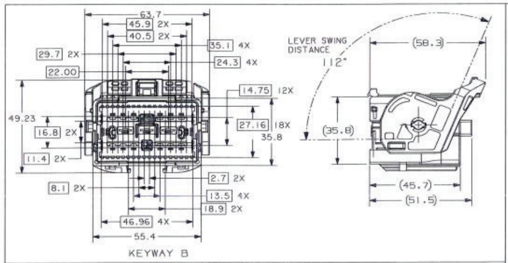
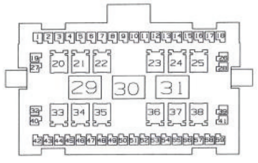
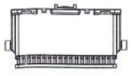


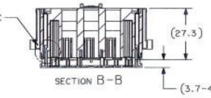
INTERFACE VIEW(S)



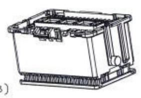
TERMINAL IDENTIFICATION
59 CAVITIES

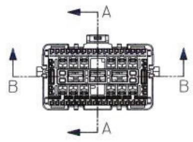


DETAIL C

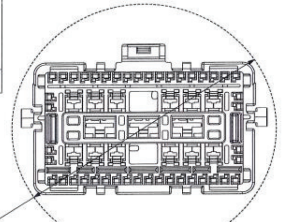


SECTION B-B



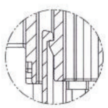


WIRE SIDE

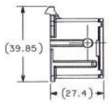


Ø 66
FEED THRU CONDITION
(MIN HOLE SIZE)

SCALE 2:1



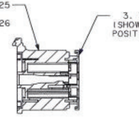
DETAIL C
SCALE 4:1
PRE-STAGE LOCK POSITION



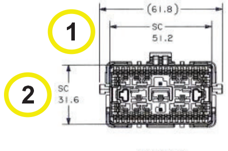
TPA IN
ASSEMBLED POSITION

1. HOUSING 6098-6325
OR
2. HOUSING 6098-6326

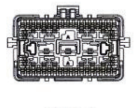
3. TPA 6918-3065
(SHOWN IN PRE-STAGED POSITION)



SECTION A-A
(TPA IN PRE-STAGED / SHIPPED POSITION)



KEYWAY B
ENGAGEMENT SIDE
(WITH TPA REMOVED)



KEYWAY A
ENGAGEMENT SIDE
(WITH TPA REMOVED)

ITEM	DESCRIPTION	COLOR (N1)	FORD COMPONENT PART NUMBER	SUMITOMO PART NUMBER (N1)	MATERIAL/ SPEC NO.	RECYCLING CODE	WEIGHT
1	FEMALE HOUSING KEYWAY A	BLACK	N/A	6098-6325	PBT	N/A	
2	FEMALE HOUSING KEYWAY B	NATURAL	N/A	6098-6326	PBT	N/A	
3	TPA	LT. GRAY	N/A	6918-3065	PBT	N/A	
4	FEMALE COVER	LT. GRAY	N/A	6911-4748	PBT	N/A	
OPTIONAL							

APPLICABLE TERMINALS

DESCRIPTION	MANDATORY (YES/NO)	TERMINAL CAVITY MIN/MAX OD	PLATING/ MATERIAL	DRAWING	SUPPLIER COMPONENT PART NO.
TERMINAL 0.64 FEMALE	YES	0/2.15x2.12	REFERENCE DRAWING	3F2T-14474-RA	REFERENCE DRAWING
TERMINAL 2.8 FEMALE	YES	0/4.4x4.5	REFERENCE DRAWING	9786-14474-BAA	REFERENCE DRAWING
TERMINAL 2.8 FEMALE	YES	0/4.4x4.5	REFERENCE DRAWING	XF2T-14474-DA	REFERENCE DRAWING
TERMINAL 6.3 FEMALE	YES	0/7.55x5.45	REFERENCE DRAWING	9786-14474-CAA	REFERENCE DRAWING
TERMINAL 6.3 FEMALE	YES	0/7.55x5.45	REFERENCE DRAWING	XW4T-14474-TA	REFERENCE DRAWING

(P1)

ASSEMBLY PART NUMBERS		MAX TEMP	WEIGHT	MATING COMPONENT ASSEMBLY PART NUMBERS		MATING COMPONENT ASSEMBLY PART NUMBERS	
FORD COMPONENT PART NUMBER	SUMITOMO PART NUMBER			FORD COMPONENT PART NUMBER	SUMITOMO PART NUMBER	FORD COMPONENT PART NUMBER	SUMITOMO PART NUMBER
9U5T-14489-AC	6098-6047	105°C	28g	9U5T-14A459-BC	6089-6044	9U5T-14N003-BC	6911-4748
9U5T-14489-VA	6098-6134	105°C		9U5T-14A459-VA	6089-6045	9U5T-14N003-BC	6911-4748

NOTES:
1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION (SDS) REV.17
2. REFERENCE TO ANY OTHER SPECIFICATIONS AND REV LEVEL, E.G., VDA
3. MAXIMUM MATING FORCE FULLY POPULATED WITH TIN TERMINALS =75(N) WITH GOLD TERMINAL =
4. THE TERMINAL EXTRACTION TOOL MUST BE REFERENCED THE DRAWING
5. FOR SEALED INTERFACES ONLY SEALING SURFACES AS IDENTIFIED ON THIS DRAWING ARE SMOOTH AND FREE OF PARTING LINES.
6. CONNECTOR IS RATED AS ERGONOMIC CLASS 1,2, OR 3 BASED ON USCAR-25 REV 1. CONNECTOR PUSH SURFACE AREA IS 1761.0mm²

TERMINAL EXTRACTION TOOLS	
TERMINAL	EXTRACTION TOOL
0.64	17180012
2.8	23730003
6.3	17330015

GENERAL TOLERANCES						
10 MAX	50 MAX	100 MAX	250 MAX	2500 VR	ANGLE	ECCENT
±0.3	±0.5	±0.8	±1.4	±2.0	±0.3°	±0.15

9U5T-14489-VA

LTRS	REVISIONS		
ORIGINATOR	CHECKER	ENGR APP	MATL APP
A RELEASE 9U5T-14489-AA ARCHIVE DATE: 102606 AELE-E-11783930-031 CAD:Y			
B.SKOLNIK	K.DAVIS	M.SALANTA	SUMITOMO
REDRAWN AFTER REVISION J TO THE FORD DRAWING STANDARDS AELE E 11783930 222 20110811			
D MALONE	M. SPENCER	M.SALANTA	SUMITOMO
L1 ADDED INTERFACE DRAWING (PAGE 2) AELE E 11783930 257 20120613			
B. NAGY	M. SPENCER	J. PITTENGER	SUMITOMO
M1 ADDED KEYWAY B DETAIL VIEW TO TEST FIXTURE INTERFACE AELE E 11783930 270 20120918			
J. KIM	M. SPENCER	M.SALANTA	SUMITOMO
N1 MODIFIED COLOR AND SUMIOTOMO PART NUMBER IN CHART AELE E 11783930 273 20121107			
D.MALONE II	M. SPENCER	M.SALANTA	SUMITOMO
P1 WAS 2.80(MAX) WAS 4.20(MAX) WAS 3.40(MAX) ADDED 0/4.4X4.5 ADDED 0/7.55X5.45 AELE E 11783930 292 20130626			
B. NAGY	M. SPENCER	M.SALANTA	SUMITOMO

Received
DEC 16 2013
SV5 QA
RECEIVED
DEC 16 2013
CONTROLLED COPY

SEWS
SEWS RELEASE LEVEL: PRODUCTION
APPLICATION: INLINE / DOOR
SEWS DRAWING/PART NUMBER: 9U5T-14489-AC
WEIGHT (g)

REFERENCE 6098-6047 59 WAY

PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P9999-A1 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 LOC.	CAD FILE	DTMC
Z-NX	N/A	9U5T-14489-AC_DWG_K	IS MASTER
OPER. NO.	UNIT	DRAWING	
N/A	MM	9U5T-14489-AC	
DESIGN	DETAIL	TITLE	SHT 1 OF 2
B.SKOLNIK	D.MALONE	SLV WIR CONN FEM	
CHECKED	SAFETY		
K.DAVIS	N/A		
SCALE	DATE	DIVISION	
1:1	08/11/2011	PLANT	

Ford Motor Company

DRW SIZE A1/0

PROCESS FLOW DIAGRAM

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

PRODUCT : Molded Component Parts

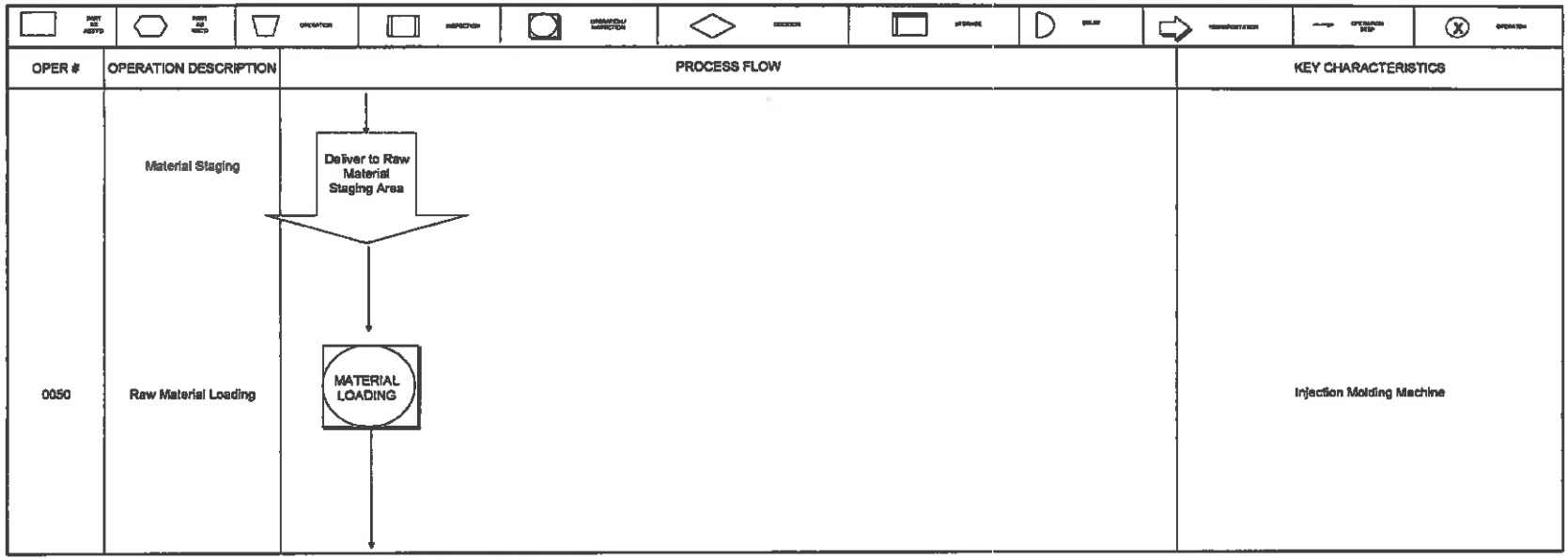
PROCESS: Injection Molding Group 1
Supplier/Loc. SEWS-Scottsville#5
Mfg. Sup.: Alan Bomar
Prepared By: John Fraim

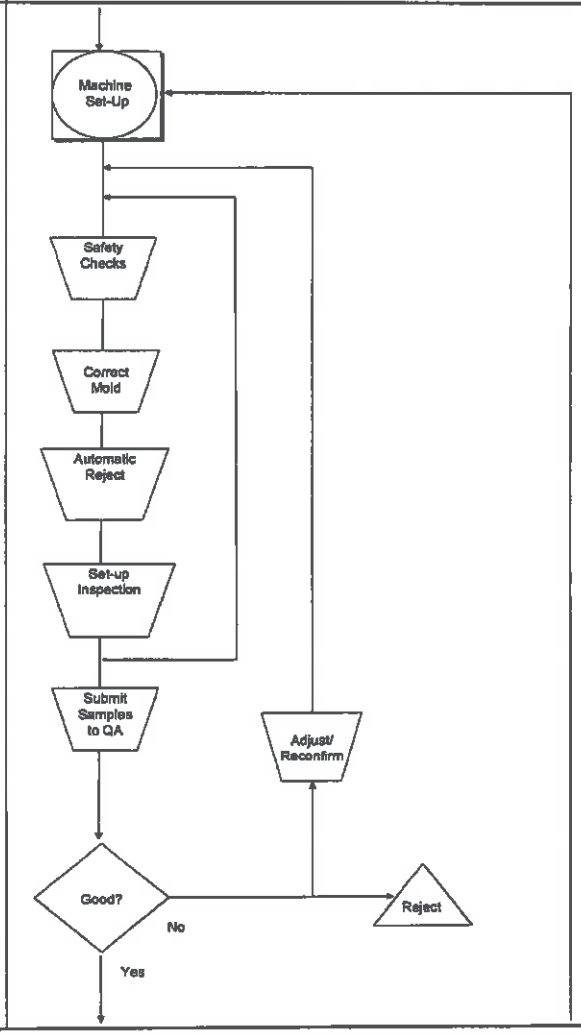
DATE	CHANGE POINTS	CORE / DEVELOPMENT TEAM
	ISSUE/REVISION HISTORY	
6/04/99	ISSUED WITH FORMAT CHANGES/UPDATED INFRO	T.Gravil, D. Lyons, T. Nell, K. Cantrell
1/6/00	ISSUED WITH FORMAT CHANGES	T.Day
2/06/01	Update Information	T.Gravil
3/13/01	Update Information	T. Gravil, R. Ramsey, D.Lyons
4-7-04	Update Information	D Gillenwater, G Smith, J Renfrow
1/25/05	Update Information	J Fraim L Roth, J Renfrow, D Gillenwater
6/25/05	Update Information	J Fraim , J Seylors
9/27/05	Update Information	D Karleskint
1.25.08	Updated process 101	J Fraim
3/30/2011	Update process - Packing	L. Roth
4/3/14	Update process - Packing	L. Roth

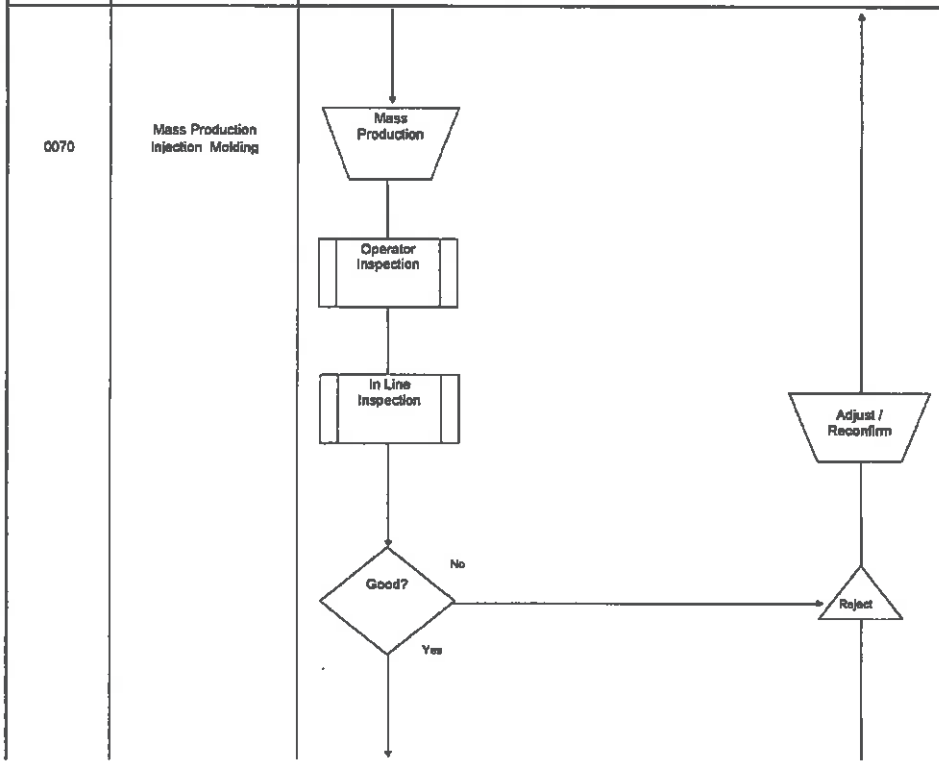
SUPPLIER APPROVALS:

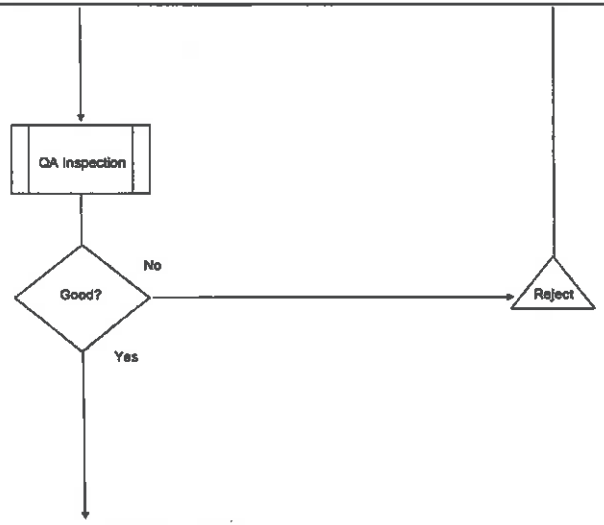
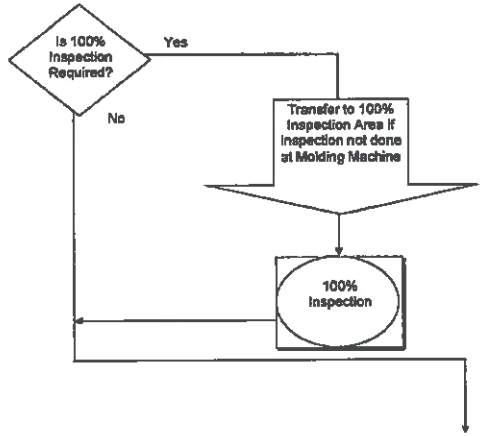
General Plant Manager
Quality Manager
Other Approvals
CUSTOMER APPROVALS:(IF REQUIRED)

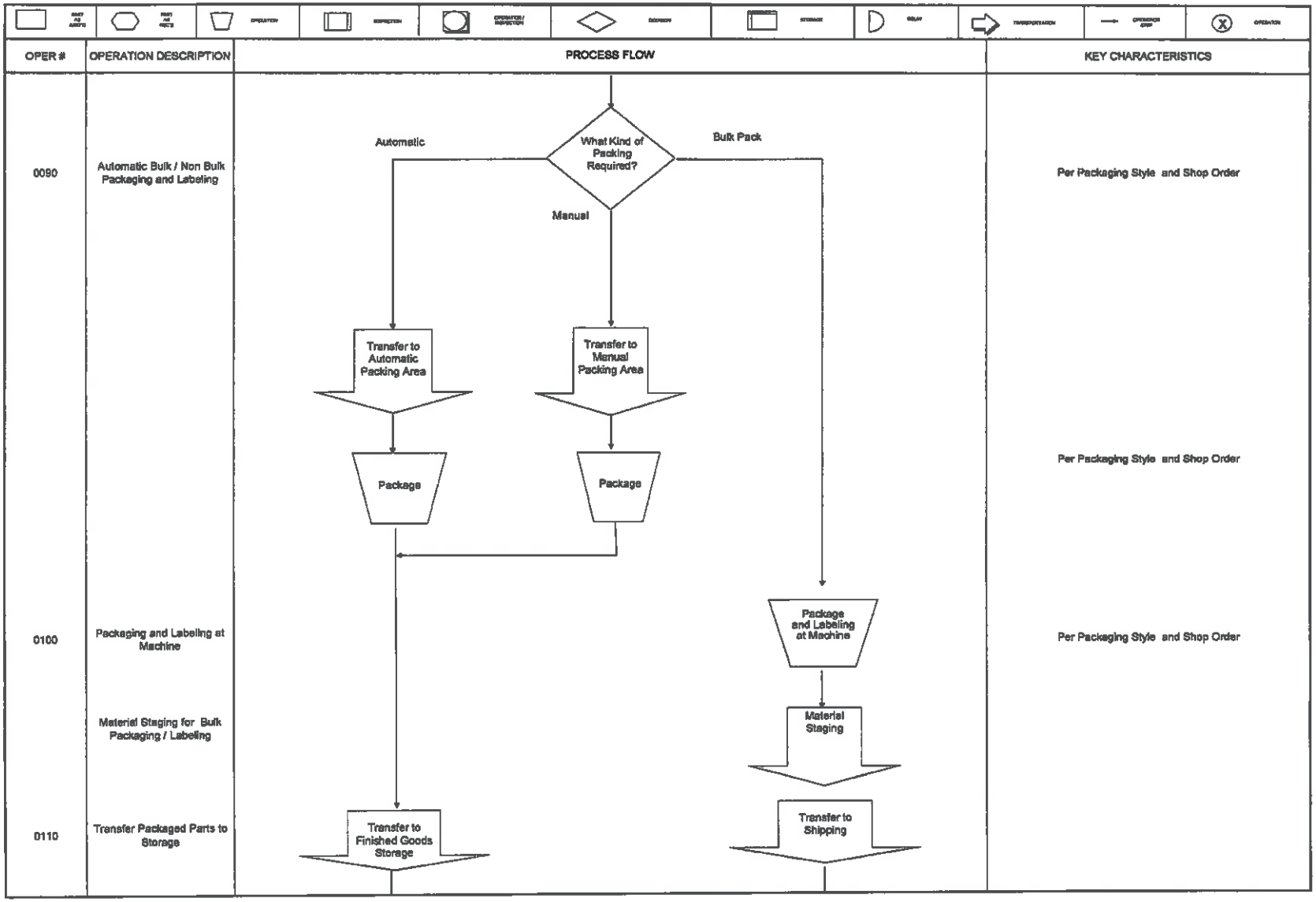
OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
010	Receive Raw Material	Purchased Raw Material	Visual Comparison Against Packing List Shipping-Receiving
	Reject for non-conformance	Good? No → Reject; Yes	Notify Quality Assurance Red Tag Procedure & Return to Vendor
0020	Quality Assurance 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	Material Storage	
	Raw Material Inventory Assessment	Raw Material Inventory Assessment	

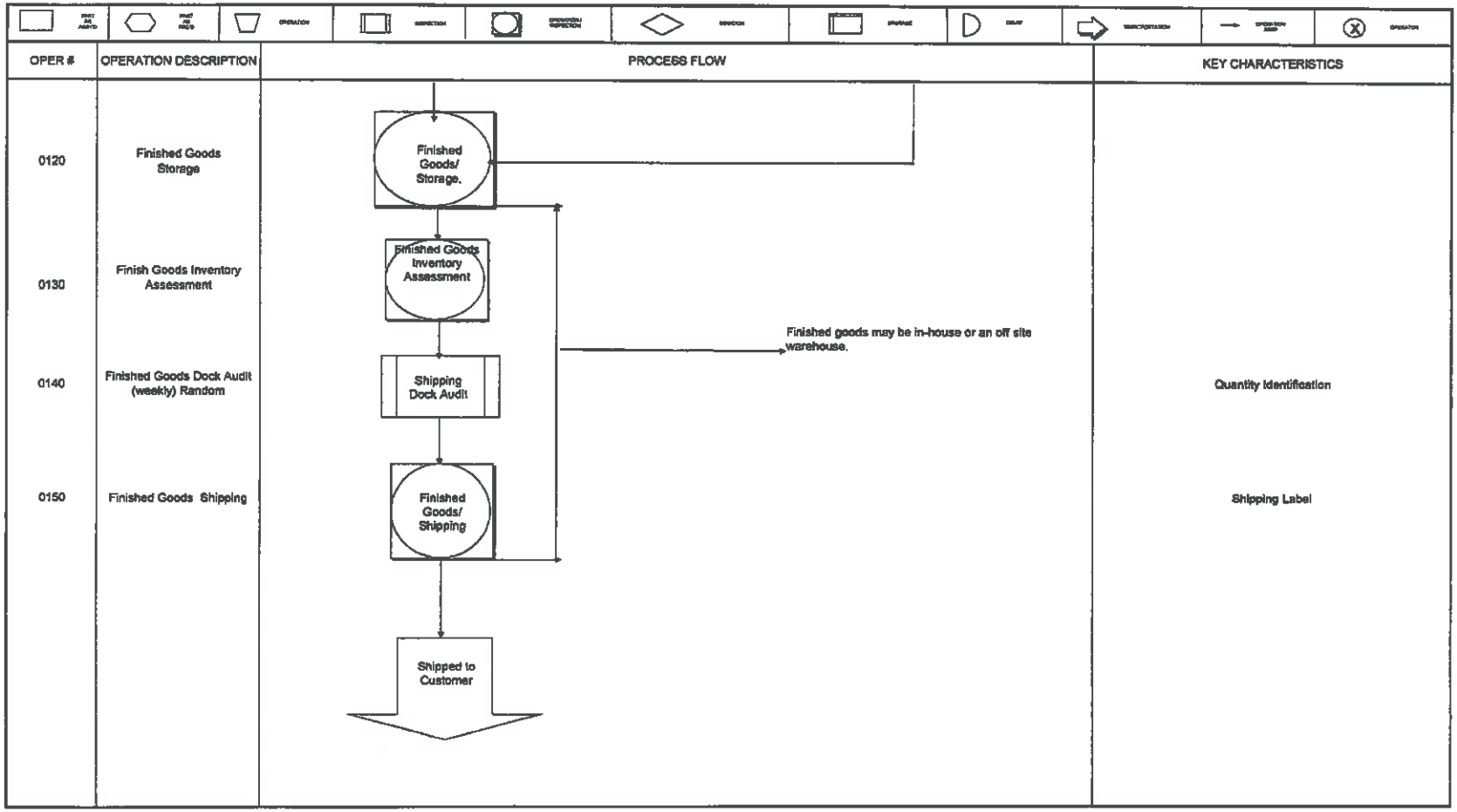

OPER #
OPERATION DESCRIPTION
PROCESS FLOW
KEY CHARACTERISTICS
Material Staging
Deliver to Raw Material Staging Area
0050
Raw Material Loading
MATERIAL LOADING
Injection Molding Machine

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0050	Set-up Injection Molding Machine		Per Shop Order Per Applicable Standard
	Raw Material Mold Numbers Process Parameters Regrind Ratio Raw Material Dryers		# Part Dimension / Function
	Reject for non-conformance		Make Adjustments, Reverify Parts, Mold Sent to Maintenance or Stop Production if applicable

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0070	Mass Production Injection Molding		Per Shop Order Per Applicable Standard

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0060	Quality Assurance Inspection Reject for non-conformance		# Part Dimension / Function / Visual Notify Manufacturing Leader /QA Eng. Reject Tag Procedure
	Material Staging for Inspection 100% Inspection (when applicable)		Visual Inspection


PART AS ASSY'S
PART AS PART'S
OPERATION
INSPECTION
OPERATION/ INSPECTION
DECISION
STORAGE
DELAY
TRANSPORTATION
OPERATION ONLY
OPERATION
OPER #
OPERATION DESCRIPTION
PROCESS FLOW
KEY CHARACTERISTICS
0090
Automatic Bulk / Non Bulk Packaging and Labeling
What Kind of Packing Required?
Automatic
Manual
Bulk Pack
Transfer to Automatic Packing Area
Transfer to Manual Packing Area
Package
Package
Per Packaging Style and Shop Order
0100
Packaging and Labeling at Machine
Package and Labeling at Machine
Per Packaging Style and Shop Order
Material Staging for Bulk Packaging / Labeling
Material Staging
0110
Transfer Packaged Parts to Storage
Transfer to Finished Goods Storage
Transfer to Shipping


OPER #
OPERATION DESCRIPTION
PROCESS FLOW
KEY CHARACTERISTICS
0120
Finished Goods Storage
Finished Goods/ Storage.
0130
Finish Goods Inventory Assessment
Finished Goods Inventory Assessment
Finished goods may be in-house or an off site warehouse.
0140
Finished Goods Dock Audit (weekly) Random
Shipping Dock Audit
Quantity Identification
0150
Finished Goods Shipping
Finished Goods/ Shipping
Shipping Label
Shipped to Customer

SUMITOMO ELECTRIC WIRING SYSTEMS, INC.

PROCESS F.M.E.A

PROCESS RESPONSIBILITY: Alan Bomar, John Saylors, Naoki Fujita

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

DATE	ISSUE/REVISION HISTORY	CHANGE POINTS	CROSS FUNCTIONAL TEAM
7.18.14	Update SC's to match control plan		L. Roth, J. Fraim, D. Gillenwater
5.6.14	Add material dryer alarm, add Central Feed Interlock, review section 0050		L. Roth, C. Threlkel, P. Keith
4.3.14	Delete runnering in 0080		L. Roth
11.14.13	review process, update detection ratings		J Fraim, L Roth, D Gillenwater
8.11.11	Update for Setup		L. Roth
9.21.10	Update for Setup		L. Roth
6/18/2010	Update to include mold gates and mold balance as cause of failure, and lance/dip breakage as failure mode. Added robot settings for damage, added damage to		D Gillenwater, J. Fraim, L. Roth, D. Duncan, A. Davidson, S. Teutsul, J. Saylors

SUPPLIER APPROVALS;
General Plant Manager : A Bomar 7.18.14
Quality Manager: L Roth 7.18.14
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. 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						
				5		Setup Operator selected incorrect central feed system raw material.	2	P - 1: Central Feed System interlocks prevent incorrect material feed D -1: Barcode scan	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.	6	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.						
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.						
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.						

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 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						
		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	Material Staging for Non-Bulk Packing / 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						

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
	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						
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 (Shipping)	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	Finished Goods Dock Audit- (Weekly) Random box per skid)	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	6	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						
		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)		Key Contact/Phone L. Roth/D. Gillenwater (270) 237-5419 x 8555 or 8583	Date (Orig.) 8/9/2010	Date (Rev.) 12/3/2014
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 12/3/14	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant Sumitomo Electric Wiring Systems	Supplier Code	Other Approval/Date (If Req'd.) A. Bomar 12/3/14	Other Approval/Date (If Req'd.)	
Revision History:		8.9.10: Reviewed process, minor changes in bold 9.21.10: Added Set-up Checksheet at Setup 3.30.11: Modified Section 0090 8.11.11: Modified Section 0060, other minor changes in bold. 9.15.11: Added Annual Layouts, other updates in bold 3.6.12: Updated for Resin Concentrate Mix Process, Resin loading process 11.27.12: Updated special characteristics designations. Added Packing Scale Setup 4.3.14: Remove references to annealing process, color concentrate and 10T machine 5/6/14: Review material loading section 0050, updated references to bag/gaylord/silo 5/29/14: Clarify 0020, Sample Size / Frequency 7/18/14: Match special characteristics with FMEA, update 0130 12/3/14: Add QA Hold Procedure to section 0060 & 0080		

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				CONTROL METHOD	REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE SIZE	SAMPLE FREQ.		
0010	Raw Material Receiving	N/A	10	Plastic Resin	Material Receiving		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		* Correct color & type * Correct Part Number * No Damage * No contamination	* Visual comparison to box/skid label * Visual check of packaging	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
						IC	* Material Certification	* Review of Material Cert.				
		Melt Flow Tester				IC	* Melt Flow (As applicable per IISRP)	* MFR Test	Each Lot	Each Lot		

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.			
0030	Material Storage (Resin & Raw Materials)	N/A	30	Correct Location	Material Storage		* Correct Location	* Electronic Label Scan	Each Container	Each Receipt	Electronic Label Scan		Notify Leader, Q.A., Coordinator as needed Reject / Hold Procedure
	Silo	N/A		Correct Location	Material Storage		* Correct Silo	Visual confirmation of Silo Label / BOL/PL	Each Reciept	Each Receipt	* Visual		Notify PC Manager
	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
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 Delivery to Manufacturing: (Assign Silo lot to Surge Bin)	Silo		Correct Materials	Assign Silo to Hopper/ Surge Bin		Assign Material to Correct Location / Loader (as applicable)	Compare raw material RPN # to RPN # on surge bin (scan)	Each Receipt	Each Receipt	*Electronic scan		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
		Central Dryer					Drying Temperature set correctly.	Visual	Each unit	Each Shift	* Checksheet * Alarm if power off		Notify Maintenance
	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. (Central Feed): Per Shop Order, match raw material RPN number to dummy Barrel Label.	* 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

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	
	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
	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

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				CONTROL METHOD	REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE SIZE	SAMPLE FREQ.		
	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Profile Projector, Caliper, Micrometer, Force Gage, Mating Parts, Various 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 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	SOP checksPer QAW - GA003		
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
0080	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Profile Projector, Caliper, Micrometer, Force Gage, Mating Parts, Various 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**

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				CONTROL METHOD	REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE SIZE	SAMPLE FREQ.		
0090	Automatic 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	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
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

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				CONTROL METHOD	REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE SIZE	SAMPLE FREQ.		
0120	Finished Goods Storage.	Material Racks		Molded Finished Product	Finished Goods Storage		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		Correct Quantities	Inventory Assessment	As needed	As needed	Electronic Scanning System, Inventory	Notify PC Management
				Correct Packing	Product Audit (QA)		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		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
0150	Shipping Finished Goods	Fork truck	150	All Finished Goods	Shipping Finished Goods		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			Per Customer Drawing	Per Customer Requirements	Per Customer Request	Per Customer Request	Customer PPAP	Notify QA Engineer/QA Manager

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

Study Date	5/4/2015	**Company Part No.:**	HW09-RET-06
Gage ID	0003437	**Part No.:**	
Gage Desc	0 - 200 Caliper	**Part Desc.:**	HW09-RET-06
Appraisers	3 **Trials** 3 **Parts** 10	**Characteristic**	Length
Study Type	Long-AIAG	**Specification Limits**	**Min** 19.6 **Max** 20.2
MSA Version	4 ☑ **Approved**	**Pp (or Ppk) Target:**	**6-Sigma Proc Variation**

	Appr A	Karen		Appr B	Tabitha		Appr C	Toni	
1	20.05	20.03	20.05	20.04	20.04	20.04	20.03	20.03	20.03
2	20.01	20.01	20.01	20.01	20.02	20.01	20.03	20.03	20.03
3	19.61	19.63	19.61	19.63	19.62	19.63	19.62	19.64	19.64
4	20.04	20.05	20.05	20.04	20.01	20.04	20.05	20.05	20.06
5	19.75	19.77	19.74	19.76	19.73	19.73	19.75	19.75	19.75
6	20.04	20.04	20.02	20.04	20.03	20.04	20.04	20.05	20.05
7	20.03	20.05	20.05	20.05	20.05	20.06	20.04	20.05	20.06
8	19.64	19.62	19.62	19.61	19.62	19.62	19.62	19.63	19.63
9	20.04	20.05	20.03	20.03	20.04	20.06	20.08	20.06	20.08
10	19.62	19.61	19.61	19.62	19.63	19.62	19.63	19.62	19.62

		% Contribution	% TV	% Tol		
Repeatability (EV)	0.008271	0.37%	6.1%	8.3%	**R bar**	0.014000
Reproducibility (AV)	0.004643	0.12%	3.4%	4.6%	**UCL-R**	0.036120
Appraiser x Part (INT)					**Study Variation**	0.136308
GRR	0.009485	0.48%	7.0%	9.5%	**Total Variation (TV)**	0.136308
Part-to-Part (PV)	0.135977	99.52%	99.8%	99.5%	**Tolerance/6 (Tol):**	0.1
	number of distinct categories		20.2	14.8		

** 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** 5/4/15

Gage R&R Analysis Sheet

Study Date	5/4/2015	**Company Part No.:**	HW09-RET-06
Gage ID	0003437	**Part No.**	
Gage Desc	0 - 200 Caliper	**Part Desc**	HW09-RET-06
Appraisers	3 **Trials** 3	**Characteristic**	Length
Study Type	Long-AIAG 4	**Specification Limits**	19.6 20.2
R bar A =	0.017000 **X bar A =** 19.882667	**6 Sigma Proc Var**	
R bar B =	0.015000 **X bar B =** 19.882333	**Pp (or Ppk) Target:**	
R bar C =	0.010000 **X bar C =** 19.891667		
R bar =	0.014000 **X bar Diff =** 0.009333	**Rp =** 0.432222	**Tol/6 =** 0.100000

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV)		
EV = R bar x K1 = 0.008271	**% EV = 100 [EV / TV]** = 6.1%	**% EV = 100 [EV / (Tol / 6)]** = 8.3%
Reproducibility - Appraiser Variation (AV)		
AV = $\sqrt{[(\text{X bar Diff} \times K2)^2 - (EV^2 / n \times r)]}$ = 0.004643	**% AV = 100 [AV / TV]** = 3.4%	**% AV = 100 [AV / (Tol / 6)]** = 4.6%
Repeatability & Reproducibility (GRR)		
GRR = $\sqrt{(EV^2 + AV^2)}$ = 0.009485	**%GRR = 100 [GRR / TV]** = 7.0%	**% GRR 100 [GRR / (Tol / 6)]** = 9.5%
Part Variation (PV)		
PV = Rp x K3 = 0.135977	**% PV = 100 [PV / TV]** = 99.8%	**% PV = 100 [PV / (Tol / 6)]** = 99.5%
Total Variation (TV)		
TV = $\sqrt{(GRR^2 + PV^2)}$ = 0.136308		

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

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

ndc = 1.41(PV/GRR)
= 20.2

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** 5/4/15

Production Part Approval
Dimensional Test Results

DaimlerChrysler Ford GM

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

PART NUMBER: 6098-6047
PART NAME: FODR-59FA-ASSY
DESIGN RECORD CHANGE LEVEL: 9U5T-14489-AC P1 06/26/13
ENGINEERING CHANGE DOCUMENTS: NA

ITEM	DIMENSION / SPECIFICATION	SPECIFICATION / LIMITS		TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)								OK	NOT OK
				6/27/16	8	M31	M32	M33	M34	M31	M32	M33	M34		
1	31.60	-0.50	0.50			31.59	31.61	31.60	31.62	31.60	31.62	31.60	31.62	O	
2	51.20	-0.80	0.80			51.09	51.08	51.09	51.10	51.11	51.09	51.08	51.10	O	
3						correct									
4						correct									
5						correct									
6						correct									
7						correct									
8						correct									

NOTES:
1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION SDS1 REV.17
2. REFERENCE TO ANY OTHER SPECIFICATIONS AND REV LEVEL, E.G., VDA
3. MAXIMUM MATING FORCE FULLY POPULATED WITH TIN TERMINALS =75(N) WITH GOLD TERMINAL =
4. THE TERMINAL EXTRACTION TOOL MUST BE REFERENCED THE DRAWING
5. FOR SEALED INTERFACES ONLY SEALING SURFACES AS IDENTIFIED ON THIS DRAWING ARE SMOOTH AND FREE OF PARTING LINES.
6. CONNECTOR IS RATED AS ERGONOMIC CLASS (1,2, OR 3) BASED ON USCAR-25 REV 1. CONNECTOR PUSH SURFACE AREA IS 1761.0mm²

Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
Jane Reid	PPAP Operator	6/27/2016

PN 80000202

TORAY

Innovation by Chemistry

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

Grade:	5101S01B
Lot:	R28051
Date:	12/12/17

Certification of Properties

Test	Method	Unit	Specification	Result
Visual	.	.	Same as Std.	Good
Color	.	.	Same as Std.	Good
MFR	ISO 1133	g/10 min.	6.7~9.2	7.2
Tensile strength	ISO 527	MPa	Min. 45	52.4
Tensile elongation	ISO 527	%	Min. 8	17.2
Charpy - notched	ISO 179	kJ/m2	Min. 4	5.5

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

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

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5 & SV5 Building 2)

PURPOSE:	APPLICATION:
To summarize the testing capabilities available at Scottsville Plant (SV5 & Building 2), and to clarify the equipment, tests performed, standards, recording method and reaction plan.	Scottsville (SV5 & Building 2)
	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 Testing	Force Gage	QAW - INSERTRETPROC	Inspection Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage	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
Insertion / Retention Test	Force Gage	QAW - INSERTRETPROC	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

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5 & SV5 Building 2)

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
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**			

DAIMLERCHRYSLER Ford GM

Part Submission Warrant

Part Name: FODR-59F-A-ASSY | Cust. Part Number: 6098-6047

Shown on Drawing No.: 9U5T-14489-AC | Org. Part Number: 6098-6047

Engineering Drawing Change Level: P1 | Date: 26/06/2013

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

Safety and/or Government Regulation: [ ] Yes [√] No | Purchase Order No.: N/A | Weight (kg): 0.0275

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: 76535443 / 5

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 1562-A (M33-M34) Mold 1583-A (M35-M38)/ INJ. 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 5,820 / 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: Assembly Machine L-77

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

Organization Authorized Signature: R J Vargas | Date: June 15, 2017

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)