

PART SUBMISSION WARRANT

Part Name <u>34 W/M Hybrid Sealed Connector Assembly</u>		Customer Part Number <u>FU5T-14A624-CC(000)</u>	
Shown on Drawing No. <u>FU5T-14A624-CC</u>		Supplier Part Number <u>60013512A01C(000)</u>	
Engineering Change Level <u>BY5 AELE-E-12035198-533</u>		Dated <u>13-Jun-2022</u>	
Additional Engineering Changes <u>N/A</u>		Dated <u>N/A</u>	
Safety and/or Government Regulation ☐ Yes ☒ No		Purchase Order No. <u>N/A</u>	Weight (kg) <u>0.0581</u>
Checking Aid No. <u>N/A</u>	Checking Aid Engineering Change Level <u>N/A</u>	Dated <u>N/A</u>	

SUPPLIER MANUFACTURING INFORMATION
Western Diversified Plastics / 609123190

Supplier Name & Supplier/Vendor Code
53150 N. Main St.

Street Address

<u>Mattawan</u>	<u>MI</u>	<u>49071</u>	<u>USA</u>
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<u>City</u>	<u>State</u>	<u>Postal Code</u>	<u>Country</u>
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CUSTOMER SUBMITTAL INFORMATION
Nursan

Customer Name/Division
Gulcin Akbas

Buyer/Buyer Code
Ford

Application

☒ Yes ☐ No ☐ Not Applicable
IMDS - 504617055 / 6

☒ Yes ☐ No ☐ Not Applicable

MATERIALS REPORTING
 Has customer-required Substances of Concern information been reported?

☒ Yes ☐ No ☐ Not Applicable

 Are polymeric parts identified with appropriate ISO marking codes?

☒ Yes ☐ No ☐ Not Applicable

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

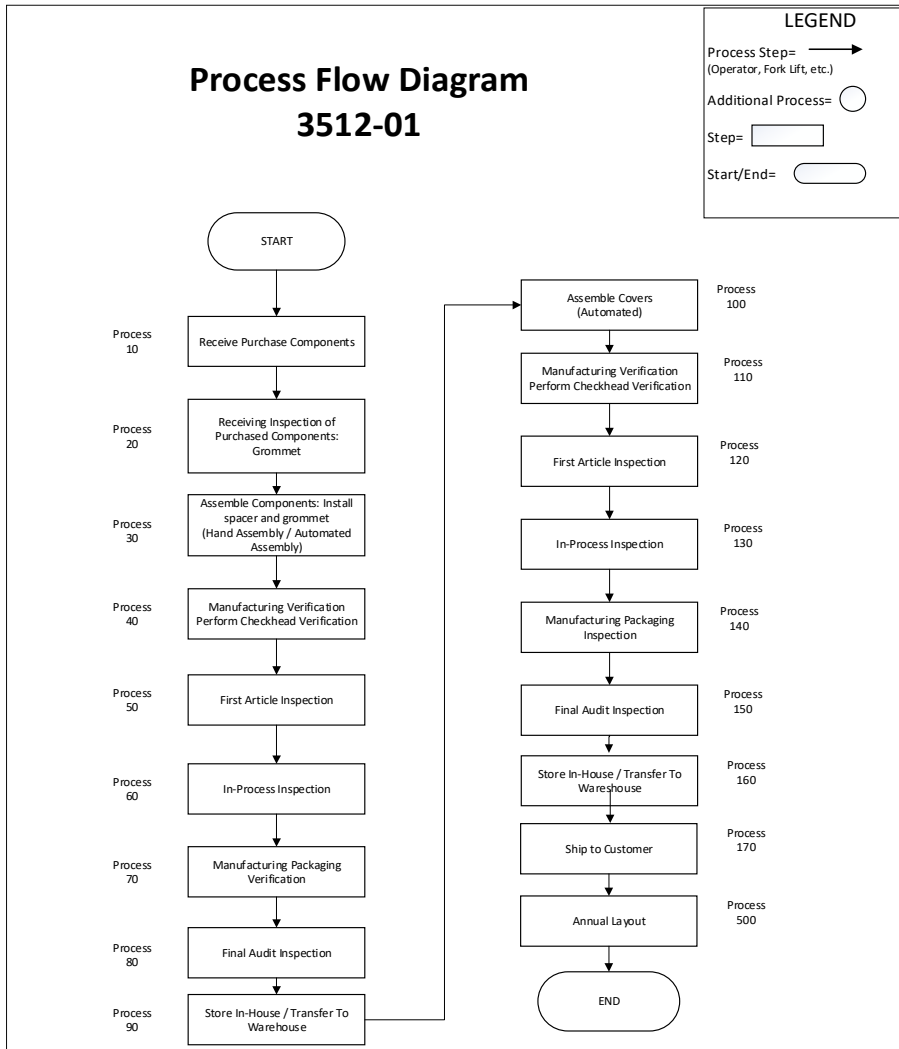
☐ Change to Optional Construction or Material
☐ Supplier or Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other - please specify below

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 organization's manufacturing location.

SUBMISSION RESULTS
 The results for ☒ dimensional measurements ☒ material and functional tests ☐ appearance criteria ☐ statistical process package
 These results meet all drawing and specification requirements: ☒ Yes ☐ No (If "No" - Explanation Required)
 Mold / Cavity / Production Process W-3512 / Assembly

Process Flow #: 3512-01 (Revision BY5 / A19 / A) Date (Orig.) 08/17/2007 Date Rev. 08/18/2022
Item / Part #: 600x3512x01x / 80043512x01x / 320013512x01x Prepared By Alice Lossie / Dan Switzer
Program(s) / Part Name: 34 Way Male Hybrid Assembly



**POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(Process FMEA)**

53150 N. Main Street
Mattawan MI 49071
Phone: (269) 668-3393
Fax: (269) 668-4694

ITEM: 600x3512x01x / 80043512x01x / 320013512x01x

Process Responsibility:

WDP Mfg. Engineering

FMEA Number:

3512-01 (Revision BY5 / A19 / A)

MODEL YEAR(s) / PROGRAM(s) 34 Way Male Hybrid Assembly

Key Date:

11/29/2010

Prepared by:

Alice Lossie / Dan Switzer

CORE TEAM: PM - Mike Davidson , ME - Dan Switzer , QE - Alice Lossie , Plant Super. - Dale White, QC Super. - Brandy Rosales

FMEA Date (Orig.):

8/17/07

FMEA Date (Rev): 8/18/22

PROCESS STEP FUNCTION	REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	S E V	C L A S S	POTENTIAL CAUSE(S)/ MECHANISM OF FAILURE	O C C	Current Control		D E T	R P N	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTION RESULTS				
								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
Molded Components in the Assembly Shell Cover Spacer	No molding defects, underfill, burn, warp, broken cores, etc	Inadequately molded part that will not comply with the print specifications	1. Dimensional inconsistency 2. Physical properties inadequate for design requirements 3. Part incomplete or deformed 4. Broken / chipped core	8		1. Machine parameters set up incorrectly on the molding machine 2. Tooling Failures 3. Machine Failures 4. Operational failures	2	1. See Individual pFMEA for the component. 2. See Systems pFMEA for molding	1. See Individual pFMEA for the component. 2. Final audit inspections of the individual parts documented in the database.	5	80	8D WDP5723, short shot on cover. Valve gate sticking. Send tool for repair. 8D WDP5767, short shot cover. Review of PFMEA and Control Plan for previous issue actions. KG	JH / BR 06/2022 JH / BR 06/2022	8	2	5	80	
Process 10 Receive material & purchased components	Material is labeled correctly with the correct quantity	Incorrectly labeled material or components from supplier Incorrect quantity of material or components	1. Inaccurate inventory 2. Possible line shut down	8		1. Supplier system failure 2. Labels not properly bar coded	3	1. Warehouse scanning system 2. Supplier is minimum ISO 9001 certified 3. Receiving inspection	1. Warehouse scanning system 2. Receiving inspection	2	48	None						
Process 20 Receiving Inspection Of Material	Material certification on file Material correctly labeled	No material certification on file Material labeled wrong	1. Inaccurate inventory 2. Possible line shut down	8		1. Error in raw material handling or processing at supplier. 2. Error in labeling product in house	2	1. Suppliers are ISO 9001 certified at minimum. 2. External Audits of the Suppliers by WDP.. 3. Receiving Inspection Instructions QWI022 4. Training of the Receiving Inspector to the work Instructions.	1. Receiving inspection 2. Material certification with each shipment	3	48	None						
Process 20 Receiving Inspection Of Purchased Components Grommet	PPAP on file, no defects, all parts meet drawing specifications	No PPAP on file Components not made to print specifications Components damaged, tears, plugged holes etc.	1. Possible line shut down 2. Unable to assemble components 3. Customer reject 4. Product on hold until PPAP is completed	8		1. Error in suppliers manufacturing process 2. Inadequate receiving inspection 3. Receiving inspection does not detect defects	2	1. Suppliers process controls 2. Suppliers submit PPAP package to WDP 3. Suppliers are ISO 9001 certified at minimum 4. Receiving inspection instructions QWI022	1. Receiving inspection QWI022 2. AQL sampling plan	5	80	None						

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Process 30 Assembly of Grommet to Connector Hand Assembly	No molding defects, grommet present & seated properly	Grommet missing	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Operator Error 2. Operator not following hand assembly instructions 3. Fixture malfunctions pulling grommet back out	2	1. Operator training on work instruction 2. Floor operator training on assembly set up 3. Fixtures reviewed daily for operational use 4. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	112	RPN high because it is all a visual inspection, no other controls at this time for hand assembly. 11/8/16 Reviewed for 8D WDP2060 for missing grommet. Label shows defect produced was from hand assembly process which is no longer used since the addition of another assembly machine. No changes required at this time. AL						
		Grommet mis-oriented	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Operator Error 2. Operator not following hand assembly instructions 3. Fixture malfunction	1	1. Part design allows grommet assembly symmetrical 180° 2. Fixtures have been Pokey-Yoke to assemble to the proper orientation 3. Operator training on work instruction 4. Fixture reviewed daily for operational use 5. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	6	48	None						
		Grommet Underfilled / Torn, plugged holes	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting 4. Unable to install terminal wire	8		1. Underfilled / Damaged Grommet received from supplier 2. Grommet damaged during assembly	2	1. Supplier process controls 2. Operator inspection prior to assembling	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. Receiving inspection QW1022 using keyence device.	7	112	RPN high because it is all a visual inspection, no other controls at this time for hand assembly						
Process 30 Assembly Of Spacer To Connector Hand Assembly	No molding defects, spacer present & seated properly	Spacer missing	1. Open circuit in the finished application 2. Customer Rejection 3. Product Verification Sorting	8		1. Operator Error 2. Operator not following hand assembly instructions 3. Fixture malfunction	2	1. Operator training on work instruction 2. Floor operator training on assembly set up 3. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	112	RPN high because it is all a visual inspection, no other controls at this time for hand assembly						
		Spacer misoriented	1. Open circuit in the finished application 2. Customer Rejection 3. Product Verification Sorting	8		1. Operator Error 2. Operator not following hand assembly instructions 3. Fixture malfunction	2	1. Fixtures have been Pokey-Yoke to assemble to the pre- locked position and proper orientation 2. Operator training on work instruction 3. Floor operator training on assembly set up 4. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. Fixture in use does not allow mis-oriented spacer	5	80	None						

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Spacer damaged / broken	1. Not capture the terminals 2. Customer Rejection 3. Product Verification Sorting	8		1. Part broken from molding process 2. Operator error during assembly 3. Fixture malfunction	2	1. Operator training on work instruction 2. Floor operator training on assembly set up 3. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	112	RPN high because it is all a visual inspection, no other controls at this time for hand assembly						
		Spacer fully engaged from prestaged position (seated)	1. Requires wire harness assembler to pull spacer out to prestage position prior to assembling terminals 2. Customer Rejection 3. Product Verification Sorting	3		1. Operator Error 2. Operator not following hand assembly instructions 3. Fixture malfunction	2	1. Fixtures have been Pokey-Yoke to assemble to the pre- locked position and proper orientation 2. Operator training on work instruction 3. Floor operator training on assembly set up 4. Operator inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	42	None						
Process 30 Assemble Spacer To Connector Automated Assembly	No molding defects, spacer present & seated properly	Spacer missing	1. Open circuit in the finished application 2. Customer rejection 3. Product verification sorting	7		1. Machine misfed 2. Part detection sensor failure	2	1. Master sample error proof verification 2. Machine logic does not cycle without part presence detection 3. Inspector and operator training to the procedures 4. 100% vision system inspection at dedicated stations 5. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	42	None						
		Spacer mis-oriented	1. Open circuit in the finished application 2. Customer rejection 3. Product verification sorting	7		1. Machine misfed 2. Part detection sensor failure	2	1. Part design allows spacer assembly symmetrical 180° 2. Inspector and operator training to the procedures 3. 100% vision system inspection at dedicated stations 4. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	42	None						
		Spacer damaged / broken	1. Not capture the terminals 2. Customer rejection 3. Product verification sorting	7		1. Machine misfed 2. Molding issues	2	1. Camera is in line to verify that spacers are not broken 2. Cylinder stroke have been designed to assemble to locked position - positive stop in equipment 3. Inspector and operator training to the procedures 4. Individual PFMEA/Control Plan to verify the molding process to make sure components are not broken or damaged in the molding process	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	42	None						

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Spacer fully engaged from prestaged position (seated)	1. Requires wire harness assembler to pull spacer out to prestage position prior to assembling terminals 2. Customer rejection 3. Product verification sorting	3		1. Machine cylinder over stroke	2	1. Cylinder stroke position sensor 2. Cylinder stroke have been designed to assemble to locked position - positive stop in equipment 3. Inspector and Operator Training to the procedures 4. 100% vision system inspection at dedicated stations 5. Verification test parts the beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	18	None						
Process 30 Assemble Grommet To Connector Automated Assembly	No defects, grommet present & seated properly	Grommet missing	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine miss feed 2. Part detection sensor failure	2	1. Machine logic does not cycle without part presence detection 2. Inspector and operator training to the procedures 3. 100% vision system inspection at dedicated stations 4. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	48	Review per CAR WDP0569 for missing Grommet	Alice Lossie 2/10/2012	Reviewed the PM records and 100% Verified product.				
		Grommet miss orientated	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine miss feed 2. Part detection sensor failure	2	1. Part design allows grommet assembly symmetrical 180° 2. Inspector and operator training to the procedures 3. 100% vision system inspection at dedicated stations 4. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	48	None						
		Grommet Underfilled / Torn, plugged holes	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Underfilled / Damaged Grommet received from supplier 2. Grommet damaged during assembly	2	1. Supplier process controls 2. Inspector and operator training to the procedures 3. 100% vision system inspection at dedicated stations 4. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift 7. Receiving inspection using AQL sampling plan / Keyence measuring 8. Supplier controls	3	48	None						

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Process 40 Manufacturing Verification 100% Inspection of Assembly Automated Assembly	All components one of each, spacer, grommet present & seated properly	Parts mis-assembled (wrong or missing components)	1. Cause loss of designed functionality	8		1. Vision system not detecting mis-assembled parts 2. Parts not going into reject chute	2	1. Training on setup of equipment. 2. Computer controlled system. 3. 100% vision system inspection at dedicated stations 4. PM on machine 5. Verification tests beginning of each shift	1. First article inspection QWI010 2. In-process inspection QWI026 3. Final Audit inspection QWI016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	48	None						
Process 40 Checkhead Verification Automated Assembly	All components present & seated properly	Parts mis-assembled (wrong or missing components)	1. Assembly machine passes non-conforming parts 2. Customer rejection 3. Validation sorting	8		1. Sensor failure on equipment 2. Opeator doesn't understand instructions	2	1. Operator training on assembly 2. First Article Inspection on Work Instructions 3. Inprocess Inspection Work Instructions 4. Final Audit Inspection Work Instructions 5. Operator Inspection Work Instruction 6. PM on machine	1. First Article Inspection 2. Inprocess Inspection 3. Final Audit Inspection 4. Operator Inspection 5. Verification test parts the beginning of each shift	3	48	None						
Process 50 First Article Inspection	All In-process steps completed, no molding defects, all components- spacer, grommet, present & seated properly, proper carton identification	Inspection process does not detect defects	1. Dimensional inconsistency 2. Poor fit to mating part causing an open or incomplete circuit 3. Missing or incomplete features 4. Validation sorting 5. Customer reject	8		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training for all inspectors to the work instructions 2. Cross functional team creates inspection instructions	1. First article inspection QWI010 2. In-process inspection QWI026 3. Final Audit inspection QWI016 4. Operator Inspection	5	80	None						
		Inspection process not completed	1. Potential nonconforming part will be produced 2. Possible customer reject & line shut down	8		1. Inspection instructions not followed 2. Operator error	2	1. Work instruction QWI010 First Last Article Inspection 2. Work Instruction QWI026 In-process inspection 3. Supervisor review of In-process inspections being performed 4. Work instruction QWI016 Final Audit inspection 5. Cross functional team creates inspection instructions 6. Training to all work instructions	1. Inspection entry into the WDP Database 2. Evidence of parts on First Article board 3. Work instruction QWI016 Final Audit Inspection	5	80	None						

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		Inspection process not effective	1. Potential nonconforming part will be produced 2. Possible customer reject & line shut down	8		1. Inspection Instructions not adequate 2. Inspection instructions not completed correctly 3. Operator error	2	1. Work instruction QWI010 First Last Article Inspection 2. Work Instruction QWI026 In-process inspection 3. Supervisor review of In-process inspections being performed 4. Work instruction QWI016 Final Audit inspection 5. Cross functional team creates inspection instructions 6. Training to all work instructions	1. Non-conforming pictures in WDP Database 2. Alerts in WDP Database 3. Cross functional team creates inspection instructions 4. Work instruction QWI016 Final Audit inspection 5. Work instruction QWI026 In-process inspection	5	80	None						
		Label printing not completed per procedure (Wrong labels)	1. Internal customer reject 2. Possibly wrong product shipped 3. Potential customer manufacturing shut down	8		1. Operator not following label printing instructions 2. Error with label maker 3. Inspector failure to verify correct labels	2	1. Work instruction MWI025 Printing Production Labels 2. Work instruction QWI010 First Last Article Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction MWI004 Label ID & Use 5. Work instruction QWI016 Final Audit inspection 6. Training to all work instructions	1. Label Verification Master 2. Work instruction QWI010 First Last Article inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI016 Final Audit inspection 5. Work instruction MWI004 Label ID & Use	5	80	None						
Process 60 In-Process Inspection	All In-process steps completed, no molding defects, all components-spacer, grommet, present & seated properly, proper carton identification	See First Article Inspection See control plan in database	See First Article Inspection See control plan in database	8		See First Article Inspection See control plan in database	2	See First Article Inspection See control plan in database	See First Article Inspection See control plan in database	5	80	None						
Process 70 Manufacturing Packaging Verification	Correct quantity, labels & parts must be packaged	Incorrect quantity packaged	1. Customer rejection 2. Potential customer line shut down 3. Component damaged during shipment	6		1. Packaging instructions not clear 2. Packaging instructions not available 3. Packaging instructions not followed 4. Audit scale APW number not calculated correctly	2	1. Detailed packaging instructions developed for each product 2. Training of operators on packaging instructions 3. Using the scale at final audit work instruction	1. First piece inspection 2. In-process inspection 3. Final audit	7	84	None					0	
		Incorrect label affixed to packaging	1. Customer rejection 2. Potential customer line shut down	7		1. Label verification not available 2. Label verification not used 3. Labels made and affixed to container ahead of time 4. Wrong labels printed at first article	2	1. Molding label verification work instructions 2. Training to all work instructions 3. Each part number assigned a label job number to print labels	1. Training matrix 2. First and Last Article inspection 3. In-process inspection 4. Operator inspection 5. Final audit inspection 6. Molding Label Verification Card	7	98	8D WDP2562, wrong labeled product. Update QWI010 First Article.	KI / BR 3/15/18	3/12/18, 8D WDP2562, Updated QWI010 First Article to verify labels in a timely manner. QWI016 was previously updated. No change to RPN. AL				0

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PROCESS STEP FUNCTION	REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	S E V	C L A S S	POTENTIAL CAUSE(S)/ MECHANISM OF FAILURE	O C C	Current Control		D E T	R P N	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTION RESULTS				
								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Wrong or mixed parts in the package	1. Customer rejection 2. Potential customer manufacturer shut down	6		1. Packages sitting open and unsealed 2. Operators not cleaning out job setups from run to run 3. Filling a partial carton with wrong product	2	1. Packaging plan 2. Housekeeping and Line clearance from previous run. 3. Inspector and Operator Training to the inspection and scanning procedures.	1. First article inspection QW1010 2. In Process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection MW1004 Label ID & Use / Label verification card	7	84	8D WDP2955 for mixed parts. Updated machine program to index a minimum of 15 times to clear table mode.	RB / 9/13/18	8d WDP2955, machine clear mode re-programed to index a minimum of 15 times before machine can be placed back into Place parts mode.	6	2	3	36
Process 80 Final Audit Inspection	Visual inspection of parts, no molding defects, no missing or mis-seated components, correct carton label	Inspection process does not detect defects	1. Dimensional inconsistency 2. Poor fit to mating part causing an open or incomplete circuit 3. Missing or incomplete features 4. Validation sorting 5. Customer reject	7		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training for all inspectors to the work instructions 2. Cross functional team creates inspection instructions	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	98	None						
		Visual Inspection not 100% effective	1. Visual Defects go undetected	8		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training to all work instructions 2. Past defective boundary sample pictures in the database	1. Internal audits 2. Work instruction QW1016 Final Audit Inspection 3. Work instruction QW1026 In-process inspection 4. Work instruction QW1010 First Last Article inspection 5. Operator inspection	7	112	None						
Process 90 Store In-House / Transfer To Warehouse	Correct product stored in correct location	Incorrect product stored in right location	1. Unable to locate product 2. May need to remake product	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning from Plant to Warehouse work instructions 2. Scanning from Warehouse to Plant work instructions 3. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Month end inventory audit	3	48	None						0
		Correct product stored in wrong location	1. Unable to locate product 2. May need to remake product	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning from Plant to Warehouse work instructions 2. Scanning from Warehouse to Plant work instructions 3. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Month end inventory audit	3	48	None						0
Process 100 Assemble Cover to connector Automated Assembly	No molding defects, correct orientation & engraving on cover, cover present & fully seated	Cover missing	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine miss feed 2. Part detection sensor failure	2	1. Machine logic does not cycle without part presence detection 2. Inspector and operator training to the procedures 3. 100% vision system inspection at dedicated stations 4. Test verification parts beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	48	None						

**POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(Process FMEA)**

ITEM: 600x3512x01x / 80043512x01x / 320013512x01x

Process Responsibility:

WDP Mfg. Engineering

FMEA Number:

3512-01 (Revision BY5 / A19 / A)

MODEL YEAR(s) / PROGRAM(s) 34 Way Male Hybrid Assembly

Key Date:

11/29/2010

Prepared by:

Alice Lossie / Dan Switzer

CORE TEAM: PM - Mike Davidson , ME - Dan Switzer , QE - Alice Lossie , Plant Super. - Dale White, QC Super. - Brandy Rosales

FMEA Date (Orig.):

8/17/07

FMEA Date (Rev):

8/18/22

PROCESS STEP FUNCTION	REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	S E V	C L A S S	POTENTIAL CAUSE(S)/ MECHANISM OF FAILURE	O C C	Current Control		D E T	R P N	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTION RESULTS				
								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		cover not fully engaged	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting 4. Potential for cover to fall off during shipping	8		1. Machine miss feed 2. Part detection sensor failure 3. Machine cylinder stroke failure	2	1. Inspector & operator training to the work instructions 2. Cylinder positive stop 3. PM program on machine covers cylinders 4. Verification tests beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	3	48	Add sensor to check for backward cover. 8D WDP3523, cover not fully installed. Broken peg stuck under cover preventing it from locking. Add cover height sensor to machine, red rabbit parts & review with all operators.	SE / SM 6/3/2013 RB / JH 08 / 2019	WDP0882 / 0884 Added another sensor to catch backward covers. 6/3/2013 No changes to RPN AL 8D WDP3523 08/08/2019, cover height sensor & red rabbit parts added to machine to detect unseated covers, reviewed with all operators. No changes to RPN. AL				
		Cover pegs broken and or bent	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine cylinder malfunction. 2. Machine miss feed 3. Vision system failure	2	1. Inspector & operator training to the work instructions 2. Cylinder positive stop 3. PM program on machine covers cylinders 4. Verification tests beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	5	80	Reviewed CAR WDP 0632 for Bent Cover pegs. 8D WDP2819, WDP2923 broken, missing cover pegs. Increase camera backlight intensity to 80% from 40%, add cleaning the backlight to the PM schedule.	Alice lossie 06/15/2012 RB / EN 9/20/18	No changes required 8D WDP2819, WDP2923 9/13/18, camera backlight intensity was set at 80% & hard coded so no changes can be made. Cleaning the camera backlight was added to PM schedule. No changes to RPN. AL				
		Cover pegs do not seal	1. Connector leak causing open circuit 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine cylinder malfunction. 2. Molding ejection process not stable 3. Grommet not dimensionally stable 4. Molding defects, flash, pitting, etc.	2	1. Cylinder stroke position sensor 2. Cylinder stroke has been designed to assemble to locked position - positive stop in equipment. 3. Inspector and Operator Training to the procedures. 4. 100% Vision system inspection at dedicated stations	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% Vision system inspection at dedicated stations 6. Machine PM schedule to maintain optimal performance	3	48	None						
		Cover peg holes not punched clean. (Chads)	1. Possibly unable to install terminal wire 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine cylinder malfunction. 2. Machine miss feed 3. Vision system failure	2	1. Inspector & operator training to the work instructions 2. Cylinder positive stop 3. PM program on machine cover cylinders 4. Verification tests beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	5	80	None						

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Damaged walls between terminal openings	1. Possibly unable to install terminal wire 2. Customer Rejection 3. Product Verification Sorting	8		1. Stuck peg in between the cover pin punch block	2	1. Inspector & operator training to the work instructions 2. Bush to sweep cover off prior to punch process 3. PM program on machine 4. Verification tests beginning of each shift 5. New light added to enhance camera inspection	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	5	80	WPD2368 damaged cover between the terminal openings. Added this line item. AL						
		Cover peg holes not punched correctly (wrong pin configuration)	1. Unable to install terminal wire 2. Customer Rejection 3. Product Verification Sorting	8		1. Machine cylinder malfunction. 2. Machine miss feed 3. Vision system failure 4. Broken punch pin on machine 5. Inspector error verifying punch set up	2	1. Inspector & operator training to the work instructions 2. Cylinder positive stop 3. PM program on machine cover cylinders 4. Verification tests beginning of each shift	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Test verification parts beginning of each shift	5	80	Add Fixture to check pin configuration Systemic for WDP 1366-1371 for wrong pin configuration. Adding card templates to set up 8D WDP1991, add color coded set up books for each polarization to prevent wrong label verification card from being pulled 8D WDP2517, wrong pin configuration, one part found with missing pin. No true root cause found. Review all process to verify acceptable. 8D WDP3015, wrong pin configuration, everyone failed to verify set up was incorrect. Review with operators, also create new label verification cards with punch block	Alice Lossie 08/3/2012 AL / TG 3/18/15 BR/JH/CW 10/5/16 BR/JH 3/20/18 JH/BR / Q Tech 11/2/18	WDP0676 AL, Systemic for WDP0700 added fixture FW-0128 to check pin configuration AL No changes to RPN Added card templates to set FW0128 pin configuration correctly. No changes to RPN. AL 10/3/16 8D WDP1991, books have been color coded for label verification cards. No change to RPN. AL 3/5/18, 8D WDP2517 Camera, label verification, final audit graphics all acceptable. No change to RPN. AL 8D WDP3015, reviews took place in Sept. Label verification card updated on 11/2/18. No changes to RPN. AL				
		Wrong laser engraved part number	1. Not engraved correctly 2. Wrong number will have customer to assemble the wrong product in the application 3. Customer rejection 4. Validation sorting	8		1. Laser machine malfunction 2. Improper programing 3. Inspector error verifying laser engraved part number at first article	2	1. Inspector and Operator Training to the work instructions 2. PM program on the machine includes laser engraver 3. Final Audit inspection QW10022 Inspection 4. Scanning of production label to set the laser engraved part number	1. First article inspection QW1010 2. In process Inspection QW1026 3. Machine PM to maintain optimal function. 4. Scanning of production label to set the laser engravaed part number	5	80	None						
		Laser engraving is not legible	Laser engraving not legible (to deep or not deep enough)	8		1. Laser machine malfunction 2. Improper programing 3. Inspector error verifying laser engraved part number at first article	2	1. Inspector and Operator Training to the work instructions 2. PM program on the machine includes laser engraver 3. Final Audit inspection QW10022 Inspection 4. Scanning of production label to set the laser engraved part number	1. First article inspection QW1010 2. In process Inspection QW1026 3. Machine PM to maintain optimal function. 4. Scanning of production label to set the laser engravaed part number	5	80	None						

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Terminal numbering on cover not correct	1. Customer unsure of where to install terminals 2. Customer Rejection 3. Product Verification Sorting	8		1. Incorrect combination of inserts used 2. Terminal cores not keyed 3. Cover terminal numbering orientation guide not available for inspectors	2	1. Tooling Standards for Injection Molds guidelines 2. First and Last Article Inspection work instruction 3. Cover orientation guide 4. Terminal cores keyed	1. First article inspection 2. Process verification synopsis per Molding Set up Book Master process 3. Tool PM per Tracking database	5	80	8D WDP4780, added this process						
Process 110 Manufacturing Verification 100% Inspection of Assembly Automated Assembly	No molding defects, correct orientation & engraving on cover, cover present & fully seated	Parts mis-assembled, wrong orientation, missing or wrong laser engraving	1. Unable to install terminal wire 2. Customer Rejection 3. Product Verification Sorting 4. Wrong number will have customer to assemble the wrong product in the application	8		1. Vision system not detecting mis-assembled parts 2. Parts not going into reject chute 3. Laser machine malfunction 4. Machine set up incorrectly by operator	2	1. Inspector and Operator Training to the work instructions 2. PM program on the machine includes laser engraver 3. Final Audit inspection QWI0022 Inspection 4. Scanning of production label to set the laser engraved part number	1. First article inspection QWI010 2. In-process inspection QWI026 3. Final Audit inspection QWI016 4. Operator Inspection 5. 100% vision system inspection at dedicated stations 6. Machine PM to maintain optimal function	3	48	8D WDP4575, short shot on cover. Send tool for gate repair. Move camera #2 for better lighting to detect defect. Hold operator reviews.	JH / 03/2021	8D WDP4575. On 3/11/21 new gate inserts were added to tool. 3/4/21 camera #2 was moved for better lighting. 3/3/21 held operator reviews of defects. No change to RPN. AL	8	2	3	48
Process 110 Checkhead Verification Automated Assembly	All components present & seated properly	Parts mis-assembled (wrong or missing components)	1. Assembly machine passes non-conforming parts 2. Customer rejection 3. Validation sorting	8		1. Sensor failure on equipment 2. Opeator doesn't understand instructions	2	1. Operator training on assembly 2. First Article Inspection on Work Instructions 3. Inprocess Inspection Work Instructions 4. Final Audit Inspection Work Instructions 5. Operator Inspection Work Instruction 6. PM on machine	1. First Article Inspection 2. Inprocess Inspection 3. Final Audit Inspection 4. Operator Inspection 5. Verification test parts the beginning of each shift	3	48	None						
Process 120 First Article Inspection	No molding defects, correct orientation & engraving on cover, cover present & fully seated	Inspection process does not detect defects	1. Dimensional inconsistency 2. Poor fit to mating part causing an open or incomplete circuit 3. Missing or incomplete features 4. Validation sorting 5. Customer reject	8		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training for all inspectors to the work instructions 2. Cross functional team creates inspection instructions	1. First article inspection QWI010 2. In-process inspection QWI026 3. Final Audit inspection QWI016 4. Operator Inspection	5	80	None						
		Inspection process not completed	1. Potential nonconforming part will be produced 2. Possible customer reject & line shut down	8		1. Inspection instructions not followed 2. Operator error	2	1. Work instruction QWI010 First Last Article Inspection 2. Work Instruction QWI026 In-process inspection 3. Supervisor review of In-process inspections being performed 4. Work instruction QWI016 Final Audit inspection 5. Cross functional team creates inspection instructions 6. Training to all work instructions 7. Gaging guides	1. Inspection entry into the WDP Database 2. Evidence of parts on First Article board 3. Work instruction QWI016 Final Audit Inspection	5	80	None						

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3512-01 (Revision BY5 / A19 / A)

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Inspection process not effective	1. Potential nonconforming part will be produced 2. Possible customer reject & line shut down	8		1. Inspection Instructions not adequate 2. Inspection instructions not completed correctly 3. Operator error	2	1. Work instruction QWI010 First Last Article Inspection 2. Work instruction QWI026 In-process inspection 3. Supervisor review of In-process inspections being performed 4. Work instruction QWI016 Final Audit inspection 5. Cross functional team creates inspection instructions 6. Training to all work instructions 7. Gaging guides	1. Non-conforming pictures in WDP Database 2. Alerts in WDP Database 3. Cross functional team creates inspection instructions 4. Work instruction QWI016 Final Audit inspection 5. Work instruction QWI026 In-process inspection	5	80	None						
		Label printing not completed per procedure (Wrong labels)	1. Internal customer reject 2. Possibly wrong product shipped 3. Potential customer manufacturing shut down	8		1. Operator not following label printing instructions 2. Error with label maker 3. Inspector failure to verify correct labels at first article & in-process inspections	2	1. Work instruction MWI025 Printing Production Labels 2. Work instruction QWI010 First Last Article Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction MWI004 Label ID & Use 5. Work instruction QWI016 Final Audit inspection 6. Training to all work instructions	1. Label Verification Master 2. Work instruction QWI010 First Last Article inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI016 Final Audit inspection 5. Work instruction MWI004 Label ID & Use	5	80	None						
Process 130 In-Process Inspection	No molding defects, correct orientation & engraving on cover, cover present & fully seated	See First Article Inspection See control plan in database	See First Article Inspection See control plan in database	8		See First Article Inspection See control plan in database	2	See First Article Inspection See control plan in database	See First Article Inspection See control plan in database	5	80	None						
Process 140 Manufacturing Packaging Verification	Correct quantity, labels & parts must be packaged	Incorrect quantity packaged	1. Customer rejection 2. Potential customer line shut down 3. Component damaged during shipment	6		1. Packaging instructions not clear 2. Packaging instructions not available 3. Packaging instructions not followed 4. Audit scale APW number not calculated correctly	2	1. Detailed packaging instructions developed for each product 2. Training of operators on packaging instructions 3. Using the scale at final audit work instruction	1. First piece inspection 2. In-process inspection 3. Final audit	7	84	None						0

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Incorrect label affixed to packaging	1. Customer rejection 2. Potential customer line shut down	7		1. Label verification not available 2. Label verification not used 3. Labels made and affixed to container ahead of time 4. Wrong labels printed at first article	2	1. Molding label verification work instructions 2. Training to all work instructions 3. Each part number assigned a label job number to print labels	1. Training matrix 2. First and Last Article inspection 3. In-process inspection 4. Operator inspection 5. Final audit inspection 6. Molding Label Verification Card	7	98	8D WDP2486, wrong product shipped, product labeled wrong. Update QW1016 final audit instruction & update 3512 Assy operator instruction to use box stop feature on last box produced.	BR / JH 2/15/18	8D WDP2486, on 1/4/18 QW1016 Final Audit work instruction was updated to complete one box at a time from start to finish. On 2/13/18, 3512 assy operator instructions were updated to use the box stop feature on the machine for last box produced for an order. No change to RPN. AL				0
		Wrong or mixed parts in the package	1. Customer rejection 2. Potential customer manufacturer shut down	6		1. Packages sitting open and unsealed 2. Operators not cleaning out job setups from run to run 3. Filling a partial carton with wrong product	2	1. Packaging plan 2. Housekeeping and Line clearance from previous run. 3. Inspector and Operator Training to the inspection and scanning procedures.	1. First article inspection QW1010 2. In Process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection MW1004 Label ID & Use / Label verification card	7	84	8D WDP2377, mixed product. Update final audit scanning job instruction QW1016.	KI / TL 1/22/18	1/18/18 8D WDP2377 mixed parts. QW1016 final audit instruction was updated to complete each step on each carton before moving on to the next carton. No change to RPN. AL				
Process 150 Final Audit Inspection	No molding defects, correct orientation & engraving on cover, cover present & fully seated	Inspection process does not detect defects	1. Dimensional inconsistency 2. Poor fit to mating part causing an open or incomplete circuit 3. Missing or incomplete features 4. Validation sorting 5. Customer reject	7		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training for all inspectors to the work instructions 2. Cross functional team creates inspection instructions	1. First article inspection QW1010 2. In-process inspection QW1026 3. Final Audit inspection QW1016 4. Operator Inspection	7	98	None						
		Visual Inspection not 100% effective	1. Visual Defects go undetected	7		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training to all work instructions 2. Past defective boundary sample pictures in the database	1. Internal audits 2. Work instruction QW1016 Final Audit Inspection 3. Work instruction QW1026 In-process inspection 4. Work instruction QW1010 First Last Article inspection 5. Operator inspection	7	98	None						
Process 160 Store In-House / Transfer To Warehouse	Correct product stored in correct location	Incorrect product stored in right location	1. Unable to locate product 2. May need to remake product	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning from Plant to Warehouse work instructions 2. Scanning from Warehouse to Plant work instructions 3. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Month end inventory audit	3	48	None						0

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								CURRENT DESIGN /PROCESS CONTROL PREVENTION	CURRENT DESIGN /PROCESS CONTROL DETECTION					ACTION TAKEN	S E V	O C C	D E T	R P N
		Correct product stored in wrong location	1. Unable to locate product 2. May need to remake product	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning from Plant to Warehouse work instructions 2. Scanning from Warehouse to Plant work instructions 3. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Month end inventory audit	3	48	None						0
Process 170 Ship To Customer	Correct carton Correct label Correct parts in carton	Wrong product shipped to customer	1. Product non-functional for the customers application 2. Potential customer Mfg. shut down 3. Customer dissatisfaction	8		1. Mis-labeled cartons 2. Operator not following label instructions 3. Improper shipping instructions	2	1. Packaging Plan 2. Packaging Instructions 3. Operator training with shipping instructions 4. Bar Code ERP system for shipping 5. Work instruction MWI025 Printing production labels 6. Work instruction WHI001 Scanning product for shipment	1. Bar code ERP system 2. Final Audit inspection QWI016 3. Work instruction MWI004 Label ID & Use / Label Verification card 4. Work instruction MWI025 Printing production labels 5. Work instruction WHI001 Scanning product for shipment	3	48	None						
		Product shipped to wrong customer	1. Product non-functional for the customers application 2. Potential customer Mfg. shut down 3. Customer dissatisfaction	8		1. Mis-labeled cartons 2. Operator not following label instructions 3. Improper shipping instructions	2	1. Packaging Plan 2. Packaging Instructions 3. Operator training with shipping instructions 4. Bar Code ERP system for shipping 5. Work instruction MWI025 Printing production labels 6. Work instruction WHI001 Scanning product for shipment	1. Bar code ERP system 2. Final Audit inspection QWI016 3. Work instruction MWI004 Label ID & Use / Label Verification card 4. Work instruction MWI025 Printing production labels 5. Work instruction WHI001 Scanning product for shipment	3	48	None						

Control Plan

Western Diversified Plastics

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone					Date (Orig.)		Date (Rev.)	
Job Number 3512A Part				Alice Lossie 269.668.3393					08/17/2007		08/18/2022	
Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)			
Part Name / Description 34 W M Hybrid Shell (Blk)					Quality Engineering				Customer Quality Approval / Date (If Req'd)			
Supplier / Plant WDP			Supplier Code 609123190		Quality Control				Other Approval / Date (If Req'd)			

Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods					Reaction Plan
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
1	10	Receiving	Supplier	Purchased Parts			Parts Purchased	Visually Verify Correct Quantity Received		Each Lot / Shipment	WHI007 Warehouse Receiving Instructions	Reject Per QWI001 / Notify Supervisor / Adjust Process
2	20	Receiving Inspection	Supplier	Purchased Grommet 3512-51-001, 3512-51-002			Verify PPAP is on file and not more than 1 year old	Supplier Database - Purchased Components		Each Lot / Each Shipment	QWI022 / Receiving Inspection	Reject Per QWI001 / Notify Supervisor / Request PPAP From Supplier
3	20	Receiving Inspection	Supplier	Purchased Grommet 3512-51-001, 3512-51-002			Inspect for any defects, underill, flash, tears, etc.	Visual	Sampling Plan AQL 1	Each Lot / Shipment	QWI022 / Receiving Inspection	Reject Per QWI001 / Notify Supervisor / Request RMA & 8D From Supplier
4	20	Receiving Inspection	Supplier	Purchased Grommet 3512-51-001, 3512-51-002			Verify parts have sufficient silicone	Visual / Verify Not Dry	Sampling Plan AQL 1	Each Lot / Shipment	QWI022 / Receiving Inspection	Reject Per QWI001 / Notify Supervisor / Request RMA & 8D From Supplier
5	20	Receiving Inspection	Supplier	Purchased Grommet 3512-51-001, 3512-51-002			Place OK TO USE on acceptable cartons	Use OK TO USE stamp	Each Acceptable Carton	Each carton per shipment	Pass / Fail	Re-inspect cartons with no label
6	30	Hand Assembly	Sub Assembly Manual	Sub Assembly Step #1 (Hand Assembly)			Place Spacer	Manual Placement FW-0010	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
7	30	Hand Assembly	Sub Assembly Manual	Sub Assembly Step #2 (Hand Assembly)			Install Spacer	Manual Placement	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
8	30	Hand Assembly	Sub Assembly Manual	Sub Assembly Step #3 (Hand Assembly)			Place Grommet	Manual Placement	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
9	30	Hand Assembly	Sub Assembly Manual	Sub Assembly Step #4 (Hand Assembly)			Install Grommet	Manual Placement FW-265	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
10	30	Hand Assembly	Sub Assembly Manual	Sub Assembly Step #5 (Hand Assembly)			Verify Presence & Proper Placement Of Components	Visual Inspection	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
11	30	Automated Assembly	Sub Assembly Machine Station #1	Sub Assembly Step #1 (7-30)			Shell Placement	Fiber Optic Eye Station #1	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
12	30	Automated Assembly	Sub Assembly Machine Station #2	Sub Assembly Step #2 (7-30)			Spacer Placement	Vision System Station #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
13	30	Automated Assembly	Sub Assembly Machine Station #3	Sub Assembly Step #3 (7-30)			Grommet Placement	Vision System Station #5	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone					Date (Orig.)		Date (Rev.)	
Job Number 3512A Part				Alice Lossie 269.668.3393					08/17/2007		08/18/2022	
Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)			
Part Name / Description 34 W M Hybrid Shell (Blk)					Quality Engineering				Customer Quality Approval / Date (If Req'd)			
Supplier / Plant WDP			Supplier Code 609123190		Quality Control				Other Approval / Date (If Req'd)			

Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods				Reaction Plan	
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample			Control Method
									Size	Freq.		
14	30	Automated Assembly	Sub Assembly Machine Station #6	Sub Assembly Step #4 (7-30)			Eject Good Part Into Production Carton / Eject Bad Part Reject Bin	Vision System Stations #3 & #5	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
15	30	Automated Assembly	Sub Assembly Machine Station #1	Sub Assembly Step #1 (7-39)			Shell Placement	Fiber Optic Eye Station #1	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
16	30	Automated Assembly	Sub Assembly Machine Station #2	Sub Assembly Step #2 (7-39)			Spacer Placement	Vision System Station #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
17	30	Automated Assembly	Sub Assembly Machine Station #3	Sub Assembly Step #3 (7-39)			Grommet Placement	Vision System Station #4	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
18	30	Automated Assembly	Sub Assembly Machine Station #5	Sub Assembly Step #4 (7-39)			Eject Good Part To Production Carton	Vision Systems Stations #3 & 4	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
19	30	Automated Assembly	Sub Assembly Machine Station #6	Sub Assembly Step #5 (7-39)			Eject Bad Part To Reject Bin	Vision Systems Stations #3 & 4	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
20	40	Manufacturing Verification	Automated Assembly	Sub Assembly (7-30)			Verify No Missing Components & Proper Component Placement	Vision System Stations # 3, & 5	Each Assembly	Each Cycle	Verification Test Parts Beginning Of Each Shift	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
21	40	Manufacturing Verification	Automated Assembly	Sub Assembly (7-39)			Verify No Missing Components & Proper Component Placement	Vision Systems Stations #3 & 4	Each Assembly	Each Cycle	Verification Test Parts Beginning Of Each Shift	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
22	40	Manufacturing Verification	Manual Assembly	Sub Assembly (Hand Assembly)			Verify Presence & Proper Location Of Components	Visual Inspection	Each Part	Each Assembly	Operator Instructions	Place In Reject Bin Per Instructions
23	40	Checkhead Verification	Automated Assembly	Sub-Assembly (730) (7-39)	Perform Checkhead Verification		Verify Machine Is Functioning Properly	Test Verification Parts On Machine	See Verification Log	Beginning of each shift equipment is used	Operator Instructions / Checkhead Verification Log	Reject Per QWI001 / Notify Supervisor / Adjust Process
24	50	First / Last Piece Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			All Control Plan In-Process Inspection steps listed	See steps listed	2 Parts	At start up	QWI010 First/Last Article	Reject Per QWI001 / Notify Supervisor / Adjust Process
25	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify Part Matches Picture In Upper Right Hand Corner	Visual Part To Picture	5 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
26	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Proper assembly	Visual Parts From Production Carton	5 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process

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Job Number 3512A Part				Alice Lossie 269.668.3393					08/17/2007		08/18/2022	
Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)			
Part Name / Description 34 W M Hybrid Shell (Blk)					Quality Engineering				Customer Quality Approval / Date (If Req'd)			
Supplier / Plant WDP			Supplier Code 609123190		Quality Control				Other Approval / Date (If Req'd)			

Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods					Reaction Plan
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
27	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Review Machine Table For Any Plastic Chips	Visually Review Machine Table		Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
28	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify No Molding Defects, underfill, flash, burn, warp, etc.	Visual Parts From Assembly Hoppers	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
29	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify No Purchased Component Defects, Flash, Underfill, Tears, etc.	Visual Parts From Assembly Hoppers	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
30	60	In-Process Inspection	Automated Assembly	Sub Assembly (7-39)			Verify Acceptable Bee Sting On Parts	Visual Parts / See Conforming Picture In Database	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
31	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify Operator Is Following Instructions & Aware Of Any Alerts	Verbally Verify With The Operator	Each Operator	At start up / Once A Shift	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
32	60	In-Process Inspection	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Carton Identification / Proper Label	Visual	All Labels At Point Of Use	At start up / Once A Shift	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
33	60	In-Process Inspection	Automated Assembly	Sub Assembly (7-30) (7-39)			Verify Check Head Verifications Are Completed & Documented	Visual Verification Log / Look For No Failures		Beginning of each shift equipment is used	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
34	70	Manufacturing Packaging Verification	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Carton Identification / Proper Label	Visual	Each Label	Each Carton	MWI004 Label ID & Use	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
35	80	Final Audit	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Proper assembly	Visual Part To Picture, From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audt Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
36	80	Final Audit	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify No Molding Defects, underfill, flash, burn, warp, etc.	Visual Parts From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audt Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
37	80	Final Audit	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Verify No Purchased Component Defects, Flash, Underfill, Tears, etc	Visual Parts From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audt Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
38	80	Final Audit	Automated Assembly	Sub Assembly (7-39)			Verify Acceptable Bee Sting On Parts	Visual Parts / See Conforming Picture In Database	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone					Date (Orig.)		Date (Rev.)	
Job Number 3512A Part				Alice Lossie 269.668.3393					08/17/2007		08/18/2022	
Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)			
Part Name / Description 34 W M Hybrid Shell (Blk)					Quality Engineering				Customer Quality Approval / Date (If Req'd)			
Supplier / Plant WDP			Supplier Code 609123190		Quality Control				Other Approval / Date (If Req'd)			

Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods					Reaction Plan
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
39	80	Final Audit	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)			Carton Identification / Proper Label	Visual Part To Picture	Each Label	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
40	90	Store In-House	Automated Assembly / Manual Assembly	Sub Assembly (7-30) (7-39) (Hand Assembly)	Transfer To Warehouse		Forklift Truck / Scanning System	WHI008	Each Carton	Each Skid	WHI008 Scanning From Plant To Warehouse	Notify Final Audit To Scan Product Into System
41	100	Automated Assembly	Assembly Machine Station #1	Assembly Step #1 (7-29)			Place Cover	Fiber Optice Eye Station #1	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
42	100	Automated Assembly	Assembly Machine Station #2	Assembly Step #2 (7-29)			Punch Cover	Vision System #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
43	100	Automated Assembly	Assembly Machine Station #3	Assembly Step #3 (7-29)			Verify Cover	Vision System #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
44	100	Automated Assembly	Assembly Machine Station #4	Assembly Step #4 (7-29)			Lazer Cover Part Number	Visual Inspection At Start Up / Train Computer	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
45	100	Automated Assembly	Assembly Machine Station # 5	Assembly Step #5 (7-29)			Place Cover On Shell	Vision System Station #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
46	100	Automated Assembly	Assembly Machine Station #6	Assembly Step #6 (7-29)			Eject Good Part Production Carton / Eject Bad Part Reject Bin	Vision System Station #3	Each Part	Each Assembly	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
47	100	Automated Assembly	Assembly Machine Station # 1	Assembly Step #1 (7-36)			Place Cover	Station #2 Fiber Optic Eye	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
48	100	Automated Assembly	Assembly Machine Station #2	Assembly Step #2 (7-36)			Verify Cover Presence/Correct Cover Location/Verify Shell Cleared Off	Fiber Optic Eye	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
49	100	Automated Assembly	Assembly Machine Station #3	Assembly Step #3 (7-36)			Brush Cover Off	Brush	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
50	100	Automated Assembly	Assembly Machine Station #4	Assembly Step #4 (7-36)			Punch Cover	Label Scanning/Vision System At Station #6	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
51	100	Automated Assembly	Assembly Machine Station #5	Assembly Step #5 (7-36)			Air Blow Off / Ionized No Static	Fiber Optic Eye Station #5	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone				Date (Orig.)		Date (Rev.)	
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Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales			Customer Engineering Approval / Date (If Req'd)			
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Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods				Reaction Plan	
				Product	Process		Product / Process Specification / Tolerance	Evaluation Measurement Technique	Sample			Control Method
									Size	Freq.		
52	100	Automated Assembly	Assembly Machine Station # 6	Assembly Step #6 (7-36)			Train Cover Punch / Verify Bent Pins & Chad	Vision System Camera Station #6	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
53	100	Automated Assembly	Assembly Machine Station # 7	Assembly Step #7 (7-36)			Shell Placement / Grommet Color Verified	Fiber Optic Eyes / Vision System	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
54	100	Automated Assembly	Assembly Machine Station # 8	Assembly Step #8 (7-36)			Cover Placement	Vision System Station #9	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
55	100	Automated Assembly	Assembly Machine Station # 9	Assembly Step #9 (7-36)			Verify Spacer Presence/Inspect For Laser Print	Vision System Station #9	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
56	100	Automated Assembly	Assembly Machine Station # 10	Assembly Step #10 (7-36)			Verify Shell Polarity / Bent Pins / Damaged Terminal Openings	Vision System Station #10	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
57	100	Automated Assembly	Assembly Machine Station #11	Assembly Step #11 (7-36)			Good Eject Chute	Vision Systems Stations #6,7,9,10	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
58	100	Automated Assembly	Assembly Machine Station #12	Assembly Step #12 (7-36)			Reject Eject Chute	Vision Systems Stations #6,7,9,10	Each Assembly	Each Cycle	Operator Instructions	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify System
59	110	Manufacturing Verification	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Missing, Mis-seated, Correct Pin Configuration	Vision System Station #3 / 6, 7, 9, 10	Each Part	Each Assembly	Verification Test Parts Beginning Of Each Shift	Reject Per QWI001 / Notify Supervisor / Re-Program / Re-Qualify Vision Syst
60	110	Checkhead Verification	Automated Assembly	Final Assembly (7-29) (7-36)	Perform Checkhead Verification		Verify Machine Is Functioning Properly	Test Verification Pars On Machine	See Verification Log	Beginning of each shift equipment is used	Operator Instructions / Checkhead Verification Log	Reject Per QWI001 / Notify Supervisor / Adjust Process
61	120	First / Last Piece Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			All Control Plan In-Process Inspection steps listed	See steps listed	2 Parts	At start up	QWI010 First / Last Article	Reject Per QWI001 / Notify Supervisor / Adjust Process
62	120	First / Last Piece Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Production Labels First / Return To Operator	Visually Verify Labels / Manually Return To Operator	All Labels At Point Of Use	At First Article	QWI010 First / Last Article - QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
63	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Part Matches Picture In Upper Right Hand Corner	Visual Part To Picture	2 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
64	130	In-Process Inspection	Automated Assembly	Final Assembly (7-36)			Verify Correct Cover Pin Configuration	Fixture FW-0128 / Fixture Template Instructions / Measuring Guide	2 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
65	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Correct Part Number Laser Engraved On Cover	Visually Verify All Letters & Numbers Match Label	2 Parts	At start up & every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process

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Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)			
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Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods				Reaction Plan	
				Product	Process		Product / Process Specification / Tolerance	Evaluation Measurement Technique	Sample			Control Method
									Size	Freq.		
66	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Cover Terminal Number Is Correct	Visual Part / See Cover Numbering Orientation Guide / Mearsuring Guide	2 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
67	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Supervisor Must Sign Off On Cover First Articles	Supervisors Signature On First Article Tag		Every First Article	QWI026 In-Process Inspection	Get Supervisor Approval
68	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Proper assembly	Visual	5 Parts	At start up / Every 4 Hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
69	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Review Machine Table For Any Plastic Chips	Visually Review Machine Table		Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
70	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Defects On The Molded Components, Flash, Underfill, etc.	Visual Parts From Assembly Hoppers	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
71	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Cover Sealing Pins Are Defect Free/ No Flash, Pits, Gouges, Etc.	Visual Parts From Assembly Hopper / See Non-Conforming Pictures	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
72	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Defects On The Purchased Components, Flash, Underfill, Tears, etc	Visual Parts From Assembly Hopper	5 Parts	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
73	130	In-Process Inspection	Automated Assembly	Final Assembly (7-36)			Verify Operators Are Completing Cover Check Form MWI000-F004	Visual Log Sheet Completed		Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
74	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Operator Is Following Instructions & Aware Of Any Alerts	Verbally Verify With The Operator	Each Operator	At start up / Once A Shift	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
75	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Carton Identification / Proper Label	Visual	All Labels At Point Of Use	At start up / Once A Shift	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
76	130	In-Process Inspection	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Check Head Verification Was Completed & Documented	Visual Verification Log / Look For No Failures		Beginning of each shift equipment is used	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
77	140	Manufacturing Packaging Verification	Automated Assembly	Final Assembly (7-29) (7-36)			Carton Identification / Proper Label	Visual	Each Label	Each Carton	MWI004 Label ID & Use / Label Verification Card	Reject Per QWI001 / Notify Supervisor / Re-Print Labels

Control Plan

Western Diversified Plastics

Master on Computer - Printed Copies for Reference Only

Page 7 of 7

☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone				Date (Orig.)		Date (Rev.)	
Job Number 3512A Part				Alice Lossie 269.668.3393				08/17/2007		08/18/2022	
Part Number 600x3512x01x/80043512		Rev. BY5/A19 /	Engineering Number 3512x-01	Rev. BY5/A19 /	Core Team A. Lossie, D. Switzer, D. White, M. Davidson, B. Rosales				Customer Engineering Approval / Date (If Req'd)		
Part Name / Description 34 W M Hybrid Shell (Blk)					Quality Engineering				Customer Quality Approval / Date (If Req'd)		
Supplier / Plant WDP			Supplier Code 609123190		Quality Control				Other Approval / Date (If Req'd)		

Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods				Reaction Plan	
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample			Control Method
									Size	Freq.		
78	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Proper assembly	Visual Part To Picture, From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
79	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Chad Or Deformed Walls On The Cover	Visually Verify No Defects Using A Light	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
80	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Molding Defects, Flash, Underfill, Burn, Warp, etc.	Visual Parts From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
81	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Verify Cover Terminal Numbering Is Correct	Visual Part To Cover Terminal Orientation Guide - Measuring Guide	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
82	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Verify No Purchased Component Defects, Flash, Underfill, Plugged Holes, etc	Visual Parts From Top, Middle & Bottom Of Carton	3 Parts	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
83	150	Final Audit	Automated Assembly	Final Assembly (7-29) (7-36)			Carton Identification / Proper Label	Visual Part To Picture	Each Label	Each Carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
84	160	Store In-House	Automated Assembly	Final Assembly (7-29) (7-36)	Transfer To Warehouse		Forklift Truck / Scanning System	WHI008	Each Carton	Each Skid	WHI008 Scanning From Plant To Warehouse	Notify Final Audit To Scan Product Into System
85	170	Shipping	Automated Assembly	Final Assembly (7-29) (7-36)	Load matches shipper		Scanning System	WHI001	100%	Each Shipment	WHI001 Scanning Product For Shipment	Notify Supervisor / Adjust Process
86	500	Annual Requirement	Layout Equipment	Dimensional			Print Dimensions	Layout	5 Parts	Annual	PDP 21 Annual Layout	Reject Per QWI001 / Notify Supervisor / Adjust Process

This assembly is processed on automated assembly equipment. The process includes the use of machine vision which verifies each step of the assembly process. The equipment is verified each shift to ensure it's continues to detect any defects. Because of the nature of the process we do not have a CPK or Gage study for this assembly.

Dimensional Layout Inspection Report

W-No. **W-3512**
 Part No. **SEE BELOW**
 Part Name **34-Way Male Hybrid Assembly**

Run Date **06/09/22**
 Print No. **FU5T-14A624-CC**
 Revision / Date **BY5 (AELE E 12035198 533) 20220613**

Material **see print**
 Insp. Date **06/15/22**
 Insp. By **Cody Strasser**

					Sample Number									
Dim.	Specification	Tol. ±	Lo Lim	Hi Lim	1	2	3	4	5	6	7	8	9	10
FU5T-14A624-CC, 60013512A01C (Sealed A-Pol)														
1	(67.5)	-	67.20	67.80	67.48	67.47	67.48	67.5	67.49					
2	(66.1)	-	65.80	66.40	65.94	66.1	66.18	66.16	66.01					
3	(35.5)	-	35.20	35.80	35.72	35.27	35.3	35.35	35.31					
4	(3.7)		3.40	4.00	3.91	3.91	3.94	3.92	3.91					
5	(84.0)	-	83.70	84.30	84.14	84.19	84.14	84.16	84.16					
6	(45.4)	-	45.10	45.70	45.27	45.36	45.31	45.39	45.29					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					
FU5T-14A624-DC, 60013512B01C (Sealed B-Pol)														
1	(67.5)	-	67.20	67.80	67.44	67.52	67.57	67.54	67.52					
2	(66.1)	-	65.80	66.40	65.96	66.00	66.28	66.32	65.93					
3	(35.5)	-	35.20	35.80	35.21	35.21	35.23	35.28	35.23					
4	(3.7)		3.40	4.00	3.89	3.82	3.51	3.54	3.55					
5	(84.0)	-	83.70	84.30	84.20	84.14	84.25	84.23	84.22					
6	(45.4)	-	45.10	45.70	45.35	45.42	45.20	45.19	45.18					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					
FU5T-14A624-BC, 60013512C01C (Sealed C-Pol)														
1	(67.5)	-	67.20	67.80	67.55	67.40	67.51	67.50	67.51					
2	(66.1)	-	65.80	66.40	66.00	66.16	66.21	66.13	66.34					
3	(35.5)	-	35.20	35.80	35.25	35.29	35.29	35.30	35.23					
4	(3.7)		3.40	4.00	3.64	3.63	3.66	3.68	3.67					
5	(84.0)	-	83.70	84.30	84.13	84.15	83.87	84.25	84.25					
6	(45.4)	-	45.10	45.70	45.20	45.22	45.36	45.55	45.34					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					
HU5T-14A624-AB, 60013512D01B (Sealed D-Pol)														
1	(67.5)	-	67.20	67.80	67.35	67.35	67.41	67.26	67.49					
2	(66.1)	-	65.80	66.40	66.10	65.95	66.19	66.12	66.01					
3	(35.5)	-	35.20	35.80	35.23	35.34	35.25	35.71	35.51					
4	(3.7)		3.40	4.00	3.74	3.95	3.93	3.68	3.67					
5	(84.0)	-	83.70	84.30	84.21	84.19	84.14	84.02	84.25					
6	(45.4)	-	45.10	45.70	45.51	45.22	45.36	45.32	45.24					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					

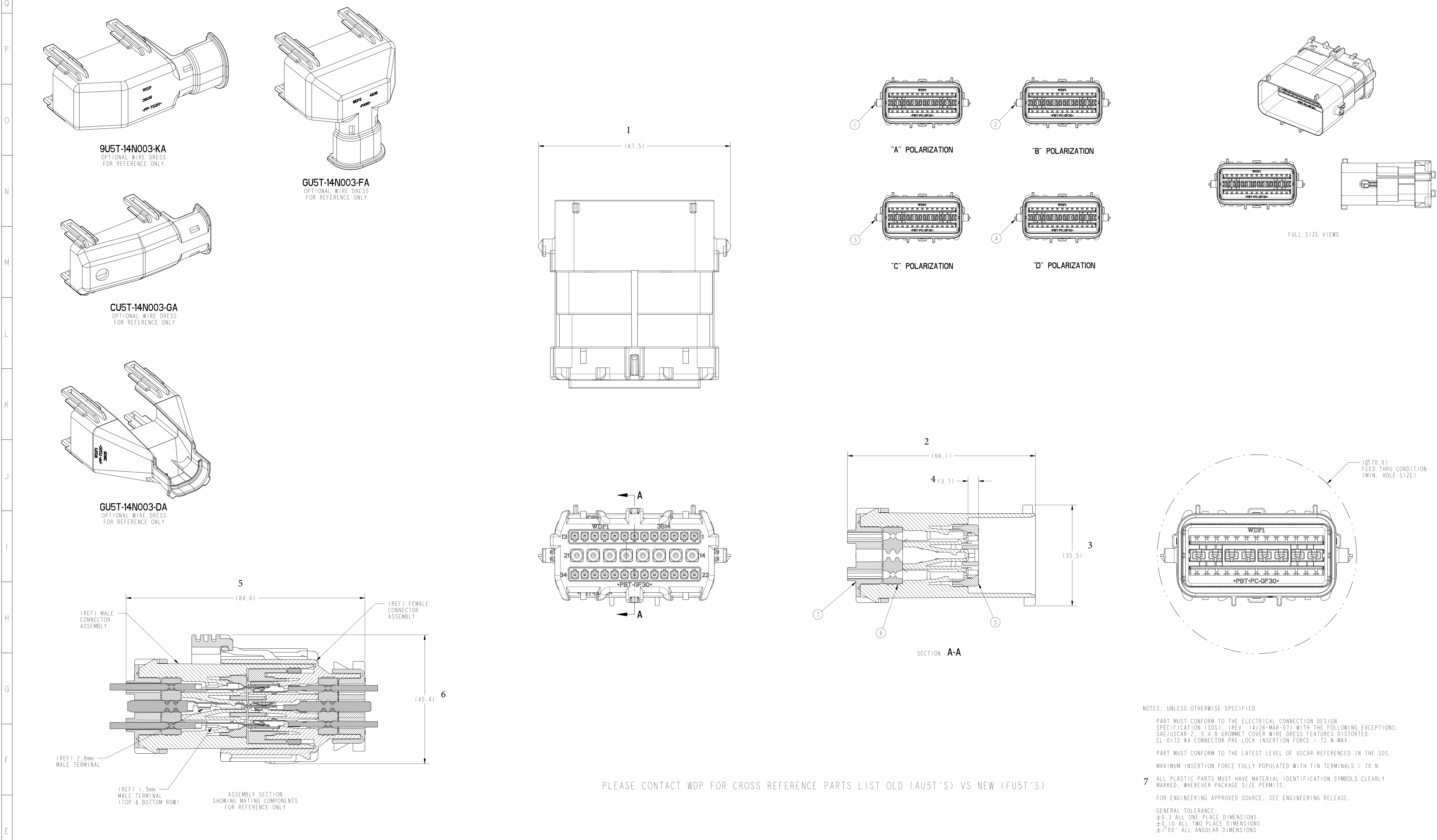
Dimensional Layout Inspection Report

W-No. **W-3512**
 Part No. **SEE BELOW**
 Part Name **34-Way Male Hybrid Assembly**

Run Date **06/09/22**
 Print No. **FU5T-14A624-CC**
 Revision / Date **BY5 (AELE E 12035198 533) 20220613**

Material **see print**
 Insp. Date **06/15/22**
 Insp. By **Cody Strasser**

					Sample Number									
Dim.	Specification	Tol. ±	Lo Lim	Hi Lim	1	2	3	4	5	6	7	8	9	10
AU5T-14A459-AD, 60023512A01D (Unsealed A-Pol)														
1	(67.5)	-	67.20	67.80	67.48	67.47	67.48	67.5	67.49					
2	(66.1)	-	65.80	66.40	65.94	66.1	66.18	66.16	66.01					
3	(35.5)	-	35.20	35.80	35.72	35.27	35.3	35.35	35.31					
4	(3.7)		3.40	4.00	3.91	3.91	3.94	3.92	3.91					
5	(84.0)	-	83.70	84.30	84.14	84.19	84.14	84.16	84.16					
6	(45.4)	-	45.10	45.70	45.27	45.36	45.31	45.39	45.29					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					
AU5T-14A459-BD, 60023512B01D (Unsealed B-Pol)														
1	(67.5)	-	67.20	67.80	67.44	67.52	67.57	67.54	67.52					
2	(66.1)	-	65.80	66.40	65.96	66.00	66.28	66.32	65.93					
3	(35.5)	-	35.20	35.80	35.21	35.21	35.23	35.28	35.23					
4	(3.7)		3.40	4.00	3.89	3.82	3.51	3.54	3.55					
5	(84.0)	-	83.70	84.30	84.20	84.14	84.25	84.23	84.22					
6	(45.4)	-	45.10	45.70	45.35	45.42	45.20	45.19	45.18					
7	Material ID Note	-			Conforms	Conforms	Conforms	Conforms	Conforms					



REFERENCE - APPLICABLE COMPONENTS								
DESCRIPTION	FORD COMPONENT PART NUMBER	SUPPLIER	SUPPLIER COMPONENT PART NUMBER	MATERIAL / SPECIFICATION	APPLICABLE WIRE SIZES	FINISHED WIRE DIAMETER	FORD COMPONENT MATING PART NUMBER	SUPPLIER COMPONENT MATING PART NUMBER
TERMINAL - MALE (Sn) - 2.8mm	8U5T-14421-BA	DELPHI	10762774	COPPER ALLOY / TIN PLATE	10 - 12 AWG 3.0 - 4.0 mm	1.90 - 4.20	XF2T-14474-BA 7LT7-14474-EA	10762802 15422738
TERMINAL - MALE (Sn) - 2.8mm	8U5T-14421-CA	DELPHI	10757692	COPPER ALLOY / TIN PLATE	14 - 16 AWG 1.5 - 2.5 mm		F8VB-14474-AA	10762803
TERMINAL - MALE (Sn) - 2.8mm	8U5T-14421-DA	DELPHI	10762775	COPPER ALLOY / TIN PLATE	18 AWG 1.0 mm		F8VB-14474-BA	10757690
TERMINAL - MALE (Sn) - 1.5mm	2L1T-14421-CA	MOLEX	33000-1002	COPPER ALLOY / TIN PLATE	16 AWG 1.0 mm	1.40 - 2.34	7C3T-14474-EA	33012-3001
TERMINAL - MALE (Sn) - 1.5mm	2L1T-14421-BA	MOLEX	33000-1003	COPPER ALLOY / TIN PLATE	14 - 20 AWG 0.5 mm		7C3T-14474-DA	33012-3002
TERMINAL - MALE (Sn) - 1.5mm	BU5T-14421-HA	MOLEX	34781-1004	COPPER ALLOY / TIN PLATE	22 AWG 0.5 mm		7C3T-14474-CA	33012-3003
TERMINAL - MALE (Au) - 1.5mm	2L1T-14421-FA	MOLEX	33011-0004	COPPER ALLOY / GOLD PLATE	0.35 mm	1.20 - 1.40	BU5T-14474-UA	34780-1004
TERMINAL - MALE (Au) - 1.5mm	2L1T-14421-EA	MOLEX	33011-0006	COPPER ALLOY / GOLD PLATE	16 AWG 1.0 mm		7C3T-14474-HA	33001-3003
TERMINAL - MALE (Ag) - 1.5mm	7U5T-14421-BA	MOLEX	33011-3002	COPPER ALLOY / SILVER PLATE	18 - 20 AWG 0.5 mm		7C3T-14474-FA	33001-3004
TERMINAL - MALE (Ag) - 1.5mm	7U5T-14421-AA	MOLEX	33011-3001	COPPER ALLOY / SILVER PLATE	22 AWG 0.5 mm	1.40 - 2.34	7C3T-14474-TA	33001-5002
WIRE DRESS (LEFT OR RIGHT ROUTE)	9U5T-14N003-KA	WDP	3805-02-001	>PBT+ABS<	N/A	N/A	7C3T-14474-SA	33001-5003
WIRE DRESS (LEFT OR RIGHT ROUTE)	CU5T-14N003-GA	WDP	4018-02-001	>PBT+ABS<	N/A	N/A		
WIRE DRESS (STRAIGHT ROUTE)	GU5T-14N003-DA	WDP	3806-02-001	>PBT+ABS<	N/A	N/A		
WIRE DRESS (UP OR DOWN ROUTE)	GU5T-14N003-FA	WDP	4836-02-001	>PBT+ABS<	N/A	N/A		

TEMPERATURE RANGE -40°C TO 125°C (CLASS #3)						NUMBER OF ITEMS REQUIRED	
ITEM	DESCRIPTION	COLOR	WDP COMPONENT PART NUMBER	MATERIAL I.D. SYMBOL			
1	HOUSING (A POL.)	BLACK	3512A-00-001	>PBT-GF30<	I		I
2	HOUSING (B POL.)	GRAY	3512B-00-001	>PBT-GF30<	I		I
3	HOUSING (C POL.)	BROWN	3512C-00-001	>PBT-GF30<	I		I
4	HOUSING (D POL.)	GREEN	3512D-00-001	>PBT-GF30<	I		I
5	SPACER	NATURAL	3513-00-002	>PBT+PC-GF30<	I	I	I
6	GROMMET	RED	3512-51-002	>VMO<	I	I	I
7	GROMMET COVER	GRAY	3514B-00-001	>PBT-GF30<	I	I	I

FORD ASSEMBLY NUMBER	WDP ASSEMBLY NUMBER	SEALING CLASS WITH WIRE DRESS	VIBRATION CLASS	FORD MATING COMPONENT	WDP MATING COMPONENT
FU5T-14A624-CC	60013512A01C	S3	V2	FU5T-14A464-A1*	60013508A01*
FU5T-14A624-DC	60013512B01C	S3	V2	FU5T-14A464-A1*	60013508B01*
FU5T-14A624-BC	60013512C01C	S3	V2	FU5T-14A464-Y*	60013508C01*
FU5T-14A624-AB	60013512D01B	S3	V2	HU5T-14A464-C*	60013508D01*
AU5T-14A459-AD	60023512A01D	N/A	V2	AU5T-14A489-A*	60023508A01*
AU5T-14A459-BD	60023512B01D	N/A	V2	AU5T-14A489-B*	60023508B01*

UNSEALED	B	60023512B01D	AU5T-14A459-BD
UNSEALED	A	60023512A01D	AU5T-14A459-AD
SEALED	D	60013512D01B	HU5T-14A624-AB
SEALED	C	60013512C01C	FU5T-14A624-BC
SEALED	B	60013512B01C	FU5T-14A624-DC
SEALED	A	60013512A01C	FU5T-14A624-CC
SEALING	POLARIZATION	WDP ASSEMBLY NO.	FORD ASSEMBLY NO.

NOTES: UNLESS OTHERWISE SPECIFIED

PART MUST CONFORM TO THE ELECTRICAL CONNECTION DESIGN SPECIFICATION (SDS) REV. 14/26-MAR-073 WITH THE FOLLOWING EXCEPTIONS:
SAE/JSCAR-2-5 4.8 GROMMET COVER WIRE DRESS FEATURES DISTORTED
EL-0172 #4 CONNECTOR PRE-LOCK INSERTION FORCE = 72 N MAX

PART MUST CONFORM TO THE LATEST LEVEL OF USCAR REFERENCED IN THE SDS.
MAXIMUM INSERTION FORCE FULLY POPULATED WITH TIN TERMINALS = 70 N.

ALL PLASTIC PARTS MUST HAVE MATERIAL IDENTIFICATION SYMBOLS CLEARLY MARKED, WHEREVER PACKAGE SIZE PERMITS.

FOR ENGINEERING APPROVED SOURCE, SEE ENGINEERING RELEASE.

GENERAL TOLERANCE:
±0.3 ALL ONE PLACE DIMENSIONS
±0.10 ALL TWO PLACE DIMENSIONS
±1°00' ALL ANGULAR DIMENSIONS

FEED THROUGH CONDITION (I.E. MIN HOLE SIZE) TO GIVE 2MM TOTAL CLEARANCE ACROSS THE MAXIMUM DIAMETER.

0.3mm MAXIMUM RADIUS PERMISSIBLE ON EDGES SHOWN AS SHARP FOR PLASTIC PARTS.

ALL RADIUS R0.5.

PARTS ARE TO BE FREE OF SCRATCHES, DISCOLORATION, SALT RESIDUE OR OTHER IMPERFECTIONS THAT MAY AFFECT FUNCTION OR FIT OF PART.

DRAWING CONFORMS TO AVP-(T404/T406)-001 REVISION C DATED 8-8-03.

Ⓢ SEALING CLASS - S2.5



WDP Western Diversified Plastics Phone: (269) 668-3393			
REFERENCE			
PART MUST COMPLY WITH RESTRICTED SUBSTANCE MANAGEMENT STANDARD WSS-M99P9999-A1 TO SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT			
DRAFTED IN ACCORDANCE WITH FORD MOTOR COMPANY ENGINEERING CAD AND DRAFTING STANDARDS VERSION 28.1		3RD ANGLE PROJ DIMENSIONS ARE IN MILLIMETERS	
CAD TYPE X-PROE	CAD LOC. TCE	CAD FILE	DTMC IS MASTER
OPER. NO.	UNIT	DRAWING FU5T-14A624-CC	
DESIGN FINSTROM	DETAIL FINSTROM	TITLE SLV ASY WIR CONN MLE	
CHECKED ENSING	SAFETY	SHT OF 9	
SCALE 2:1	DATE 20130114	DIVISION PLANT	
FORD MOTOR COMPANY			

[illegible]

[illegible]

130°C 1.5 Hrs

Polyram Plastic Industries LTD

Moshav Ram On
M.P Gilboa 1920500
Israel

Tel.: 972-4-6599900, Fax: 972-4-6499763

Company Number: 515251593

VAT Number: 515251593

Withheld Tax File: 902248582



URL: <https://www.polyram-group.com>

E-mail: mail@polyram-group.com

Certificate of Analysis

acc. to ASTM D5927-03 TPES011G30

© Created in Priority - Priority Software Ltd.

Grade Name: RAMSTER PF312G6BK401
Polyram Desc: PBT I GF30 HR BLACK
Customer PN#: MAT-089-BLK
Customer Desc: RAMSTER 620 BLK
LOT Number: 22050406
LOT Date: 06/14/22
Color: BLACK 401
Customer: WESTERN DIVERSIFIED PLASTICS

Properties	Test Method	Units	Designated Min	Designated Max	AVG RESULTS
Determination of ASH	ISO 3451-1	%	28.0000	32.0000	30.6750
Physical					
SPIRAL FLOW	INTERNAL	in	35.0000	42.0000	39.1250
MFI (250/2.16kg)	ISO 1133	g/10min	12.0000	35.0000	18.0750
Mechanical					
TENSILE STRENGTH	ISO 527-2/1A	MPa	115.0000	---	131.7500
TENSILE MODULUS	ISO 527-2/1A	MPa	7,500.0000	---	9,252.5000
Impact					
NOTCHED CHARPY IMPACT	ISO179-1/1eA	kJ/m²	7.0000	---	10.6350
Thermal					
HDT 1.8MPa	ISO-75	°C	200.0000	---	205.3000

Grade Remarks

Layout inspection data:

HDT @1.8 MPa ISO-75 200C

This lot meets the mechanical requirements of FCA MS50103 CPN 4615 and Ford WSK-M4D725-B1 specification

The test values reported are means of individual test values determined on samples taken in accordance with the testing plan of the day of production.
Thank you for deciding on Polyram product.

No. 86 Version A

Polyram Plastic Industries LTD

Moshav Ram On

M.P Gilboa 1920500

Israel

Tel.: 972-4-6599900, Fax: 972-4-6499763

Company Number: 515251593

VAT Number: 515251593

Withheld Tax File: 902248582



URL: <https://www.polyram-group.com>

E-mail: mail@polyram-group.com

Certificate of Analysis

acc. to ASTM D5927-03 TPES011G30

Grade Name: RAMSTER PF312G6GR402
Polyram Desc: PBT I GF30 HR GREY
Customer PN#: MAT-089-GRY
Customer Desc: RAMSTER 620 GRAY
LOT Number: 22050677
LOT Date: 06/10/22
Color: GREY 402
Customer: WESTERN DIVERSIFIED PLASTICS

Properties	Test Method	Units	Designated Min	Designated Max	AVG RESULTS
Determination of ASH	ISO 3451-1	%	28.0000	32.0000	30.4333
Physical					
SPIRAL FLOW	INTERNAL	in	34.0000	42.0000	37.1667
MFI (250/2.16kg)	ISO 1133	g/10min	12.0000	35.0000	17.3667
Mechanical					
TENSILE STRENGTH	ISO 527-2/1A	MPa	115.0000	---	124.3333
TENSILE MODULUS	ISO 527-2/1A	MPa	7,500.0000	---	9,246.6667
Impact					
NOTCHED CHARPY IMPACT	ISO179-1/1eA	kJ/m ²	7.0000	---	8.9233

Grade Remarks

Layout inspection data:

HDT @1.8 MPa ISO-75 200C

This lot meets the mechanical requirements of FCA MS50103 CPN 4615 and Ford WSK-M4D725-B1 specification

No. 86 Version A

The test values reported are means of individual test values determined on samples taken in accordance with the testing plan of the day of production.

Thank you for deciding on Polyram product.

Yaara Avrahami

Polyram Plastic Industries LTD

Moshav Rami On

M.P. Gilboa 1920500

Israel

Tel.: 972-4-6599900, Fax: 972-4-6499763

Company Number: 515251593

VAT Number: 515251593

Withheld Tax File: 902248582

URL: <https://www.polyram-group.com>E-mail: mail@polyram-group.com**Certificate of Analysis**

acc. to ASTM D5927-03 TPES051G30

Grade Name: RAMLLOY PZF304G6NT
Polyram Desc: PBT/PC GF30 Natural
Customer PN#: MAT-102-NAT
Customer Desc: RAMLLOY 304 NAT
LOT Number: 22060542
LOT Date: 07/03/22
Color: NATURAL
Customer: WESTERN DIVERSIFIED PLASTICS

Properties	Test Method	Units	Designated Min	Designated Max	AVG RESULTS
Determination of ASH	ISO 3451-1	%	28.0000	32.0000	30.8333
Physical					
MFI (250/2, 16kg)	ISO 1133	g/10min	12.5000	17.0000	13.8850
Mechanical					
TENSILE STRENGTH	ISO 527-2/1A	MPa	96.0000	---	148.0000
TENSILE MODULUS	ISO 527-2/1A	MPa	5,800.0000	---	10,400.0000
Impact					
NOTCHED IZOD IMPACT	ISO 180	kJ/m ²	4.4000	---	11.0667

Grade RemarksLayout inspection data:

HDT @1.8 MPa ISO-75 170C

The test results presented on this COA comply with Ford WSK-M4D790-A specification

* MFI SPEC maximum per WDP agreement

The test values reported are means of individual test values determined on samples taken in accordance with the testing plan of the day of production.

Thank you for deciding on Polyram product.

No. 86 Version A

Yaara Avrahami
Quality Manager
Polyram Plastic Industries LTD



Certificate of Registration

This certificate has been awarded to

Polyram Plastic Industries Ltd

Ram-On, 1920500, Israel

in recognition of the organization's Quality Management System which complies with

IATF 16949:2016

The scope of activities covered by this certificate is defined below

Design and Manufacture of Thermoplastic Raw Material Compounds

Certificate Number:

Date of Issue of Certification Cycle:

61487/B/0001/SM/En

22 June 2020

Issue No:

Expiry Date:

IATF No:

4

21 June 2023

0368787

Issued by:

On behalf of the Schemes Manager



If there is any doubt as to the authenticity of this certificate, please do not hesitate to contact the Head Office of the Group on info@urs-certification.com.
URS is a member of United Registrar of Systems (Holdings) Ltd, Derby Manor, Derby Road, Bournemouth, BH1 3QB, UK. Company Registration no. 5298496





Appendix to Certificate

Design and Manufacture of Thermoplastic Raw Material Compounds

Extended Manufacturing Location

Afula Site

1 Rabin Road

Tadiran Site

Afula

Israel

Scope: Manufacture of Thermoplastic Raw Material Compounds

Certificate Number:

61487/B/0001/SM/En

Date of Issue of Certification Cycle:

22 June 2020

Issue No:

4

Expiry Date:

21 June 2023

IATF No:

0368787



If there is any doubt as to the authenticity of this certificate, please do not hesitate to contact the Head Office of the Group on info@urs-certification.com.
URS is a member of United Registrar of Systems (Holdings) Ltd, Derby Manor, Derby Road, Bournemouth, BH1 3QB. UK. Company Registration no. 5298498





Certificate of Registration

This certificate has been awarded to

Polyram Plastic Industries Ltd

Ram-On, 1920500, Israel

in recognition of the organization's Quality Management System which complies with

ISO 9001:2015

The scope of activities covered by this certificate is defined below

Design and Manufacture of Thermoplastic Raw Material Compounds

Certificate Number:

61487/BB/0001/SM/En

Date of Issue: (Original)

04 July 2017

Date of Issue:

22 June 2020

Issue No:

4

Expiry Date:

21 June 2023

Issued by:

On behalf of the Schemes Manager



If there is any doubt as to the authenticity of this certificate, please do not hesitate to contact the Head Office of the Group on info@urs-certification.com.
URS is a member of United Registrar of Systems (Holdings) Ltd, United House, 4 Hinton Road, Bournemouth, BH1 2EE, UK. Company Registration no. 5296496



MATERIAL: SELF LUBRICATED SILICONE
 ORIGINAL PROPERTIES, ASTM D2240-91, D412-92
 HARDNESS, SHORE A = 13-22
 TENSILE STRENGTH, DIE-C, MPa = 2.0 MIN.
 ELONGATION, % = 500 MIN.
 TEAR STRENGTH, DIE-C, KN/m = 3.0 MIN.
 HEAT AGING, ASTM D-573-88, 168h @ 150°C
 HARDNESS CHANGE, p.s. = -5 TO +10
 TENSILE STRENGTH CHANGE, % = -30 MAX.
 ELONGATION CHANGE, % = -30 MAX.
 COMPRESSION SET, ASTM D-395-89, METHOD B, 70h & 150°C
 SET, % = 25 MAX.
 FLUID RESISTANCE, ASTM D-471-95, 70h @ 150°C ASTM #1 OIL
 HARDNESS CHANGE, p.s. = 0 TO -12
 TENSILE STRENGTH CHANGE, % = -30 MAX.
 ELONGATION CHANGE, % = -30 MAX.
 VOLUME CHANGE, % = 0 TO +15
 COLOR: RED

DaimlerChrysler Ford General Motors

SUPPLIER		PART NUMBER			JS#: 16-0341		
FOREST CITY TECHNOLOGIES		3512-51-002					
NAME OF LABORATORY		PART NAME					
FOREST CITY TECHNOLOGIES		Grommet - 34 Way Male Hybrid					
Test	MATERIAL SPECIFICATION Print Callout	FCMS 848			UOM	OK	NOT OK
		SPEC MIN.	SPEC MAX.	TEST RESULTS			
DUROMETER	ASTM-D2240, SHORE A	13	22	19	points		
TENSILE	ASTM-D412	2		3.5	MPa		
ULTIMATE ELONGATION	ASTM-D412, DIE C	500		883	%		
TEAR STRENGTH	DIE C	3		14.96	KN/m		
HEAT AGED	ASTM D 537-04(15) 70HRS. @ 302°F ASTM D-573-88, 168h @ 150°C						
	TENSILE	-30		1.0	%		
	ELONGATION	-30		9.0	%		
	HARDNESS	-5	10	2	%		
COMPRESSION SET	ASTM-D395, 70 hrs @ 150°C	0	25	1.0	%		
FLUID RESISTANCE	ASTM D 471-16, 70HRS @ 302°F in IRM 901 oil ASTM D-471-95, 70HRS @ 150°C ASTM #1 Oil						
	HARDNESS	-12		-1	points		
	TENSILE	-30		-16.5	%		
	ELONGATION	-30		-0.28	%		
	CHANGE IN VOLUME	0	15	5.3	%		
COLOR		RED		Pass			
LUBRICANT BLEED		Evident Within 24 Hours		Pass			
IMDS # 465593237		Signature Diana Brasee			Date 7/7/2022		
		Reported by/Tilte: Diana Brasee / Quality Liaison					



SMITHERS
QUALITY ASSESSMENTS

CERTIFICATE OF APPROVAL

This is to Certify that the Quality Management System of:

Forest City Technologies, Inc.

299 Clay Street
Wellington, OH 44090

(Page 1 of 2; see Appendix)

has been assessed and approved by Smithers Quality Assessments, Inc., to
the following quality management system standards and requirements:

ISO 9001:2015 without Design

The Quality Management System is Applicable to:

The manufacture of sealing devices and molded products and the application of
sealants, coatings tapes and related services to both such as sorting/packing, and
delivery for the fastener, automotive, infant care and other industries

Approval
Certificate Number: 97.127.1

Original Approval: May 7, 1997

Current Certificate: April 22, 2021

Certificate Expires: April 21, 2024



*The use of the accreditation mark indicates
accreditation in respect of those activities
covered by the above certificate number.*


on behalf of SQA - J. Michael Hochschwender, CEO

The approval is subject to the company maintaining its system to the required standards which will be monitored by
Smithers Quality Assessments, Inc., 121 S. Main St. Suite 300, Akron, Ohio 44308, USA



APPENDIX A TO THE CERTIFICATE OF REGISTRATION NO. 97.127.1



Page 2 of 2

SMITHERS QUALITY ASSESSMENTS, INC.

Forest City Technologies, Inc.
299 Clay Street
Wellington, OH 44090
Scope of activities: Corporate

The above site is certified by Smithers Quality Assessments, Inc. with regard to ISO 9001:2015 without Design. The following locations are included utilizing a Multi-site (Combination) approach.

Locations:
Forest City Technologies, Inc.
299 Clay Street
Wellington, OH 44090
Scope of activities: Manufacturing

Forest City Technologies, Inc.
232 Maple Street
Wellington, OH 44090
Scope of activities: Manufacturing

Forest City Technologies, Inc.
892 Southrock Drive
Rockford, IL 61102
Scope of activities: Manufacturing

Forest City Technologies, Inc.
401 Magyar Street
Wellington, OH 44090
Scope of activities: Manufacturing

Forest City Technologies, Inc.
22069 Fairgrounds Roads
Wellington, OH 44090
Scope of activities: Manufacturing

Forest City Technologies, Inc. - Novathane
228 TWP RD 931
Nova, OH 44859
Scope of activities: Manufacturing

This appendix applies only to those sites listed above. As other sites are assessed and approved, or as sites already approved are removed from active services, this appendix will be amended to show the current status. Sites not listed on this appendix shall not be viewed as approved.



CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Western Diversified Plastics, LLC

53150 North Main Street, Mattawan, MI, 49071, USA

has been registered by Intertek as conforming to the requirements of:

IATF 16949:2016

The management system is applicable to:

Design and Manufacture of Plastic Components and Assemblies

Permissible exclusions include: None

IATF Certificate Number
0407520

Certificate Number:
2007-0124

Certificate Issue Date:
28 June 2021

Certificate Expiry Date:
27 June 2024



Calin Moldovean
President, Business Assurance

Intertek – 4700 Broadmoor, Suite 200
Kentwood MI 49512, USA



APPENDIX TO CERTIFICATE OF REGISTRATION

This is to certify that the quality management system of:

Western Diversified Plastics, LLC

53150 North Main Street, Mattawan, MI, 49071, USA

has been registered by Intertek as conforming to the requirements of:

IATF 16949:2016

Including the Following Support Functions:

Western Diversified Plastics -
53196 N. Main Street, Mattawan,
MI, 49071, USA

Calibration, Contract Review,
Laboratory, Process Design,
Product Design, Sales

Western Diversified Plastics -
53301 N. Main Street, Mattawan,
MI, 49071, USA

Warehousing

IATF Certificate Number
0407520

Certificate Number:
2007-0124

Certificate Issue Date:
28 June 2021

Certificate Expiry Date:
27 June 2024



Calin Moldovean
President, Business Assurance

Intertek – 4700 Broadmoor, Suite200
Kentwood MI 49512, USA



INTERNAL TEST LAB SCOPE

Field of Test	Products or Items Tested	Specified Tests or Properties Measured	Specification, Standard, or Method Used	Equipment / Range
Mechanical	Electrical and Mechanical Components	Force - Tension & Compression	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 25 FCA PF90012 WDP PS-001 WDP PSA-002	Instron 3342 5 to 500N Instron 3366 5 to 10KN
Mechanical	Electrical and Mechanical Components	Torque	ES-GU5T-14A067-AB Ford Connector SDS WDP PS-001 WDP PSA-002	Jetco ED-2501 Stanley E231b-16 Stanley E33LA18-46 .5 to 46 Nm
Mechanical	Electrical and Mechanical Components	Environmental Exposure – Temperature, Humidity Salt Fog Dust	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 20, 21 FCA PF90012 CETP 00.00L/E-412 WDP PS-001 WDP PSA-002	Humboldt H30135E Thermotron SM32 & 4, S8 Thermotron SE-600 & 300 Singleton SCCH 22 ESPEC EDC-27 Control Co 4040 Fluke 54 T/C Monitor -70C to 500C
Mechanical	Electrical and Mechanical Components	Environmental Exposure - Vibration – Sine, Random, Sine on Random, & Transient	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2 SAE/USCAR-20 FCA PF90012 WDP PS-001 WDP PSA-002	Thermotron DSX-2250 & 8000 Vib 5 to 3000 Hz, 8000 force lb. 11ms 100g half sine shock 2.54 mps, 3" displacement Endevco 7251A Accel Dytran 3215 Accel ±500g max
Mechanical	Electrical and Mechanical Components	Environmental Exposure - Thermal Shock	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 20, 21 FCA PF90012 WDP PS-001 WDP PSA-002	Thermotron ATS-320 H/V Fluke 54 T/C Meter -70C to 175C
Mechanical	Electrical and Mechanical Components	Sealing Integrity	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2 FCA PF90012 ISO 2653 IPX3,4 WDP PS-001 WDP PSA-002	Weiss DUGY2-015 ±15psi Fluke 700RG07 -14 - 500psi 29.9 in Hg to 350 psi ESPEC ETH-37 Water chmbr Up to 1500 psi - 4 gpm IPX3/4 Spray Head Ashcroft 5000 psig gage 100, 2000, 4000ml Grad Cyl Control Co 1042 Stopwatch - 1/100 th sec

Distribution List:	Quality Director, Test Lab Manager, Test Lab Technicians, Quality Engineering, Program Managers, Manufacturing Engineer		
TLI002 Internal Test Lab Scope		Page 1 of 3	Revision Date 03/30/2022
Printed Copies are for Reference Only			

Field of Test	Products or Items Tested	Specified Tests or Properties Measured	Specification, Standard, or Method Used	Equipment / Range
Temperature	Electrical Components	Thermal Imaging	ES-GU5T-14A067-AB WDP PS-001 WDP PSA-002	FLIR T620 FLIR E50 Up to 500°C
Sound	Mechanical Components	Sound Level Audible noise	Ford Connector SDS SAE/USCAR-2	Extech 407768 dB A&C scale to 140dB
AC Electrical	Electrical and Mechanical Components	Dielectric	ES-GU5T-14A067-AB WDP PS-001 WDP PSA-002	Vitrek V63 100V to 5KV AC
Dimensional	Electrical and Mechanical Components	Distance / Length Height/Width	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2 SAE/USCAR-20 WDP PS-001 WDP PSA-002	Mitutoyo 0- 6" Caliper GEI SS 1000mm ruler Wixey WR300 Angle Gage
DC Electrical	Electrical and Mechanical Components	Insulation Resistance Dielectric Resistance	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2 FCA PF90012 WDP PS-001 WDP PSA-002	Vitrek V63 IR from 1 to 10Gohm Dielectric 100V to 6KV DC
DC Electrical	Electrical and Mechanical Components	Amperage	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 20, 21 FCA PF90012 WDP PS-001 WDP PSA-002	Fluke 87, 287, 289 Keysight 34450A, HP 60504 Extech 380941, 380947 .01 micro to 400A DC
DC Electrical	Electrical and Mechanical Components	Voltage	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 20, 21 FCA PF90012 WDP PS-001 WDP PSA-002	Fluke 87, 287, 289 Keysight 34450A HP 44701A HP 44702B Rigol DS1104Z O-scope 1 micro to 1000 Volts DC
DC Electrical	Electrical and Mechanical Components	Resistance	ES-GU5T-14A067-AB Ford Connector SDS SAE/USCAR-2, 20, 21 FCA PF90012 WDP PS-001 WDP PSA-002	Keithley 580 Keysight 34450A Analysis Tech 32-106 10micro to 200Kohm
Mechanical / DC Electrical	Electrical and Mechanical Components	Combined Environment Durability/Life Test	Various as Listed Above	Various as Listed Above

Distribution List:	Quality Director, Test Lab Manager, Test Lab Technicians, Quality Engineering, Program Managers, Manufacturing Engineer		
TLI002 Internal Test Lab Scope	Page 2 of 3	Revision Date 03/30/2022	
Printed Copies are for Reference Only			

- 1.1** WDP test lab performs testing relative to the internal scope using the Test Request, DVP&R, and the Test Specification.
- 1.2** Capabilities may include tests related to the test technologies listed which utilize equipment and properties listed.
- 1.3** Any required conditions, or deviations, are communicated to the customer as identified in the DVP&R and/or Test data sheet.

Distribution List:	Quality Director, Test Lab Manager, Test Lab Technicians, Quality Engineering, Program Managers, Manufacturing Engineer	
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