internal Inspection (When Applicable)	Under Light		Molded Parts	100% Inspection		No Short Shot No Excessive Flash No defects	Visual, Per Critical Position Checksheet / Applicable work instruction	Each piece per Lot	As needed / required	CPC / Daily Inspection Log	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure **QA Hold Procedure**
0090	Automatic / Manual Bulk Packaging / Labeling	Weigh Scale	90	Molded Parts	Setup Packing Scale		Setup Scale	Set up scale per M1W-SCALESETUP	Per W/I	Each SOP, Each new Shop Order	Record confimation on Changeover Checksheet	Notify Manufacturing Coordinator
	Automatic Bulk Packaging / Labeling	Weigh Scale, Label Printer, Scanner		Molded Parts	Automatic Bulk Packaging		Correct Number of Parts, No mixed parts	Automatic Machine Count, verify correct weight/quantity	Each Container	Each bag	Electronic Scanning System, Packing Log	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	Manual Packing / Labeling	Weigh Scale		Molded Parts	Setup Packing Scale		Setup Scale	Set up scale per W/I M1W-SCALE SETUP MAN PACK	Per W/I	Each SOP, Each new Shop Order	Record confimation on Changeover Checksheet	Notify Manufacturing Coordinator
	Manual Packing / Labeling	Weigh Scale, Label Printer, Scanner		Molded Parts	Manual Bulk Packaging		Correct Number of Parts, No mixed parts	Verify correct weight/quantity	Each Container	Each bag	Electronic Scanning System, Packing Log, **Connector ID Sheet**.	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0100	Packaging & Labeling at Machine	Traveller label, Boxes, Plastic Bags	100	Molded Parts	Packaging & Labeling at Machine		Per shop Order	Visual	Each container	As Needed	Process Sheet, Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	Material Staging (Parts not going to Packing Process	Cart		Molded Parts	Material Staging for Non-Bulk Packing / Labeling		Correct staging location	Visual per Location	Each Container	As Needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
0110	Transfer packaged parts to storage	Fork Truck / Cart	110	Molded Finished Product	Transfer packaged parts to storage		Correct Location	Electronic Scanning System	Each container	As needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
0120	Finished Goods Storage.	Material Racks		Molded Finished Product	Finished Goods Storage **(SCOTTSVILLE SVW)**		Correct Location	Electronic Scanning System	Each container	As needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
0130	Finished Goods Inventory Assessment		130	Correct Inventory Quantities	Inventory **(SCOTTSVILLE SVW)**		Correct Quantities	Inventory Assessment	As needed	As needed	Electronic Scanning System, Inventory	Notify PC Management
				Correct Packing	Product Audit (QA) **(SCOTTSVILLE SVW)**		Confirm Packing, Damage	Visual Evaluation	Sample of FG Inventory	Weekly	SQA Inventory Audit - SV6	Notify Leader, Coordinator / Above Reject Tag Procedure **QA Hold Procedure**
0140	Shipping Product Audit (S/R)		140	Finished Product Audit	Product Audit **(SCOTTSVILLE SVW)**		No box damage, Skid correctly stacked Labels attached, Correct Label content	Visual Evaluation	Sample of FG Inventory	Weekly	Warehouse Stock Assessment Checklist	Notify Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0150	Shipping Finished Goods	Fork truck	150	All Finished Goods	Shipping Finished Goods **(SCOTTSVILLE SVW)**		Correct Quantity / Labels, Skid correctly stacked, Correct P.O. number, Correct Carrier	Electronic Scanning System, Visual	Each container	As needed	Electronic Scanning System	Notify Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
	Annual Layouts			Per Customer Drawing	**(SCOTTSVILLE SV5)**		Per Customer Drawing	Per Customer Requirements	Per Customer Request	Per Customer Request	Customer PPAP	Notify QA Engineer/QA Manager

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M25	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M26	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
1	15.44	16.85				15.42	16.87		
2	15.44	16.86				15.42	16.86		
3	15.43	16.84				15.42	16.86		
4	15.44	16.86				15.42	16.87		
5	15.45	16.85				15.43	16.87		
6	15.44	16.85				15.42	16.87		
7	15.44	16.85				15.42	16.87		
8	15.44	16.84				15.43	16.87		
9	15.45	16.84				15.42	16.87		
10	15.43	16.84				15.43	16.88		
11	15.44	16.85				15.42	16.87		
12	15.43	16.84				15.43	16.86		
13	15.44	16.85				15.42	16.87		
14	15.44	16.85				15.42	16.87		
15	15.44	16.85				15.42	16.87		
16	15.44	16.85				15.44	16.87		
17	15.43	16.85				15.42	16.87		
18	15.45	16.85				15.42	16.87		
19	15.45	16.86				15.43	16.87		
20	15.43	16.84				15.41	16.87		
21	15.44	16.84				15.41	16.86		
22	15.44	16.85				15.43	16.87		
23	15.44	16.85				15.42	16.87		
24	15.44	16.86				15.43	16.87		
25	15.45	16.86				15.42	16.87		
26	15.45	16.86				15.42	16.87		
27	15.44	16.85				15.42	16.87		
28	15.44	16.85				15.42	16.87		
29	15.45	16.86				15.42	16.87		
30	15.44	16.85				15.42	16.87		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M25	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M26	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
31	15.42	16.85				15.42	16.87		
32	15.44	16.86				15.43	16.87		
33	15.43	16.85				15.42	16.87		
34	15.43	16.85				15.43	16.87		
35	15.44	16.85				15.42	16.87		
36	15.44	16.85				15.43	16.86		
37	15.44	16.86				15.43	16.88		
38	15.45	16.85				15.43	16.87		
39	15.44	16.86				15.43	16.87		
40	15.43	16.84				15.45	16.87		
41	15.42	16.85				15.43	16.87		
42	15.44	16.85				15.43	16.87		
43	15.44	16.86				15.42	16.87		
44	15.44	16.85				15.43	16.87		
45	15.43	16.84				15.41	16.87		
46	15.44	16.85				15.42	16.87		
47	15.45	16.85				15.42	16.87		
48	15.44	16.85				15.43	16.87		
49	15.45	16.86				15.43	16.87		
50	15.43	16.85				15.44	16.88		
51	15.44	16.84				15.42	16.87		
52	15.44	16.85				15.42	16.87		
53	15.43	16.85				15.42	16.87		
54	15.45	16.86				15.42	16.87		
55	15.43	16.84				15.43	16.87		
56	15.44	16.85				15.42	16.88		
57	15.44	16.85				15.42	16.87		
58	15.44	16.85				15.43	16.87		
59	15.44	16.85				15.41	16.87		
60	15.45	16.86				15.42	16.87		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △A 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M25	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M26	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
61	15.44	16.85				15.42	16.87		
62	15.44	16.85				15.42	16.88		
63	15.44	16.85				15.42	16.87		
64	15.45	16.86				15.42	16.87		
65	15.44	16.86				15.42	16.86		
66	15.44	16.85				15.42	16.87		
67	15.45	16.85				15.42	16.87		
68	15.45	16.85				15.42	16.87		
69	15.43	16.85				15.42	16.86		
70	15.43	16.85				15.42	16.86		
71	15.44	16.85				15.42	16.87		
72	15.44	16.85				15.42	16.86		
73	15.44	16.85				15.42	16.87		
74	15.45	16.85				15.42	16.87		
75	15.44	16.85				15.43	16.87		
76	15.45	16.85				15.42	16.87		
77	15.43	16.84				15.42	16.86		
78	15.44	16.84				15.42	16.87		
79	15.44	16.85				15.43	16.87		
80	15.45	16.86				15.41	16.86		
81	15.45	16.87				15.42	16.87		
82	15.42	16.84				15.42	16.87		
83	15.45	16.86				15.42	16.87		
84	15.45	16.85				15.42	16.87		
85	15.44	16.85				15.43	16.88		
86	15.45	16.85				15.41	16.86		
87	15.46	16.86				15.43	16.87		
88	15.45	16.85				15.42	16.87		
89	15.46	16.86				15.41	16.86		
90	15.44	16.85				15.42	16.87		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △A 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M25	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M26	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
91	15.44	16.85				15.41	16.87		
92	15.43	16.84				15.41	16.87		
93	15.44	16.85				15.42	16.87		
94	15.43	16.85				15.42	16.86		
95	15.45	16.85				15.42	16.87		
96	15.44	16.84				15.43	16.87		
97	15.42	16.85				15.42	16.86		
98	15.45	16.86				15.42	16.87		
99	15.44	16.85				15.43	16.87		
100	15.42	16.84				15.44	16.88		

average	15.44	16.85	15.42	16.87
minimum	15.42	16.84	15.41	16.86
maximum	15.46	16.87	15.45	16.88
range	0.03	0.03	0.04	0.03
std dev	0.01	0.01	0.01	0.00
LSL	15.10	16.60	15.10	16.60
NOM	15.40	16.90	15.40	16.90
USL	15.70	17.20	15.70	17.20
CPK	11.512536	15.1685055	14.91064294	21.52692005

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M27	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M28	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
1	15.42	16.84				15.42	16.86		
2	15.43	16.84				15.45	16.86		
3	15.42	16.84				15.42	16.86		
4	15.42	16.84				15.44	16.86		
5	15.42	16.84				15.44	16.85		
6	15.41	16.85				15.44	16.86		
7	15.42	16.84				15.44	16.86		
8	15.41	16.84				15.43	16.86		
9	15.42	16.84				15.42	16.86		
10	15.42	16.84				15.42	16.85		
11	15.41	16.84				15.44	16.86		
12	15.43	16.84				15.44	16.86		
13	15.43	16.85				15.44	16.86		
14	15.42	16.85				15.45	16.86		
15	15.42	16.84				15.45	16.86		
16	15.42	16.84				15.45	16.86		
17	15.42	16.84				15.44	16.87		
18	15.43	16.84				15.44	16.85		
19	15.42	16.84				15.45	16.86		
20	15.42	16.84				15.44	16.87		
21	15.42	16.85				15.44	16.87		
22	15.42	16.84				15.44	16.86		
23	15.42	16.84				15.43	16.86		
24	15.42	16.85				15.45	16.86		
25	15.43	16.84				15.45	16.86		
26	15.42	16.84				15.44	16.87		
27	15.42	16.84				15.44	16.87		
28	15.41	16.84				15.45	16.86		
29	15.43	16.85				15.44	16.86		
30	15.42	16.84				15.43	16.85		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M27	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M28	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
31	15.42	16.84				15.45	16.86		
32	15.42	16.84				15.43	16.86		
33	15.42	16.84				15.44	16.86		
34	15.43	16.85				15.44	16.86		
35	15.43	16.84				15.43	16.85		
36	15.42	16.84				15.44	16.86		
37	15.43	16.85				15.44	16.85		
38	15.44	16.86				15.44	16.86		
39	15.42	16.84				15.44	16.86		
40	15.43	16.85				15.43	16.85		
41	15.42	16.84				15.44	16.85		
42	15.42	16.85				15.45	16.86		
43	15.42	16.84				15.44	16.86		
44	15.42	16.84				15.44	16.87		
45	15.43	16.85				15.45	16.86		
46	15.42	16.84				15.43	16.86		
47	15.42	16.85				15.43	16.85		
48	15.42	16.85				15.46	16.87		
49	15.42	16.84				15.44	16.86		
50	15.42	16.84				15.44	16.86		
51	15.42	16.84				15.43	16.86		
52	15.43	16.84				15.45	16.86		
53	15.42	16.85				15.44	16.86		
54	15.43	16.85				15.44	16.86		
55	15.43	16.85				15.44	16.86		
56	15.43	16.85				15.44	16.86		
57	15.42	16.84				15.44	16.86		
58	15.43	16.85				15.45	16.86		
59	15.43	16.84				15.44	16.87		
60	15.42	16.84				15.44	16.86		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #↓

M27	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M28	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
61	15.41	16.84				15.45	16.86		
62	15.43	16.85				15.45	16.86		
63	15.42	16.84				15.44	16.86		
64	15.42	16.84				15.44	16.86		
65	15.43	16.84				15.44	16.86		
66	15.43	16.84				15.45	16.86		
67	15.43	16.85				15.44	16.86		
68	15.42	16.84				15.43	16.85		
69	15.42	16.84				15.42	16.85		
70	15.42	16.84				15.44	16.86		
71	15.43	16.85				15.44	16.86		
72	15.42	16.85				15.44	16.86		
73	15.42	16.85				15.45	16.86		
74	15.43	16.85				15.43	16.86		
75	15.41	16.84				15.43	16.86		
76	15.43	16.84				15.44	16.86		
77	15.42	16.85				15.44	16.86		
78	15.42	16.84				15.44	16.86		
79	15.42	16.84				15.45	16.86		
80	15.41	16.84				15.44	16.86		
81	15.42	16.84				15.45	16.87		
82	15.42	16.84				15.43	16.86		
83	15.42	16.84				15.42	16.85		
84	15.42	16.84				15.45	16.87		
85	15.42	16.84				15.43	16.86		
86	15.42	16.84				15.44	16.86		
87	15.42	16.84				15.45	16.86		
88	15.42	16.84				15.44	16.86		
89	15.41	16.84				15.44	16.85		
90	15.42	16.85				15.43	16.86		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #↓

M27	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M28	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
91	15.42	16.84				15.44	16.86		
92	15.42	16.85				15.43	16.86		
93	15.42	16.84				15.44	16.86		
94	15.42	16.84				15.43	16.86		
95	15.43	16.85				15.44	16.86		
96	15.42	16.85				15.44	16.86		
97	15.42	16.84				15.44	16.86		
98	15.42	16.85				15.45	16.86		
99	15.42	16.84				15.43	16.85		
100	15.42	16.84				15.44	16.87		

average	15.42	16.84	15.44	16.86
minimum	15.41	16.84	15.42	16.85
maximum	15.44	16.86	15.46	16.88
range	0.03	0.02	0.04	0.03
std dev	0.01	0.00	0.01	0.00
LSL	15.10	16.60	15.10	16.60
NOM	15.40	16.90	15.40	16.90
USL	15.70	17.20	15.70	17.20
CPK	17.92549589	19.58182407	11.52229845	17.72340172

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB (4) 11/9/2016
Eng. Change Documents: NA

CAVITY #

M29	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M30	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
1	15.44	16.86				15.41	16.84		
2	15.42	16.85				15.42	16.84		
3	15.45	16.86				15.43	16.85		
4	15.42	16.85				15.42	16.84		
5	15.43	16.85				15.43	16.84		
6	15.44	16.86				15.43	16.84		
7	15.45	16.87				15.42	16.84		
8	15.44	16.86				15.43	16.85		
9	15.43	16.86				15.43	16.85		
10	15.44	16.86				15.43	16.84		
11	15.44	16.86				15.43	16.85		
12	15.45	16.87				15.43	16.85		
13	15.44	16.85				15.42	16.84		
14	15.44	16.86				15.43	16.84		
15	15.44	16.86				15.42	16.84		
16	15.43	16.87				15.42	16.84		
17	15.43	16.86				15.43	16.84		
18	15.43	16.86				15.43	16.84		
19	15.44	16.86				15.42	16.84		
20	15.44	16.86				15.43	16.85		
21	15.42	16.84				15.42	16.84		
22	15.43	16.85				15.43	16.85		
23	15.44	16.86				15.42	16.84		
24	15.44	16.87				15.42	16.84		
25	15.44	16.86				15.43	16.83		
26	15.43	16.86				15.44	16.84		
27	15.44	16.86				15.43	16.84		
28	15.44	16.86				15.42	16.84		
29	15.43	16.86				15.42	16.84		
30	15.45	16.86				15.43	16.85		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB (4) 11/9/2016
Eng. Change Documents: NA

CAVITY #

M29	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M30	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
31	15.44	16.86				15.43	16.84		
32	15.44	16.86				15.42	16.85		
33	15.45	16.86				15.43	16.84		
34	15.44	16.86				15.43	16.84		
35	15.44	16.85				15.42	16.84		
36	15.43	16.86				15.43	16.85		
37	15.42	16.85				15.42	16.84		
38	15.44	16.86				15.42	16.84		
39	15.44	16.86				15.43	16.84		
40	15.44	16.87				15.42	16.84		
41	15.42	16.86				15.43	16.85		
42	15.43	16.86				15.45	16.86		
43	15.45	16.86				15.43	16.84		
44	15.43	16.84				15.43	16.85		
45	15.44	16.86				15.42	16.84		
46	15.44	16.86				15.43	16.84		
47	15.42	16.86				15.43	16.84		
48	15.43	16.86				15.43	16.84		
49	15.43	16.85				15.43	16.85		
50	15.45	16.86				15.42	16.84		
51	15.44	16.86				15.43	16.85		
52	15.43	16.86				15.42	16.84		
53	15.43	16.86				15.42	16.84		
54	15.44	16.86				15.42	16.85		
55	15.44	16.86				15.45	16.85		
56	15.44	16.86				15.42	16.84		
57	15.42	16.85				15.42	16.84		
58	15.44	16.86				15.43	16.85		
59	15.44	16.85				15.43	16.85		
60	15.44	16.86				15.43	16.84		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M29	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M30	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
61	15.44	16.85				15.42	16.85		
62	15.43	16.85				15.43	16.85		
63	15.43	16.86				15.43	16.85		
64	15.44	16.86				15.43	16.84		
65	15.43	16.85				15.43	16.84		
66	15.44	16.85				15.45	16.85		
67	15.44	16.86				15.43	16.84		
68	15.44	16.85				15.43	16.84		
69	15.42	16.85				15.43	16.84		
70	15.43	16.85				15.43	16.84		
71	15.43	16.85				15.43	16.84		
72	15.44	16.86				15.42	16.84		
73	15.43	16.86				15.44	16.85		
74	15.42	16.85				15.42	16.84		
75	15.45	16.87				15.42	16.84		
76	15.44	16.85				15.43	16.85		
77	15.44	16.86				15.42	16.84		
78	15.43	16.85				15.43	16.85		
79	15.43	16.86				15.42	16.84		
80	15.44	16.86				15.42	16.84		
81	15.42	16.85				15.43	16.84		
82	15.44	16.86				15.42	16.84		
83	15.44	16.86				15.43	16.85		
84	15.44	16.86				15.43	16.85		
85	15.43	16.86				15.43	16.84		
86	15.43	16.85				15.43	16.85		
87	15.43	16.85				15.41	16.83		
88	15.42	16.85				15.45	16.86		
89	15.44	16.86				15.43	16.84		
90	15.44	16.86				15.42	16.84		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M29	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M30	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
91	15.44	16.86				15.43	16.84		
92	15.44	16.85				15.43	16.84		
93	15.43	16.86				15.43	16.84		
94	15.44	16.86				15.42	16.84		
95	15.43	16.85				15.43	16.85		
96	15.43	16.86				15.43	16.85		
97	15.42	16.85				15.42	16.84		
98	15.44	16.86				15.43	16.84		
99	15.44	16.86				15.43	16.84		
100	15.43	16.85				15.43	16.85		

average	15.44	16.86	15.43	16.84
minimum	15.42	16.84	15.41	16.83
maximum	15.45	16.87	15.45	16.86
range	0.03	0.03	0.04	0.03
std dev	0.01	0.01	0.01	0.00
LSL	15.10	16.60	15.10	16.60
NOM	15.40	16.90	15.40	16.90
USL	15.70	17.20	15.70	17.20
CPK	12.05346092	15.51974005	13.8980166	18.9331559

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △A 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M31	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M32	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
1	15.43	16.85				15.42	16.84		
2	15.42	16.85				15.43	16.85		
3	15.44	16.85				15.42	16.84		
4	15.43	16.85				15.44	16.86		
5	15.43	16.85				15.42	16.84		
6	15.43	16.85				15.44	16.85		
7	15.43	16.85				15.44	16.85		
8	15.43	16.85				15.42	16.85		
9	15.43	16.84				15.43	16.85		
10	15.43	16.85				15.43	16.85		
11	15.43	16.85				15.43	16.85		
12	15.42	16.85				15.43	16.86		
13	15.42	16.84				15.42	16.84		
14	15.45	16.86				15.43	16.85		
15	15.42	16.84				15.44	16.85		
16	15.43	16.85				15.44	16.85		
17	15.42	16.84				15.43	16.85		
18	15.42	16.84				15.44	16.86		
19	15.43	16.85				15.42	16.84		
20	15.43	16.84				15.43	16.85		
21	15.42	16.84				15.44	16.85		
22	15.43	16.84				15.45	16.85		
23	15.43	16.84				15.44	16.85		
24	15.43	16.85				15.42	16.85		
25	15.44	16.85				15.43	16.85		
26	15.43	16.84				15.43	16.85		
27	15.43	16.85				15.45	16.86		
28	15.43	16.85				15.44	16.85		
29	15.43	16.85				15.44	16.85		
30	15.44	16.85				15.42	16.84		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB △A 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M31	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M32	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
31	15.43	16.84				15.44	16.85		
32	15.43	16.85				15.42	16.84		
33	15.44	16.86				15.43	16.85		
34	15.42	16.84				15.45	16.85		
35	15.42	16.84				15.43	16.85		
36	15.43	16.84				15.44	16.85		
37	15.43	16.85				15.44	16.86		
38	15.43	16.84				15.43	16.85		
39	15.43	16.85				15.44	16.85		
40	15.43	16.85				15.43	16.83		
41	15.43	16.85				15.43	16.85		
42	15.42	16.85				15.45	16.86		
43	15.43	16.85				15.44	16.85		
44	15.42	16.85				15.44	16.86		
45	15.43	16.85				15.42	16.85		
46	15.42	16.85				15.43	16.85		
47	15.44	16.85				15.44	16.85		
48	15.43	16.84				15.43	16.85		
49	15.42	16.84				15.43	16.85		
50	15.42	16.84				15.42	16.84		
51	15.42	16.85				15.45	16.86		
52	15.43	16.84				15.43	16.84		
53	15.43	16.84				15.44	16.85		
54	15.43	16.85				15.43	16.85		
55	15.44	16.85				15.44	16.85		
56	15.43	16.85				15.44	16.84		
57	15.42	16.84				15.44	16.85		
58	15.43	16.85				15.44	16.85		
59	15.42	16.84				15.43	16.84		
60	15.42	16.84				15.44	16.85		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB ⚠4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M31	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M32	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
61	15.43	16.85				15.43	16.85		
62	15.42	16.84				15.45	16.86		
63	15.42	16.84				15.43	16.85		
64	15.42	16.84				15.43	16.85		
65	15.42	16.85				15.43	16.85		
66	15.43	16.85				15.43	16.85		
67	15.42	16.84				15.43	16.85		
68	15.42	16.84				15.43	16.85		
69	15.42	16.83				15.43	16.84		
70	15.43	16.84				15.43	16.85		
71	15.44	16.85				15.42	16.84		
72	15.42	16.84				15.43	16.84		
73	15.43	16.85				15.44	16.85		
74	15.43	16.85				15.42	16.85		
75	15.43	16.85				15.44	16.85		
76	15.42	16.84				15.44	16.85		
77	15.44	16.85				15.42	16.84		
78	15.43	16.85				15.44	16.85		
79	15.42	16.84				15.43	16.85		
80	15.43	16.85				15.43	16.84		
81	15.42	16.84				15.43	16.85		
82	15.43	16.85				15.43	16.85		
83	15.42	16.84				15.44	16.86		
84	15.43	16.85				15.42	16.84		
85	15.42	16.85				15.45	16.86		
86	15.43	16.85				15.44	16.85		
87	15.42	16.85				15.44	16.85		
88	15.43	16.84				15.44	16.85		
89	15.42	16.84				15.45	16.86		
90	15.43	16.85				15.43	16.85		

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/7/18
Design Rec. Change level/date:
EU5T-14A464-TB ⚠4 11/9/2016
Eng. Change Documents: NA

CAVITY #:

M31	15.40 +0.30 -0.30	16.90 +0.30 -0.30			M32	15.40 +0.30 -0.30	16.90 +0.30 -0.30		
91	15.43	16.85				15.42	16.84		
92	15.43	16.84				15.42	16.84		
93	15.42	16.85				15.43	16.85		
94	15.41	16.83				15.43	16.85		
95	15.42	16.85				15.45	16.86		
96	15.42	16.84				15.43	16.85		
97	15.43	16.85				15.44	16.85		
98	15.43	16.85				15.44	16.85		
99	15.43	16.85				15.44	16.85		
100	15.43	16.85				15.45	16.85		

average	15.43	16.85	15.43	16.85
minimum	15.41	16.83	15.42	16.83
maximum	15.45	16.86	15.45	16.86
range	0.04	0.02	0.03	0.03
std dev	0.01	0.00	0.01	0.01
LSL	15.10	16.60	15.10	16.60
NOM	15.40	16.90	15.40	16.90
USL	15.70	17.20	15.70	17.20
CPK	14.59659997	20.11310786	11.60700083	15.95754685

TERMINAL TO HOUSING INSERTION FORCE DATA

Specification: 30 N Max

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/12/18
Design Rec. Change level/date:
EU5T-14S464-TB △4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25			M26			M27			M28			M29			M30			M31			M32			
1	5.6	4.6		6.7	4.7		4.4	5.4		5.3	5.4		6.3	6.2		6.9	5.8		5.4	8.1		5.4	6.3		
2	4.1	5.7		6.2	4.4		4.3	5.3		5.4	6.6		5.7	4.9		6.8	6.7		5.5	7.3		6.3	7.8		
3	4.4	5.9		8.3	6.6		6.5	5.5		6.7	7.1		5.4	5.5		6.3	6.3		5.5	5.9		5.6	5.2		
4	4.3	5.1		5.4	6.2		8.1	8.2		6.8	8.3		5.5	7.2		5.9	7.2		6.3	6.4		4.9	4.4		
5	4.4	4.8		6.2	8.1		5.7	6.9		9.1	6.1		5.4	7.1		5.4	6.6		6.7	5.7		5.7	8.7		

AVERAGE 6.1
MIN 4.1
MAX 9.1

TERMINAL TO HOUSING RETENTION FORCE DATA

Specification: 60 N MIN

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FA-B
PART NO (s): 6189-7456, 6189-7673
Mold #: 1714-A

Tested by/Date: Mary Jo Mackin 6/12/18
Design Rec. Change level/date:
EU5T-14S464-TB △L4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25			M26			M27			M28			M29			M30			M31			M32			
1	80.0	78.1		76.4	73.6		77.2	79.3		76.3	74.2		74.6	79.3		72.6	78.2		76.6	74.4		74.2	80.0		
2	77.6	78.8		75.3	78.4		78.3	77.6		75.7	76.3		77.8	76.4		73.9	73.1		77.7	74.2		74.6	72.6		
3	76.7	76.7		77.1	75.0		80.1	79.2		76.3	76.7		79.2	73.4		75.3	76.9		78.1	74.4		75.5	77.0		
4	74.3	77.3		80.3	76.9		80.6	74.3		72.8	78.2		80.3	75.6		76.4	76.6		80.8	74.4		72.1	76.3		
5	76.8	79.2		74.0	77.2		79.5	72.6		74.3	72.9		81.2	76.1		76.4	75.4		76.3	72.6		80.1	74.0		

AVERAGE 76.5
MIN 72.1
MAX 81.2

CONNECTOR INSERTION FORCE DATA WITH TERMINALS AND LOCK

Specification: **45 N Max**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FOW120A02FA-B**
PART NO (s): **6189-7456, 6189-7673**
Mold #: **1714-A**

Tested by/Date: Mary Jo Mackin 6/12/18
Design Rec. Change level/date:
EU5T-14S464-TB △4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32								
1	9.8	10.8	14.3	10.2	12.3	12.1	9.5	12.3								
2	10.2	10.7	14.7	12.3	11.4	11.4	9.8	11.9								
3	9.7	9.9	12.2	11.2	13.6	13.2	10.2	10.4								
4	12.4	12.3	10.0	9.8	14.7	9.8	9.7	12.8								
5	10.2	15.4	9.9	12.6	13.8	9.7	9.6	13.6								

AVERAGE 11.5
MIN 9.5
MAX 15.4

CONNECTOR EXTRACTION FORCE DATA WITH TERMINALS NO LOCK

Specification: **75 N Max**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FOW120A02FA-B**
PART NO (s): **6189-7456, 6189-7673**
Mold #: **1714-A**

Tested by/Date: Mary Jo Mackin 6/12/18
Design Rec. Change level/date:
EU5T-14S464-TB △L4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32								
1	8.7	9.7	6.2	9.6	8.7	10.9	11.4	9.4								
2	8.9	8.8	7.6	10.2	7.6	8.2	12.6	10.7								
3	9.3	10.3	8.6	12.4	9.2	8.4	11.0	12.3								
4	10.2	12.7	8.3	13.2	10.6	9.8	9.4	8.6								
5	8.6	9.4	9.4	9.3	9.4	10.3	9.0	9.9								

AVERAGE 9.8
MIN 7.6
MAX 13.2

RETAINER TO HOUSING INSERTION FORCE DATA

Specification: **60 N MAX**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FOW120A02FA-B**
PART NO (s): **6189-7456, 6189-7673**
Mold #: **1714-A**

Tested by/Date: Mary Jo Mackin 6/11/18
Design Rec. Change level/date:
EU5T-14S464-TB △L4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32								
1	36.4	36.4	38.4	37.0	36.7	36.8	33.4	34.9								
2	36.4	35.3	39.5	39.4	36.4	36.7	34.6	40.0								
3	40.4	39.7	39.6	33.5	39.0	40.1	34.5	37.6								
4	39.4	33.7	38.6	38.4	36.8	40.3	38.4	38.4								
5	33.8	37.8	38.7	34.0	34.7	38.7	36.8	33.9								

AVERAGE 37.1
MIN 33.4
MAX 40.4

RETAINER TO HOUSING RETENTION FORCE DATA

Specification: **60 N MAX**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FOW120A02FA-B**
PART NO (s): **6189-7456, 6189-7673**
Mold #: **1714-A**

Tested by/Date: Mary Jo Mackin 6/22/18
Design Rec. Change level/date:
EU5T-14S464-TB 4 11/9/16
Eng. Change Documents: NA

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32						
1	31.3	34.5	34.9	30.9	32.1	30.0	30.2	36.2						
2	32.8	34.3	30.7	33.0	29.3	33.6	30.9	34.3						
3	33.3	33.8	31.6	34.5	30.4	32.1	33.4	35.5						
4	35.0	31.5	36.3	34.6	32.8	29.3	31.8	34.8						
5	32.1	33.7	31.5	35.4	33.6	34.9	32.5	32.5						

AVERAGE 32.9
MIN 29.3
MAX 36.3

CPA TO HOUSING INSERTION FORCE DATA

Specification: **See Below**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FOW120A02FA-B**
PART NO (s): **applicable only to 6189-7673**
Mold #: **1714-A**

Tested by/Date: Mary Jo Mackin 6/11/18
Design Rec. Change level/date:
EU5T-14S464-TB L4 11/9/16
Eng. Change Documents: NA

Insertion With Connectors Mated 22 N Max

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32
1	16.2	18.5	20.4	15.7	18.7	19.4	20.4	18.3
2	18.4	18.3	18.6	16.9	17.3	19.2	18.3	19.4
3	16.7	16.7	19.4	19.4	18.4	18.7	19.0	20.4
4	17.2	19.2	17.3	20.6	16.3	16.8	17.6	17.3
5	16.5	18.6	15.2	21.1	18.4	20.5	16.9	16.7

AVERAGE 18.2
MIN 15.2
MAX 21.1

Retention With Connectors Mated 10 - 30 N

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32
1	14.6	14.6	15.3	13.7	14.9	15.6	12.9	12.9
2	14.3	18.3	13.2	16.3	14.3	15.2	13.4	16.4
3	14.8	18.1	12.8	18.5	14.8	16.3	16.9	15.2
4	13.4	14.6	15.0	13.5	14.7	16.7	16.4	18.1
5	16.4	14.7	15.4	13.7	14.6	14.9	15.3	13.5

AVERAGE 15.1
MIN 12.8
MAX 18.5

WATERPROOF TESTING DATA

Specfication: 48 kPa

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
Tested by/Date: Mary Jo Mackin 6/12/18
PART Name/Desc: **FOW120A02FA-B**
Design Rec. Change level/date:
PART NO (s): **6189-7456, 6189-7673** EU5T-14S464-TB L4 11/9/16
Mold #: **1714-A**
Eng. Change Documents: NA

CAVITY # →	M25	M26	M27	M28	M29	M30	M31	M32								
1	59.0	61.0	63.0	62.0	64.0	58.0	60.0	59.0								
2	61.0	58.0	62.0	59.0	60.0	61.0	60.0	61.0								
3	61.0	63.0	64.0	59.0	58.0	59.0	63.0	58.0								
4	63.0	62.0	62.0	63.0	63.0	61.0	64.0	63.0								
5	64.0	59.0	58.0	60.0	59.0	58.0	59.0	63.0								

AVERAGE 60.9
MIN 58.0
MAX 64.0

Toray Resin Company

Material Safety Data Sheet

CREATED DATE: 05/28/2010
UPDATED DATE: 05/12/2014

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Toray PBT resin "Toraycon" 5108X01, 5108X01B, 5108X01TLGR2, 5108X01TBR4
MSDS Number: D3E-B0005-01

Name of Supplier: Toray Resin Company
Sales Department
Address: 340 East Big Beaver, Suite 120 Troy, MI 48083
Telephone Number: 248-269-8800
FAX Number: 248-269-8900
Technical Department
Address: 821-W. Mausoleum Road Shelbyville, IN 46176
Telephone Number: 317-398-7833
FAX Number: 317-392-9204

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Polytetramethylene terephthalate resin
Synonyms: Polybutylene terephthalate resin, PBT resin
Substance/Mixture: Mixture
Chemical Formula

Component	Chemical formula	CAS No.
Polytetramethylene terephthalate	-[O(CH2)4OCO(C6H4)CO]n-	26062-94-2
Elastomer	Confidential	Confidential

3. HAZARDS IDENTIFICATION

Emergency Overview:
- Pellets with slight or no odor
- Spilled material may create slipping hazard.
- Can burn in a fire / high temperature condition to produce dense toxic smoke.
- Molten material can cause severe thermal burns.
- Fumes produced at elevated temperatures can be toxic and/or irritating.

Adverse Human Health Effects:
Don't use this material for implant articles.

Environmental Effects:
There is not the environment influence that should be described.

Physical and Chemical Hazards:
Flammable

4. FIRST AID MEASURES

Inhalation:
Remove the victim from the contamination immediately to fresh air.
If the victim feels unwell, seek medical advice immediately. (Show the label if possible)

Skin contact:
If a person touches the molten polymer, cool the affected part with fresh water. Do not try to remove the polymer by force and see a doctor if the person got burnt.

Eye contact:
Gently rinse the affected eyes with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Ingestion:
Rinse mouth with water. Give the person one or two glasses of water. Try to get the victim to vomit by having the victim touch the back of their with a finger. If the victim feels unwell, seek medical advice immediately.

5. FIRE FIGHTING MEASURES

Extinguishing Media:
Use water mist, water jet, foam, dry powder, or Carbon dioxide (CO_2)

Specific Hazards with regard to Fire-Fighting Measures:
Do not breathe fumes.
The following toxic gases will be formed by the combustion;
Carbon monoxide.
Burning of this material produces a large amount of sooty smoke.
During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Specific Fire-Fighting Measures:
Apply the extinguishing media from a safe distance to cool and protect surrounding area.
Keep personnel removed from and upwind of fire.
Evacuate personnel to safe area.

Protection of Firefighters:
Firefighters should wear proper protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Measures for Handling Personnel:
Pellets on road or floor may cause a person to fall down.

Measures for environmental effects:
Do not wash away into waterway.
If pellets got released in environment, take adequate steps to prevent aquatic animals and birds dying from eating pellets.

Measures when handling spilled substances:
Sweep, scoop or vacuum, place them in a bag(s) (or an appropriate container(s)) and hold for waste disposal.

Preventive measures for secondary accident:
Shut off an all sources of ignition; no flares, smoking or flames in area.

7. HANDLING AND STORAGE

Handling:
Preventative measures;
Exposure control for handling personnel;
Do not smoke when handling.
Do not breathe dust.

Do not breathe gas, fumes.
Use this material only in the well-ventilated area.
Avoid using fire in the neighborhood.
Do not keep inhale the gas and fumes generated during molding.
Do not touch hot resin without protector.
Do not keep this material under high temperature condition for a long time.
Plastics pellets are easily electrified, so take countermeasures to eliminate static electricity if necessary.

Protective measures against fire and explosion;
Take the prevention measure to a mine dust explosion in the case that mine dust occurred by secondary processing.

Safety treatments;
Good general ventilation should be sufficient for most conditions.

Safety Measures/Incompatibility;
Protect against physical damage.
Do not drop onto, or slide across sharp objects.
Avoid rough handling or dropping.

Storage:

Recommendation for storage;
This material is flammable. Follow the local law and regulations of storage.

Incompatible storage condition;
Keep away from heat.
Keep away from sources of ignition – No smoking.
Separating it from a heat source, steam pipe, direct ray it stores in the cool place.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering measures:
When processing, partial ventilation is desirable to eliminate generated gas and dust.

Personal protective equipment:

Respiratory protection;
In case of insufficient ventilation, wear suitable respiratory equipment.
Against powder - dust: protective mask for dust.
Against gas from molten resin: protective mask for organic gas.

Hand protection;
Wear suitable gloves.

Eye protection;
Wear protective eyeglasses or chemical safety goggles.

Skin and body protection;
Wear suitable protective clothing.

Safety and Health measures:
Wash hands before breaks and at the end of work.
Do not eat, drink or smoke at work.

ADDITIONAL COMMENTS:
The greatest potential for injury occurs when working with molten PBT such as during a purge of a molding machine, extruder and the like. During this type of operation, it is essential that all workers in the immediate area wear eye and skin protection (safety glasses, long sleeves, gloves, etc.).

This product can give off fumes when heated. Fumes and fume condensates from this product can be irritating and/or toxic. When used at elevated temperatures, adequate protective systems and controls for irritating and/or toxic fumes should be provided to prevent contact and/or inhalation of fumes and/or with fume condensates. Proper protection against fumes and fume condensates include full-face mask or face shield and goggles, well insulated chemical gloves, and appropriate long sleeved clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical properties:

Appearance:	Solid pellets
Odor:	None
Phase change temperature:	
Boiling point:	None
Melting Point:	225°C
Flash point:	Not available
Ignition temperature:	> 400°C
Explosion:	Not available
Vapor pressure:	None
Vapor density:	None
Density:	1290 kg/m3

NOTE: These physical data are typical values on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Stability:
This product is considered a stable material under normal and anticipated storage and handling conditions.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:
N.A.

Effects on skin, eyes and others:
Gas generated during drying or molding is irritative to eyes.

Allergenic and/or sensitizing effects:
N.A.

Chronic and/or long term toxicity:
N.A.

Carcinogenic effects:
N.A.

Mutagenic effects:
N.A.

Teratogenic effects:
N.A.

12. ECOLOGICAL INFORMATION

Biodegradability:
N.A.

Bioaccumulation:
N.A.
Fish toxicity:
N.A.

13. DISPOSAL CONSIDERATION

Dispose to an authorized waste collection point.
Follow the federal, state, and local requirements of waste disposal and prevention against public nuisance.

14. TRANSPORT INFORMATION

Specific safety measures and conditions on transport:
Covering is necessary for shutting off sunlight and rain. Handle gently to avoid damaging bags/boxes. Caution for slipping by the scattered pellets.

15. REGULATORY INFORMATION

TSCA:
All components are listed.
SARA313:
If any components in this product are SARA313 listed as reportable, they are shown below. The quantities listed for elements represent typical or average values for compounds containing the element.

Component	CAS No.	%
No SARA313-listed chemicals in this product.		

16. OTHER INFORMATION

REASON FOR REVISION:

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

05/29/2018

Study Date: 6/2/2017 12:00:00 AM
Gage ID: 06381913
Gage Desc: 0 - 200 Caliper
Appraisers: 3 Trials: 3 Parts: 10
Study Type:
MSA Version: 4

Company Part No.: Mold 268
Part No.:
Part Desc: HW09-RET-06F
Characteristic: Length
Specification Limits: Min 19.6 Max 20.2
☑ Approved Pp (or Ppk) Target 6-Sigma Proc Variation

	Appr A: Tabitha Whitney			Appr B: Toni Robinson			Appr C: Eric Skaggs		
1	20.06	20.06	20.05	20.07	20.08	20.08	20.09	20.09	20.09
2	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03
3	19.65	19.64	19.65	19.64	19.64	19.64	19.65	19.65	19.65
4	20.05	20.04	20.05	20.08	20.08	20.08	20.08	20.08	20.08
5	19.76	19.77	19.76	19.74	19.75	19.75	19.77	19.77	19.77
6	20.04	20.04	20.03	20.05	20.04	20.05	20.05	20.05	20.05
7	20.03	20.02	20.02	20.05	20.06	20.08 *	20.09	20.09	20.09
8	19.64	19.65	19.65	19.6	19.59	19.6	19.64	19.64	19.64
9	20.06	20.07	20.08 *	20.06	20.06	20.05	20.07	20.07	20.07
10	19.63	19.64	19.65 *	19.64	19.63	19.65 *	19.65	19.65	19.65

	Std. Dev.	% Contribution	% TV	% Tol		
Repeatability (EV):	0.004136	0.1%	2.9%	4.1%	R bar:	0.007000
Reproducibility (AV):	0.008335	0.4%	5.9%	8.3%	UCL-R:	0.018060
Appraiser x Part (INT):					Study Variation:	0.140829
GRR:	0.009305	0.4%	6.6%	9.3%	Total Variation (TV):	0.140829
Part-to-Part (PV):	0.140521	99.6%	99.8%	99.6%	Tolerance/6 (Tol):	0.100000
number of distinct categories:			21.3	15.1		

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

Approved By: E Skaggs Date: 6/2/17

GRR Analysis Sheet

Study Date: 6/2/2017 12:00:00 AM
Gage ID: 06381913
Gage Desc: 0 - 200 Caliper
Appraisers: 3 Trials: 3
Study Type: Long-AIAG 4

Company Part No.: Mold 268
Part No.:
Part Desc: HW09-RET-06F
Characteristic: Length
Specification Limits: 19.6 20.2
6 Sigma Process Variation:
Pp (or Ppk) Target:

R bar A = 0.011000 X bar A = 19.896000
R bar B = 0.010000 X bar B = 19.897667
R bar C = 0.000000 X bar C = 19.912000
R bar = 0.0070000 X bar Diff = 0.016000

Rp = 0.446667 Tol/6 = 0.100000

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV) EV = R bar x K1 = 0.004136 Trials K1: 2 0.8862; 3 0.5908	% EV = 100 [EV / TV] = 2.9%	% EV = 100 [EV / (Tol / 6)] = 4.1%
Reproducibility - Appraiser Variation (AV) AV = √[(X bar Diff x K2)^2 - (EV^2 / n x r)] = 0.008335 Appraisers 2 3; K2 0.7071 0.5231 Note: If a negative value is calculated under the square root sign, AV defaults to zero. n = number of parts; r = number of trials	% AV = 100 [AV / TV] = 5.9%	% AV = 100 [AV / (Tol / 6)] = 8.3%
Repeatability and Reproducibility (GRR) GRR = √(EV^2 + AV^2) = 0.009305	%GRR = 100 [GRR / TV] = 6.6%	% GRR = 100 [GRR / (Tol / 6)] = 9.3%
Part Variation (PV) PV = Rp x K3 = 0.140521 Parts K3: 2 0.7071; 3 0.5231; 4 0.4467; 5 0.4030; 6 0.3742; 7 0.3534; 8 0.3375; 9 0.3249; 10 0.3146	% PV = 100 [PV / TV] = 99.8%	% PV = 100 [PV / (Tol / 6)] = 99.6%
	In MSA4, for % Tolerance, PV = SQRT [(Tol / 6)^2 - (GRR)^2]	
	ndc = 1.41(PV/GRR) = 21.3	ndc = 1.41(PV/GRR) = 15.1
Total Variation (TV) TV = √(GRR^2 + PV^2) = 0.140829	If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].	

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

11/2/2016

Study Date 11/2/2016
Gage ID 329079
Gage Desc Force Gage
Appraisers 3 Trials 3 Parts 10
Study Type Long-AIAG
MSA Version 3

Company Part No.: Connector 1484-B
Part No.:
Part Desc.: Connector 1484-B
Characteristic Terminal Retention
Specification Limits Min 30 Max 100
☑ Approved
6-Sigma Proc Variation

	Appr A	Jimmy		Appr B	Tabitha		Appr C	Jamie	
1	49.3	48.5	49.6	49	47.7	49.3	47.2	48.5	46.8
2	45.3	47.9	46	48.2	47.4	45.4	47.5	46.4	48.6
3	46.6	45.6	47.6	48.9	47.7	48.7	49.7	49	47
4	47.8	48.4	47.5	48.1	47.7	46.8	46.4	46.4	48.7
5	36	37.6	35.9	35.9	35.7	35.4	37.2	36.5	36.8
6	48.1	48.1	45.9	46.7	47.1	46.3	50	45.7	47.2
7	48.5	46.1	46	49.5	48	47.4	48.5	46.7	48.4
8	47.9	48.3	48.4	47.5	46.3	47.7	48.1	49.2	47.1
9	75.1	75.7	77.2	76.7	76.5	74.8	75.8	74.3	76.7
10	50	49.3	48.2	49.6	48.1	49.1	47.5	51.4	47.9

		% Contribution	% TV	% Tol		
Repeatability (EV)	1.138275	0.83%	9.1%	9.8%	R bar	1.926667
Reproducibility (AV)	0.000000	0.00%	0.0%	0.0%	UCL-R	4.970800
Appraiser x Part (INT)					Study Variation	12.475244
GRR	1.138275	0.83%	9.1%	9.8%	Total Variation (TV)	12.475244
Part-to-Part (PV)	12.423210	99.17%	99.6%	106.5%		
	number of distinct categories		15.4			

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments

Approved by _____ Date 11/2/16

Gage R&R Study

Gage R&R Analysis Sheet

Study Date 11/2/2016
Gage ID 329079
Gage Desc Force Gage
Appraisers 3 Trials 3
Study Type Long-AIAG 3

Company Part No.: Connector 1484-B
Part No.
Part Desc Connector 1484-B
Characteristic Terminal Retention
Specification Limits 30 100
6 Sigma Proc Var

R bar A = 1.800000 X bar A = 49.406667
R bar B = 1.550000 X bar B = 49.440000
R bar C = 2.430000 X bar C = 49.580000
R bar = 1.926667 X bar Diff = 0.173333

Rp = 39.488890 Tol/6 = 11.666670

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV) EV = R bar x K1 = 1.138275 Trials K1: 2 0.8862; 3 0.5908	% EV = 100 [EV / TV] = 9.1%	% EV = 100 [EV / (Tol / 6)] = 9.8%
Reproducibility - Appraiser Variation (AV) AV = √ [(X bar Diff x K2)² - (EV² / n x r)] = 0.000000 Appraisers 2 3; K2 0.7071 0.5231 Note: If a negative value is calculated under the square root sign, AV defaults to zero. n = number of parts; r = number of trials	% AV = 100 [AV / TV] = 0.0%	% AV = 100 [AV / (Tol / 6)] = 0.0%
Repeatability & Reproducibility (GRR) GRR = √ (EV² + AV²) = 1.138275	%GRR = 100 [GRR / TV] = 9.1%	% GRR 100 [GRR / (Tol / 6)] = 9.8%
Part Variation (PV) PV = Rp x K3 = 12.423210 Parts K3: 2 0.7071; 3 0.5231; 4 0.4467; 5 0.4030; 6 0.3742; 7 0.3534; 8 0.3375; 9 0.3249; 10 0.3146	% PV = 100 [PV / TV] = 99.6%	% PV = 100 [PV / (Tol / 6)] = 106.5%
	ndc = 1.41(PV/GRR) = 15.4	
Total Variation (TV) TV = √ (GRR² + PV²) = 12.47524	If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].	

Approved by _____ Date 11/2/16

Gage R&R Study

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

Study Date: 6/2/2017 12:00:00 AM
Gage ID: 3002231
Gage Desc: Profile Projector
Appraisers: 3 Trials: 3 Parts: 10
Study Type:
MSA Version: 4

Company Part No.: Mold 268
Part No.:
Part Desc: HW09-RET-06F
Characteristic: Length
Specification Limits: Min 19.6 Max 20.2
☑ Approved Pp (or Ppk) Target 6-Sigma Proc Variation

	Appr A: Eric Skaggs			Appr B: Toni Robinson			Appr C: Tabitha Whitney		
1	20.03	20.03	20.04	20.03	20.04	20.04	20.03	20.04	20.03
2	20.02	20.03	20.01	20	20.03	20.01	20.01	20.03	20.02
3	19.76	19.76	19.76	19.74	19.74	19.74	19.75	19.75	19.75
4	20.03	20.02	20.04	20.03	20.04	20.01	20.01	20.02	20
5	19.87	19.87	19.87	19.83	19.82	19.84	19.85	19.84	19.87
6	19.95	19.96	19.95	19.93	19.96	19.95	19.96	19.95	19.93
7	20.01	19.99	20	20	19.99	20	19.98	20	19.99
8	19.7	19.7	19.7	19.7	19.71	19.71	19.71	19.71	19.71
9	20.04	20.02	20.03	20.04	20.02	20.03	20.02	20.03	20.03
10	19.73	19.73	19.73	19.73	19.74	19.76	19.74	19.73	19.75

	Std. Dev.	% Contribution	% TV	% Tol		
Repeatability (EV):	0.008862	0.7%	8.5%	8.9%	R bar:	0.015000
Reproducibility (AV):	0.002484	0.1%	2.4%	2.5%	UCL-R:	0.038700
Appraiser x Part (INT):					Study Variation:	0.103877
GRR:	0.009203	0.8%	8.9%	9.2%	Total Variation (TV):	0.103877
Part-to-Part (PV):	0.103468	99.2%	99.6%	99.6%	Tolerance/6 (Tol):	0.100000
	number of distinct categories:		15.9	15.3		

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

Approved By: E Skaggs Date: 6/2/17

GRR Analysis Sheet

Study Date: 6/2/2017 12:00:00 AM
Gage ID: 3002231
Gage Desc: Profile Projector
Appraisers: 3 Trials: 3
Study Type: Long-AIAG 4

R bar A = 0.010000 X bar A = 19.912667
R bar B = 0.015000 X bar B = 19.907000
R bar C = 0.016000 X bar C = 19.906000
R bar = 0.0150000 X bar Diff = 0.005667

Company Part No.: Mold 268
Part No.:
Part Desc: HW09-RET-06F
Characteristic: Length
Specification Limits: 19.6 20.2
6 Sigma Process Variation:
Pp (or Ppk) Target:
Rp = 0.328888 Tol/6 = 0.100000

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV) EV = R bar x K1 = 0.008862 Trials K1: 2 0.8862; 3 0.5908	% EV = 100 [EV / TV] = 8.5%	% EV = 100 [EV / (Tol / 6)] = 8.9%
Reproducibility - Appraiser Variation (AV) AV = √[(X bar Diff x K2)^2 - (EV^2 / n x r)] = 0.002484 Appraisers K2: 2 0.7071; 3 0.5231 Note: If a negative value is calculated under the square root sign, AV defaults to zero. n = number of parts r = number of trials	% AV = 100 [AV / TV] = 2.4%	% AV = 100 [AV / (Tol / 6)] = 2.5%
Repeatability and Reproducibility (GRR) GRR = √(EV^2 + AV^2) = 0.009203	%GRR = 100 [GRR / TV] = 8.9%	% GRR = 100 [GRR / (Tol / 6)] = 9.2%
Part Variation (PV) PV = Rp x K3 = 0.103468 Parts K3: 2 0.7071; 3 0.5231; 4 0.4467; 5 0.4030; 6 0.3742; 7 0.3534; 8 0.3375; 9 0.3249; 10 0.3146	% PV = 100 [PV / TV] = 99.6%	% PV = 100 [PV / (Tol / 6)] = 99.6%
	In MSA4, for % Tolerance, PV = SQRT [(Tol / 6)^2 - (GRR)^2]	
	ndc = 1.41(PV/GRR) = 15.9	ndc = 1.41(PV/GRR) = 15.3
Total Variation (TV) TV = √(GRR^2 + PV^2) = 0.103877	If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].	

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)

PURPOSE:	APPLICATION:
To summarize the testing capabilities available at Scottsville Plant (SV5, SV5-2, SV5-Franklin), and to clarify the equipment, tests performed, standards, recording method and reaction plan.	Scottsville (SV5, SV5-2, SV5-Franklin)
	RULE ENFORCER: QA Coordinator / Above

SV5 Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	Reject Tag Procedure
Moisture Analysis (Reference Only)	Moisture Tester	F-A-SV5-010	Moisture Test Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 - Franklin Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)

Dimensional Measurement	Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 (Building 2) Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Hardness Test	Hardness Tester	H-A-001	Hardness Test Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Nikon MM-400	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Contact Force Test	Contact Force Gage	MSW-Force Gage	Inspection Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Keyence System / OGP / Caliper / Micrometer / Depth Gage / Slip Gages	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

Equipment Calibrations

	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Calipers, Micrometers, Depth Gages, Weigh Scales, other process tools/jigs.	Certified Gages (Gage Blocks & Weights)	Per Calibration Procedure	Calibration Record and Gagetrak	Reject Tag Procedure
Keyence Microscope	Certified Gages			
Force Gages	Certified Weights			
Freezer	Certified Meter			
Melt Indexer	Outside Vendor			
Moisture Analyzer	Outside Vendor			
Water Pressure Gage	Outside Vendor			
Hardness Tester	Outside Vendor			
Optical Comparator (Profile)	Outside Vendor			
Keyence Measurement Scope	Outside Vendor			
OGP	Outside Vendor			
NIKON MM-400	Outside Vendor			
INSTRON Tensile Tester	Outside Vendor			

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

Study Date	6/2/2017	**Company Part No.:**	Mold 268
Gage ID	08381913	**Part No.:**	
Gage Desc	0 - 200 Caliper	**Part Desc.:**	HW09-RET-06F
Appraisers	3 **Trials** 3 **Parts** 10	**Characteristic**	Length
Study Type	Long-AIAG	**Specification Limits**	Min Max
MSA Version	4 ☑ Approved	**Pp (or Ppk) Target:**	6-Sigma Proc Variation

	Appr A	Tabitha Whitney		Appr B	Toni Robinson		Appr C	Eric Skaggs	
1	20.06	20.06	20.05	20.07	20.08	20.08	20.09	20.09	20.09
2	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03
3	19.65	19.64	19.65	19.64	19.64	19.64	19.65	19.65	19.65
4	20.05	20.04	20.05	20.08	20.08	20.08	20.08	20.08	20.08
5	19.76	19.77	19.76	19.74	19.75	19.75	19.77	19.77	19.77
6	20.04	20.04	20.03	20.05	20.04	20.05	20.05	20.05	20.05
7	20.03	20.02	20.02	20.05	20.06	20.08 *	20.09	20.09	20.09
8	19.64	19.65	19.65	19.6	19.59	19.6	19.64	19.64	19.64
9	20.06	20.07	20.08 *	20.06	20.06	20.05	20.07	20.07	20.07
10	19.63	19.64	19.65 *	19.64	19.63	19.65 *	19.65	19.65	19.65

		% Contribution	% TV	% Tol		
Repeatability (EV)	0.004136	0.09%	2.9%		**R bar**	0.007000
Reproducibility (AV)	0.008335	0.35%	5.9%		**UCL-R**	0.018060
Appraiser x Part (INT)					**Study Variation**	0.140829
GRR	0.009305	0.44%	6.6%		**Total Variation (TV)**	0.140829
Part-to-Part (PV)	0.140521	99.56%	99.8%		**Tolerance/6 (Tol):**	
	number of distinct categories		21.3			

** Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.*

Comments

Approved by _____ **Date** 6/2/17

Gage R&R Analysis Sheet

Study Date	6/2/2017	**Company Part No.:**	Mold 268
Gage ID	08381913	**Part No.**	
Gage Desc	0 - 200 Caliper	**Part Desc**	HW09-RET-06F
Appraisers	3 **Trials** 3	**Characteristic**	Length
Study Type	Long-AIAG 4	**Specification Limits**	
		6 Sigma Proc Var	
R bar A =	0.011000 **X bar A =** 19.896000	**Pp (or Ppk) Target:**	
R bar B =	0.010000 **X bar B =** 19.897667		
R bar C =	0.000000 **X bar C =** 19.912000		
R bar =	0.007000 **X bar Diff =** 0.016000	**Rp =** 0.446667	**Tol/6 =** 0.000000

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV) $EV = R\ bar \times K1$ $= 0.004136$ Trials / K1: 2 / 0.8862; 3 / 0.5908	$\%EV = 100\,[EV / TV]$ $= 2.9\%$	$\%EV = 100\,[EV / (Tol / 6)]$ =
Reproducibility - Appraiser Variation (AV) $AV = \sqrt{[(X\ bar\ Diff \times K2)^2 - (EV^2 / n \times r)]}$ $= 0.008335$ Appraisers / K2: 2 / 0.7071; 3 / 0.5231 *Note: If a negative value is calculated under the square root sign, AV defaults to zero.* **n = number of parts** **r = number of trials**	$\%AV = 100\,[AV / TV]$ $= 5.9\%$	$\%AV = 100\,[AV / (Tol / 6)]$ =
Repeatability & Reproducibility (GRR) $GRR = \sqrt{(EV^2 + AV^2)}$ $= 0.009305$	$\%GRR = 100\,[GRR / TV]$ $= 6.6\%$	$\%GRR = 100\,[GRR / (Tol / 6)]$ =
Part Variation (PV) $PV = Rp \times K3$ $= 0.140521$ Parts / K3: 2 / 0.7071; 3 / 0.5231; 4 / 0.4467; 5 / 0.4030; 6 / 0.3742; 7 / 0.3534; 8 / 0.3375; 9 / 0.3249; 10 / 0.3146	$\%PV = 100\,[PV / TV]$ $= 99.8\%$	$\%PV = 100\,[PV / (Tol / 6)]$ =
	$ndc = 1.41(PV/GRR)$ $= 21.3$	
Total Variation (TV) $TV = \sqrt{(GRR^2 + PV^2)}$ $= 0.140829$	*If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].*	

Approved by E Shapp **Date** 6/2/17

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)

PURPOSE:	APPLICATION:
To summarize the testing capabilities available at Scottsville Plant (SV5, SV5-2, SV5-Franklin), and to clarify the equipment, tests performed, standards, recording method and reaction plan.	Scottsville (SV5, SV5-2, SV5-Franklin)
	RULE ENFORCER: QA Coordinator / Above

SV5 Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	Reject Tag Procedure
Moisture Analysis (Reference Only)	Moisture Tester	F-A-SV5-010	Moisture Test Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 - Franklin Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)

Dimensional Measurement	Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 (Building 2) Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Hardness Test	Hardness Tester	H-A-001	Hardness Test Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Nikon MM-400	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Contact Force Test	Contact Force Gage	MSW-Force Gage	Inspection Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Keyence System / OGP / Caliper / Micrometer / Depth Gage / Slip Gages	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

Equipment Calibrations

	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Calipers, Micrometers, Depth Gages, Weigh Scales, other process tools/jigs.	Certified Gages (Gage Blocks & Weights)	**Per Calibration Procedure**	Calibration Record and Gagetrak	Reject Tag Procedure
Keyence Microscope	Certified Gages			
Force Gages	Certified Weights			
Freezer	Certified Meter			
Melt Indexer	Outside Vendor			
Moisture Analyzer	Outside Vendor			
Water Pressure Gage	Outside Vendor			
Hardness Tester	Outside Vendor			
Optical Comparator (Profile)	Outside Vendor			
Keyence Measurement Scope	Outside Vendor			
OGP	Outside Vendor			
NIKON MM-400	Outside Vendor			
INSTRON Tensile Tester	Outside Vendor			

CERTIFICATE

This is to certify that

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:
The design and manufacture of connectors, molded parts, and terminals.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2008

Certificate registration no.	10001349 QM08
Date of original certification	1998-09-29
Date of revision	2017-08-15
Date of certification	2017-08-13
Valid until	2018-09-14

DQS Inc.

Brad McGuire
Managing Director

Annex to certificate
Registration No. 10001349 QM08

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

Remote Location	Scope
10001667 **Sumitomo Wiring Systems, Ltd.** **1820 Nakanoike, Mikkaichi-cho** **Suzuka-shi** **Mie-ken 513-8631** **Japan**	Engineering and Product Design.
10003837 **Sumitomo Electric Wiring Systems, Inc.** **1018 Ashley Street** **Bowling Green, KY 42102** **United States of America**	Management Review, Policy Making, Purchasing, Quality System Management, and Strategic Planning.
10004404 **Sumitomo Electric Wiring Systems, Inc.** **SEWS Detroit** **27360 Drake Road** **Farmington Hills, MI 48331** **United States of America**	Engineering, Product Design, Purchasing, Testing, and Warranty Management.
10004405 **SWSUSA-El Paso** **7500 Viscount Drive, Suite 192** **El Paso, TX 79925** **United States of America**	Customer Service.
10004406 **SWSUSA-Novi Office** **39555 Orchard Hill Place** **Novi, MI 48375** **United States of America**	Sales.
10013624 **Sumitomo Electric Wiring Systems** **4940 Eisenhauer Rd, Suite 265** **San Antonio, TX 78218** **United States of America**	Warehousing.
10013991 **Sumitomo Electric Wiring Systems** **120 Industrial Drive** **Scottsville, KY 42164** **United States of America**	Logistics.

This annex (edition: 2017-08-15) is only valid in connection with the above-mentioned certificate.

Annex to certificate
Registration No. 10001349 QM08

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

Extended manufacturing site	Scope
10012558 **Sumitomo Electric Wiring Systems, Inc.** **796 Smith Grove Rd.** **Scottsville, KY 42164** **United States of America**	Manufacture of terminals.
10015246 **Sumitomo Electric Wiring Systems, Inc.** **Franklin Connector Molding** **265 Garvin Lane** **Franklin, KY 42134** **United States of America**	Supplemental Manufacturing.

This annex (edition: 2017-08-15) is only valid in connection with the above-mentioned certificate.

CERTIFICATE

This is to certify that

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

has implemented and maintains a **Quality Management System**.

Scope:
The design and manufacture of connectors, molded parts, and terminals.

An audit, conducted and documented in a report, has verified that this quality management system fulfills the requirements of the following ISO Technical Specification:

ISO/TS 16949:2009

(with product design)

Certificate registration no.	10001349 TS09
Main certificate registration no.	10003837 TS09
Issuing date	2017-08-13
This certificate is valid until	2018-09-14
Date of revision	2017-08-15
IATF No.	0271447

2-IAO-QMC-01001

For and on behalf of DQS

Brad McGuire
Managing Director, DQS Inc.

Michael Drechsel
Managing Director, DQS Holding GmbH

Annex to certificate registration no.: 10001349 TS09
IATF-No.: 0271447

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

2-IAO-QMC-01001

Remote Location	Scope
10001667 **Sumitomo Wiring Systems, Ltd.** **1820 Nakanoike, Mikkaichi-cho** **Suzuka-shi** **Mie-ken 513-8631** **Japan**	Engineering and Product Design.
10003837 **Sumitomo Electric Wiring Systems, Inc.** **1018 Ashley Street** **Bowling Green, KY 42102** **United States of America**	Management Review, Policy Making, Purchasing, Quality System Management, and Strategic Planning.
10004404 **Sumitomo Electric Wiring Systems, Inc.** **SEWS Detroit** **27360 Drake Road** **Farmington Hills, MI 48331** **United States of America**	Engineering, Product Design, Purchasing, Testing, and Warranty Management.
10004405 **SWSUSA-El Paso** **7500 Viscount Drive, Suite 192** **El Paso, TX 79925** **United States of America**	Customer Service.
10004406 **SWSUSA-Novi Office** **39555 Orchard Hill Place** **Novi, MI 48375** **United States of America**	Sales.
10013624 **Sumitomo Electric Wiring Systems** **4940 Eisenhauer Rd, Suite 265** **San Antonio, TX 78218** **United States of America**	Warehousing.
10013991 **Sumitomo Electric Wiring Systems** **120 Industrial Drive** **Scottsville, KY 42164** **United States of America**	Logistics.

This annex (edition: 2017-08-15) is only valid in connection with the above-mentioned certificate.

2017-04-10

Annex to certificate registration no.: 10001349 TS09
IATF-No.: 0271447

Sumitomo Electric Wiring Systems, Inc.

US Components Division

Scottsville Plant 5
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

2-IAO-QMC-01001

Extended manufacturing site	Scope
10012558 **Sumitomo Electric Wiring Systems, Inc.** **796 Smith Grove Rd.** **Scottsville, KY 42164** **United States of America**	Manufacture of terminals.
10015246 **Sumitomo Electric Wiring Systems, Inc.** **Franklin Connector Molding** **265 Garvin Lane** **Franklin, KY 42134** **United States of America**	Supplemental Manufacturing.

DAIMLERCHRYSLER Ford GM

Part Submission Warrant

Part Name: FOW120A02F | Cust. Part Number: 6189-7673

Shown on Drawing No.: EU5T-14A464-TB | Org. Part Number: 6189-7673

Engineering Drawing Change Level: L4 | Date: 09/11/2016

Additional Engineering Changes: N/A | Dated: N/A

Safety and/or Government Regulation: [ ] Yes [√] No | Purchase Order No.: N/A | Weight (kg): 0.0030

Checking Aid No.: N/A | Checking Aid Engineering Change Level: N/A | Dated: N/A

ORGANIZATION MANUFACTURING INFORMATION

Sumitomo Wiring Systems, Inc. /SEWS
Organization Name & Supplier/Vendor Code

7500 Viscount Blvd. suite 192 / 2687 Old Gallatin Rd.
Street Address

EL Paso, TX 79925 / Scottsville Ky. 42164 USA
City Region Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

SEWS-CE
Customer Name / Division

N/A
Buyer/Buyer Code

AUTOMOTIVE
Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? [√] Yes [ ] No [ ] n/a

Submitted by IMDS or other customer format: IMDS ID: 554675928 / 2

Are polymeric parts identified with appropriate ISO marking codes? [ ] Yes [ ] No [√] n/a

REASON FOR SUBMISSION (Check at least one)

- [ ] Initial Submission
- [ ] Engineering Change(s)
- [√] Tooling: Transfer, Replacement, Refurbishment, or additional
- [ ] Correction of Discrepancy
- [ ] Tooling Inactive > than 1 year
- [ ] Change to Optional Construction or Material
- [ ] Supplier or Material Source Change
- [ ] Change in Part Processing
- [ ] Parts Produced at Additional Location
- [ ] Other - please specify below

REQUESTED SUBMISSION LEVEL (Check one)

- [ ] Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- [ ] Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- [√] Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- [ ] Level 4 - Warrant and other requirements as defined by customer.
- [ ] Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location

SUBMISSION RESULTS

The results for [√] [√] material and functional tests [ ] appearance criteria [√] statistical process package

These results meet all design record requirements: [√] Yes [ ] NO (If "NO" - Explanation Required)

Mold / Cavity / Production Process: Mold 1714-A (M25-M32) / INJECTION MOLD / ASSEMBLY

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all roduction Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 24,000 /8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted a,ny deviations from this declaration below.

EXPLANATION/COMMENTS: SV5-FR1 (FRANKLIN FACILITY)

Is each Customer Tool properly tagged and numbered? [ ] Yes [ ] No [√] n/a

Organization Authorized Signature: R J Vargas | Date: July 10, 2018

Print Name: Javier Vargas/ Veronica de Santiago | Phone No.: (915) 843-3000 | FAX No.: (915) 843-3001

Title: Q.A Supervisor / PPAP Coordinator | E-mail: j.vargas@us.sws.co.jp / s.veronica@us.sws.co.jp

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: [ ] Approved [ ] Rejected [ ] Other

Customer Signature | Date

Print Name | Customer tracking number (optional)