

PART SUBMISSION WARRANT

Part Name	CVR WIR CONN	Customer Part Number	GU5T-14N003-FA
Shown on Drawing No.	GU5T-14N003-FA	Supplier Part Number	6001483602A
Engineering Change Level	Released AELE-E-12035198-352	Dated	10/6/15
Additional Engineering Changes	N/A	Dated	N/A
Safety and/or Government Regulation	☐ Yes ☒ No	Purchase Order No.	N/A
Weight (kg)			0.0100
Checking Aid No.	N/A	Checking Aid Engineering Change Level	N/A
		Dated	N/A

SUPPLIER MANUFACTURING INFORMATION

Western Diversified Plastics / 609123190

Supplier Name & Supplier/Vendor Code

53150 N. Main St.

Street Address

Mattawan MI 49071 USA
City State Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

Nursan Kablo Donanimlari San. Ve Tic. A.S.

Customer Name/Division

Buyer/Buyer Code

Ford

Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported?

☒ Yes ☐ No ☐ Not Applicable

IMDS - 558251343 / 1

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-4836 / Inj. Molding

DECLARATION

I hereby affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 6,330 / 24 hours.
 I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from the declaration below.

EXPLANATION / COMMENTS: Customer requested

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☒ n/a

Supplier Authorized Signature

Angela Henson

Date 27-Oct-23

Print Name Angela Henson

Phone No. 269-668-3393

Fax No. 269-668-7143

Title Quality Engineer

E-mail angela.henson@westerndp.com

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

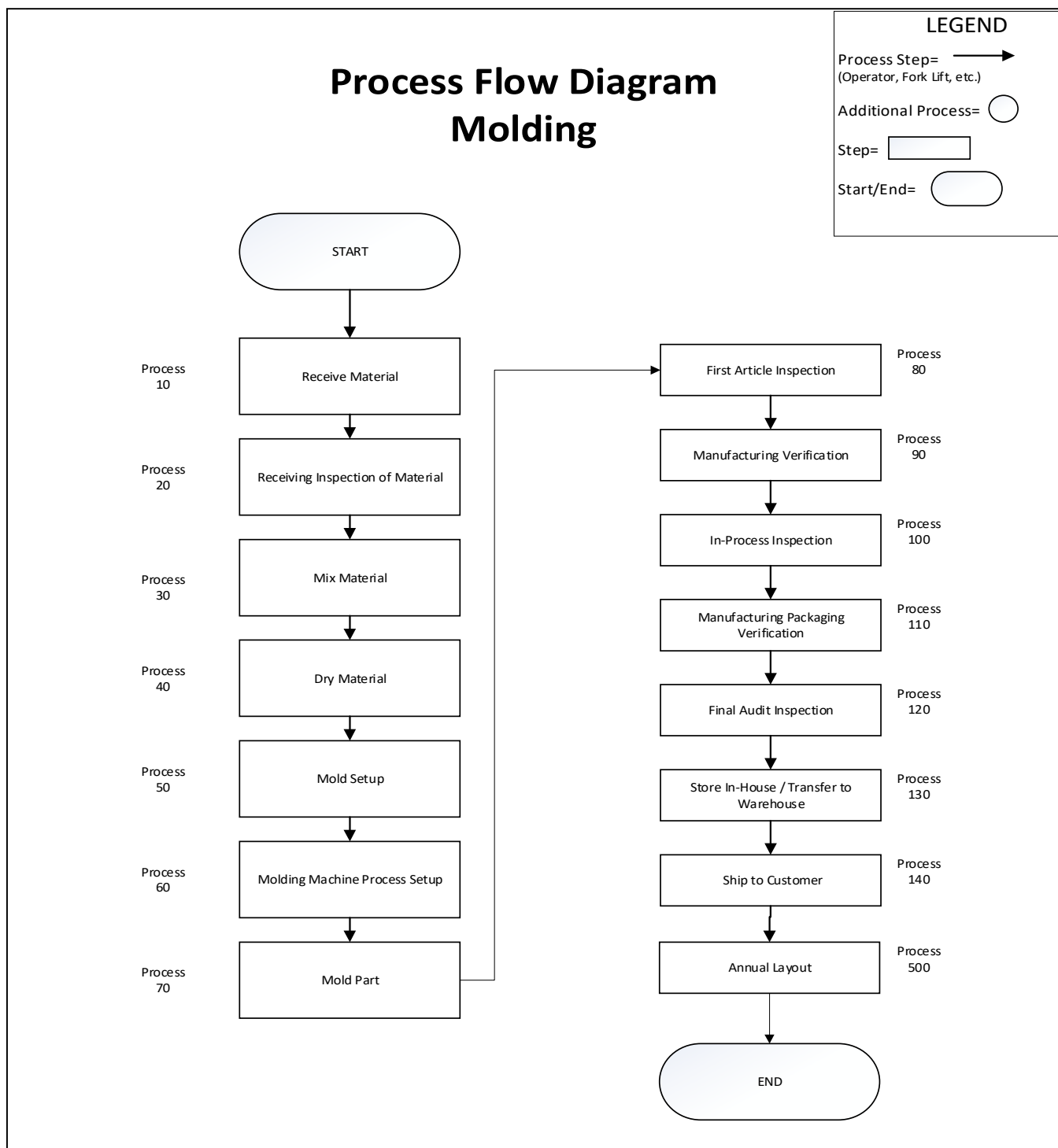
Customer Signature

Date

Print Name

Customer Tracking Number (optional)

Process Flow #: 4836-02 (Revision Released) Date (Orig.) 07/24/2015 Date Rev. 10/12/2023
Item / Part #: 4836-02-001A / 6001483602A / 80014836 Prepared By Kellie Garcia / Dan Switzer
Program(s) / Part Name: 34 Way Wire Dress Cover



POTENTIAL FAILURE MODE AND EFFECTS ANALYSIS (Process FMEA)

ITEM: 4836-02-001A / 6001483602A / 8001483602A

Process Responsibility:

WDP Mfg. Engineering

FMEA Number:

4836-02 (Revision Released)

MODEL YEAR(s) / PROGRAM(s) 34 Way Wire Dress Cover

Key Date:

09/24/2015

Prepared by:

Kellie Garcia / Dan Swtizer

CORE TEAM: PM - Kirk Boeskool, ME - Dan Swtizer, QE - Kellie Garcia, Plant Super. - Steve Britton Jr., QC Super. - Karrie Kollin

FMEA Date (Orig.):

7/24/15

FMEA Date (Rev): 10/12/23

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	O X S	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
Process 10 Receive material	Material is labeled correctly with the correct quantity	1. Incorrectly labeled material from supplier 2. Incorrect quantity of material	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 submits PPAP package 3. Supplier is minimum ISO 9001 certified 4. Receiving inspection	1. Warehouse scanning system 2. Receiving inspection	2	48	24	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 QW1022 4. Training of the Receiving Inspector to the work Instructions.	1. Supplier submits PPAP to WDP. 2. Receiving inspection	3	48	16	None						
Process 30 Mix Material	Correct material blended with the correct amount of regrind	Contaminated material through mixing & handling	1. Premature failures of the part design due to the material properties 2. Unable to process 3. Unable to make a good part	8		1. Error in raw material handling or processing at supplier. 2. Error in labeling product in house 3. Error by material handler requesting material 4. Material handler not following procedures	2	1. Suppliers are ISO 9001 certified at minimum. 2. Work instruction MW1009 Mixing Material 3. Work instruction MW1019 Material Change For Job Change 4. Work instruction MW1027 Printing Raw Material Labels 5. Work instruction MW1032 Material Change & Cleaning Hoppers 6. Work instruction MW1033 Cleaning the Material Loading System 7. Training to all work	1. Visual differences in appearance of pellets at material mixing station 2. Verification scan of resin manufacturer's label placed by supplier 3. One person responsible for mixing of material 4. Mix % documented on the label by material handler	3	48	16	None						
		Physical properties shift due to excessive regrind mix	1. Premature failures of the part design due to the material properties 2. Unable to process 3. Unable to make a good part	8		1. Error in labeling product in house 2. Error by material handler requesteing material 3. Material handler not following procedures	2	1. Suppliers are ISO 9001 certified at minimum. 2. Work instruction MW1009 Mixing Material 3. Work instruction MW1019 Material Change For Job Change 4. Work instruction MW1027 Printing Raw Material Labels 5. Work instruction MW1032 Material Change & Cleaning Hoppers 6. Work instruction MW1033 Cleaning the Material Loading System 7. Training to all work	1. Visual differences in appearance of pellets at material mixing station 2. Verification scan of resin manufacturer's label placed by supplier 3. One person responsible for mixing of material 4. Mix % documented on the label by material handler	3	48	16	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
Process 40 Dry Material	Material sufficiently dried, meets moisture analysis requirements	Inadequately dried material prior to molding	1. Premature part failures due to processing wet material affecting physical properties of parts 2. Unable to process parts 3. Unable to make a good part	8		1. Inadequate drying equipment throughput 2. Excessive moisture in the material and/or regrind 3. Dryer equipment failure 4. Operator failed to dry material prior to use	2	1. MWI017 Molding Set Up Book 2. MWI015 Dryer Verification 3. MWI023 Moisture Analysis - In process checks of drying equipment 3. PM on dryers 4. Annual calibration of the moisture analyzer used for production 5. Training to all work instructions	1. MWI015 Dryer Verification each shift 2. QWI023 Moisture Analysis at start up 3. Visual appearance of parts 4. QWI026 In-process inspection 5. QWI010 First Article inspection	5	80	16	None						
		Over dried material prior to molding	1. Premature part failures due to processing over dried material affecting physical properties of parts 2. Unable to process parts 3. Unable to make a good part 4. Possible brittle parts causing them to break	8		1. Dryer equipment failure 2. Operator not following instructions & over dried the material	2	1. MWI017 Molding Set Up Book 2. MWI015 Dryer Verification 3. MWI023 Moisture Analysis - In process checks of drying equipment 3. PM on dryers 4. Annual calibration of the moisture analyzer used for production 5. Training to all work instructions	1. MWI015 Dryer Verification each shift 2. QWI023 Moisture Analysis at start up 3. Visual appearance of parts 4. QWI026 In-process inspection 5. QWI010 First Article inspection	5	80	16	None						
Process 50 Mold Set Up	Mold safely set up in molding machine	Mold not capable due to the set up of the tool by the mold shop	1. Part does not meet dimensional requirements due to mold insert deficiencies 2. Molding defects - flash, under fill, warpage, etc. - due to mold deficiencies 3. Wrong product shipped to the customer 4. 100% scrap of product produced	8		1. Mold is in need of Preventative Maintenance 2. Process drift outside of manufacturer's recommendations due to blocked water lines or hot runner heaters within the tool, etc. 3. Toolmaker error during set up 2. Mold not set back up correctly during the maintenance phase	3	1. All tooling is built to Tooling Standards for Injection Molds guidelines PDP03-F03 2. First and Last Article Inspection work instruction QWI010 2. Operator training of First and Last Article Inspection work instruction 4. Molding Set up Book Master work instruction MWI017 5. Operator training of Molding Set up Book Master work instruction 6. Systems FMEA for Molding	1. Critical key characteristics of the part are verified per the First and Last Article Inspection process 2. Process verification synopsis per Molding Set up Book Master process 3. Tool PM per Tracking database	3	72	24	None						

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FMEA Number:

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Key Date:

09/24/2015

Prepared by:

Kellie Garcia / Dan Swtizer

FMEA Date (Orig.):

7/24/15

FMEA Date (Rev): **10/12/23**

CORE TEAM: **PM - Kirk Boeskool, ME - Dan Swtizer, QE - Kellie Garcia, Plant Super. - Steve Britton Jr., QC Super. - Karrie Kollin**

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	O X S	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
		Tool inserts incorrectly set up between versions or PM	1. Parts do not meet customer requirements	8		1. Incorrect combination of inserts used	2	1. All tooling is built to Tooling Standards for Injection Molds guidelines PDP03-F03 2. First and Last Article Inspection work instruction QWI010 3. Operator training of First and Last Article Inspection work instruction 4. Molding Set up Book Master work instruction MWI017 5. Operator training of Molding Set up Book Master work instruction 4. Systems FMEA for Molding	1. Critical key characteristics of the part are verified through the First and Last Article Inspection process 2. Process verification synopsis per Molding Set up Book Master process 3. Tool PM per Tracking database	5	80	16							
				8		1. Injection mold construction issues a-Inadequate venting b-poorly supported c-Inadequate cooling d-Other tooling issues	2	1. All tooling is built to Tooling Standards for Injection Molds guidelines PDP03-F03 2. First and Last Article Inspection work QWI010 3. Operator training of First and Last Article Inspection work instruction 4. Molding Set up Book Master work instruction MWI017 5. Operator training of Molding Set up Book Master work instruction 6. Systems FMEA for Molding	1. Documented evidence of the inspection in the WDP database per the Control Plan 2. Process verification synopsis per Molding Set up Book Master process	4	64	16	None						
Process 60 Molding Machine Set Up	Machine set up to MWI017 Molding setup book parameters	Molding machine not set up to MWI017 Molding set up book to meet PPAP requirements	1. Molding defects - flash, under fill, warpage, etc. 2. Part does not meet dimensional requirements 3. Part does not meet functional requirements	8		1. Molding outside the Material Manufacturer's recommendations 2. Inadequate setup to molding standards 3. Set up book was not created during sampling phase 4. Scientific molding was not performed during sampling phase	2	1. Mold set up parameters developed during launch - PDP process 2. Molding Set up Book Master work instruction MWI017 3. Operator training of Molding Set up Book Master work instruction 4. First and Last Article Inspection work instruction QWI010 6. Operator training of First and Last Article Inspection work instruction 7. Systems FMEA for Molding	1. Critical key characteristics of the part are verified through the First and Last Article Inspection process 2. Process verification synopsis per Molding Set up Book Master process	5	80	16	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
		Molding machine set up adjusted outside of tolerances	1. Molding defects - flash, under fill, warpage, etc. 2. Part does not meet dimensional requirements 3. Part does not meet functional requirements	8		1. Molding outside the Material Manufacturer's recommendations 2. Inadequate setup to molding standards 3. Scientific molding was not performed during sampling phase 4. Tooling condition dictating process adjustments to maintain part Quality	2	1. Mold set up per Molding Set up Book Master work instruction MWI017 2. Operator training of Molding Set up Book Master work instruction 3. Changes outside boundaries are reviewed by Senior Process Technician & elevated to Eng., if applicable 4. First and Last Article Inspection work instruction QW/010 5. Operator training of First and Last Article Inspection work instruction 6. Systems FMEA for Molding 7. Manufacturer's recommendations are referenced while establishing initial samples	1. Critical key characteristics of the part are verified through the First and Last Article Inspection process 2. Process verification synopsis per Molding Set up Book Master process.	5	80	16	None						
		Process not set up to material manufacturer's process specifications	1. Molding defects - flash, under fill, warpage, etc. 2. Part does not meet dimensional requirements 3. Part does not meet functional requirements	8		1. Lack of discipline to process materials to Material Manufacturer's recommendations. 2. Inadequate setup to molding standards 3. Tooling condition dictating process adjustments to maintain part quality	2	1. Manufacturer's recommendations are referenced while establishing initial samples 2. Changes outside boundaries are reviewed by Senior Process Technician & elevated to Eng., if applicable 3. Systems FMEA for Molding	1. Critical key characteristics of the part are verified through the First and Last Article Inspection process 2. Process verification synopsis per Molding Set up Book Master process	5	80	16	None						
				8		1. Injection mold dirty causing molding processing issues	2	1. Robust tool PM program - IQMS 2. Tool cycles tracked through Preventative Tool Maintenance Schedule PDP-18-F02 3. Operator training of Preventative Tool Maintenance Schedule	1. Quality Synopsis process 2. First and Last Article Inspection process 3. In Process Inspection process 4. Operator inspects per Hourly Review / Process Verification process 5. Final Audit Inspection and Scanning Instruction process	5	80	16	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
Process 70 Mold Component	Mold components to set up book with out any defects	Molding machine cycle interruption	1. Molding defects in parts creating customer rejections (i.e. flash, underfill, smashed parts, contamination, splay, etc.)	8		1. Part hung up in tool 2. Clamp not locking up 3. Machine out of material 4. Sprue picker missing runner	2	1. Work instruction MWI017 Molding Set Up Book 2. Operator training to work instruction MWI017 3. Work Instruction QWI010 First and Last Article Inspection 4. Inspector training of QWI010 First and Last Article Inspection 5. Reversing conveyors with low pressure settings alarm 6. Work instruction QWI016 Final Audit 7. System FMEA - Molding 8. Work instruction MWI024 Molding Cycle Interruption	1. Work instruction MWI022 Operator Hourly Review 2. Work instruction QWI010 First Last Article inspection documented in the database 3. Overall cycle machine alarm 4. Work instruction MWI024 Molding Cycle Interruption	6	96	16	8D WDP6319 Short shot on locking leg. Review work instructions, include cycle interruption with plant personnel. Update defect photos and containment actions.	CM 10/6/23	8D WDP6319 Reviewed work instructions, including cycle interruption with plant personnel. Updated defect photos and containment actions. No change to S/O/D/RPN. KG	8	2	6	96
		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	8		1. Machine control issues 2. Machine wear - screw - barrel 3. Material handling - contamination - regrind control	2	1. MWI017 Molding Set Up Book 2. Tool & machine preventative maintenance 3. Systems FMEA for Molding	1. Work instruction QWI010 First Last Article inspection 2. Work instruction QWI026 In-process inspection 3. Work instruction QWI016 Final Audit inspection 4. Work instruction MWI022 Operator Hourly Review 5. SPC performed	6	96	16	None						0
				8		1. Injection mold dirty causing molding processing issues	2	1. Robust PM program for tools 2. Tool cycles tracked through Preventative Tool Maintenance Schedule PDP-18-F02	1. Work instruction QWI010 First Last Article inspection 2. Work instruction QWI026 In-process inspection 3. Work instruction QWI016 Final Audit inspection 4. Work instruction MWI022 Operator Hourly Review 5. SPC performed	6	96	16	None						0
				5		1. Inspection mold construction issues 2. Inadequate venting 3. Poorly supported 4. Inadequate cooling 5. Other tooling issues	2	1. All tooling is built to Tooling Standards for Injection Molds guidelines PDP03-F03 2. First and Last Article Inspection work instruction QWI010 3. Molding Set up Book Master work instruction MWI017 4. Systems FMEA for Molding 5. Operator training to all work instructions 6. Tool PM program	1. Work instruction QWI010 First Last Article inspection 2. Work instruction QWI026 In-process inspection 3. Work instruction QWI016 Final Audit inspection 4. Work instruction MWI022 Operator Hourly Review 5. SPC performed	5	50	10	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
Process 80 First Article Inspection	All In-process steps completed, no molding defects, proper carton identification	Inspection process does not detect defects	1. Customer reject 2. Excessive flash 3. Underfill 4. Broken core 5. Warpage 6. Validation sorting	8		1. Inspection instructions not adequate 2. Inspection instructions not followed 3. Inspector error using gages 4. Operator error using gages 5. Gage failure	2	1. Training for all work instructions 2. Gaging guides 3. Internal audits 4. Gage calibrations 5. Cross functional team creates inspection instructions	1. Internal audits 2. Work instruction QWI016 Final Audit Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI010 First Last Article inspection 5. Work instruction MWI022 Operator Hourly Review	5	80	16	None						0
		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 & molding machine 3. Comparison of parts to Last Article samples 4. Work instruction MWI022 Operator Hourly Review 5. Work instruction QWI016 Final Audit Inspection	5	80	16	None						0
		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 MWI022 Operator Hourly Review 6. Work instruction QWI026 In-process inspection	5	80	16	None						0
		Part does not mate with mating part	1. Customer rejection 2. Potential customer manufacturing shut down	8		1. Broken or chipped core 2. Mold in need of preventative maintenance 3. Inspector / Operator error	2	1. Preventative Tool Maintenance Schedule 2. Gaging guides 3. Training to all relevant work instructions	1. Preventative Tool Maintenance Schedule 2. First Last Article Inspection 3. In-process inspection 4. Final Audit inspection 5. Training Matrix	5	80	16	None						0

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		Lock tabs inadequate for the mating device	1. Poor fit to mating part causing no build condition 2. Missing or incomplete features 3. Potential customer manufacturing shut down	8		1. Material degradation through processing 2. Broken and/or chipped cores 3. Improper processing parameters due to a tooling or material problem	2	1. Setup Process 2. DVP&R Testing and full layout validating the process prior to production	1. Preventative Tool Maintenance Schedule 2. Work instruction QWI010 First Last Article Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI016 Final Audit inspection	5	80	16	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	16	None						
Process 90 Manufacturing Verification	Visual inspection of parts / gaging of parts if required, no molding defects	1. Visual Inspection not 100% effective 2. Error in using gage	1. Customer rejection 2. Potential customer manufacturing shut down 3. Visual Defects go undetected	8		1. Operator not following proper instructions 2. Operator error 3. Visual inspection not 100% affective	2	1. Work instruction MWI022 Operator Hourly Review 2. Work instruction QWI010 First Last Article Inspection 3. Work instruction QWI026 In-process inspection 4. Gaging guides 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	80	16	None						
Process 100 In-process Inspection	Visual inspection of parts / gaging of parts if required, no molding defects, proper carton identification	See First Article See Control plan	See First Article See Control plan	8		See First Article See Control plan	2	See First Article See Control plan	See First Article See Control plan	5	80	16	None						
Process 110 Manufacturing Packaging Verification	Correct quantity, labels & parts must be packaged	Incorrect quantity packaged	1. Customer short 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	12	None						0

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

ITEM: **4836-02-001A / 6001483602A / 8001483602A**

Process Responsibility:

WDP Mfg. Engineering

FMEA Number:

4836-02 (Revision Released)

MODEL YEAR(S) / PROGRAM(S) **34 Way Wire Dress Cover**

Key Date:

09/24/2015

Prepared by:

Kellie Garcia / Dan Swtizer

CORE TEAM: **PM - Kirk Boeskool, ME - Dan Swtizer, QE - Kellie Garcia, Plant Super. - Steve Britton Jr., QC Super. - Karrie Kollin**

FMEA Date (Orig.):

7/24/15

FMEA Date (Rev): **10/12/23**

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	O X S	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
		Incorrect label affixed to packaging	1. Customer rejection 2. Potential customer line shut down	6		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	84	12	None						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 QWI010 2. In Process inspection QWI026 3. Final Audit inspection QWI016 4. Operator Inspection MWI004 Label ID & Use / Label verification card	7	84	12	None						0
Process 120 Final Audit Inspection	Visual inspection of parts, no molding defects, correct carton label	Inspection process does not detect defects	1. Customer reject 2. Excessive flash 3. Underfill 4. Broken core 5. Warpage 6. Validation sorting	6		1. Inspection Instructions not adequate 2. Inspection instructions not followed 3. Operator error	2	1. Training to all work instructions 2. Internal audits 3. Cross functional team creates inspection instructions	1. Internal audits 2. Work instruction QWI016 Final Audit Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI010 First Last Article inspection 5. Work instruction MWI022 Operator Hourly Review	7	84	12	None						
		Visual Inspection not 100% effective	1. Visual Defects go undetected	6		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 QWI016 Final Audit Inspection 3. Work instruction QWI026 In-process inspection 4. Work instruction QWI010 First Last Article inspection 5. Work instruction MWI022 Operator Hourly Review	7	84	12	None						
		Label printing not completed per procedure (Wrong labels)	1. Internal customer reject 2. Possibly wrong product shipped 3. Potential customer manufacturing shut down	6		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	60	12	None						

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

ITEM: **4836-02-001A / 6001483602A / 8001483602A**

Process Responsibility:

WDP Mfg. Engineering

FMEA Number:

4836-02 (Revision Released)

MODEL YEAR(s) / PROGRAM(s) **34 Way Wire Dress Cover**

Key Date:

09/24/2015

Prepared by:

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CORE TEAM: **PM - Kirk Boeskool, ME - Dan Swtizer, QE - Kellie Garcia, Plant Super. - Steve Britton Jr., QC Super. - Karrie Kollin**

FMEA Date (Orig.):

7/24/15

FMEA Date (Rev): **10/12/23**

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	O X S	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
Process 130 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	16	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	16	None						0
Process 140 Ship To Customer	Correct product shipped to customer	Incorrect product shipped to customer	1. Customer rejection 2. Potential customer manufacturing shut down 3. Product non-functional for the application	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning Product for Shipment work instructions 2. Printing Production Labels work instruction 3. Customer specific label work instruction 4. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Label ID & Use 4. Inventory audits-monthly/quarterly 5. Pick process by WHS utility 6. Shipping clerk matches packing list with order and applies BOL & Packing List if they agree 7. WHS utility verifies load to paper work, physically loads it and stamps/initials paper work for accountability	3	48	16	None						0
		Correct product shipped to incorrect customer	1. Customer rejection 2. Potential customer manufacturing shut down 3. Product non-functional for the application	8		1. Mis-labeled cartons 2. Scanning instructions not followed 3. Scanning instructions not available	2	1. Scanning Product for Shipment work instructions 2. Printing Production Labels work instruction 3. Customer specific label work instruction 4. Training to all relevant work instructions	1. Training matrix 2. Barcode ERP system 3. Label ID & Use 4. Inventory audits-monthly/quarterly 5. Pick process by WHS utility 6. Shipping clerk matches packing list with order and applies BOL & Packing List if they agree 7. WHS utility verifies load to paper work, physically loads it and stamps/initials paper work for accountability	3	48	16	None						0

Control Plan

Western Diversified Plastics

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone				Date (Orig.)		Date (Rev.)	
Job Number 4836 Part				Kellie Garcia 269.668.3393				07/24/2015		10/12/2023	
Part Number 6001483602A/800148360		Rev. Released	Engineering Number 4836-02		Rev. Released	Core Team K. Garcia, D. Switzer, S. Britton Jr., K. Boeskool, K. Kollin			Customer Engineering Approval / Date (If Req'd)		
Part Name / Description 34 W Wire Dress Cover						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	Raw Material	Material Received			>PA66< Mat-087 Chemlon104 Black	Visually Verify Correct Quantity Received		Each Lot / Shipment	WHI007 Warehouse Receiving Instructions	Reject Per QWI001 / Notify Supervisor / Adjust Process
2	20	Receiving Inspection	Raw Material	Material Content			>PA66< Mat-087 Chemlon 104 Black	Verify Material Certification Per Receiving Insp. Instructions		Each Lot / Each Shipment	QWI022 / Receiving Inspection	Reject Per QWI001 / Notify Supervisor / Request Material Cert From Supplier
3	20	Receiving Inspection	Raw Material	Material Labels			>PA66< Mat-087 Chemlon 104 Black	Review material Labels		Each Lot / Shipment	QWI022 / Receiving Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
4	30	Mix Material	Injection Molding		Mix Material		Setup Parameters	WHI026		When Required	WHI026 Mixing Material	Reject Per QWI001 / Notify Supervisor / Adjust Process
5	40	Dry Material	Injection Molding		Dry Material		0.200% Max moisture	See QWI023-F001, Moisture Material Code Spreadsheet		At start up	QWI023 Moisture Analyzer	Notify Supervisor / Correct Material Condition / QWI007 Reaction Plan
6	50	Mold Setup	Injection Molding		Setting Mold		MWI029 Mold Changes	MWI028 Process Verification		When Required	MWI028 / Process Verification	Reject Per QWI001 / Notify Supervisor / Adjust Process
7	60	Machine Setup	Injection Molding		Setup Parameters		MWI017 / Molding Setup Book	MWI028 Process Verification		Daily	MWI028 / Process Verification	Reject Per QWI001 / Notify Supervisor / Adjust Process
8	70	Mold Component	Injection Molding		Molding Parameters		MWI017 Molding Setup Book	Tolerances Specified On Process Verification / All Control Plan Inprocess	1 Shot	At start up / Once A Shift / Every 4 Hours & Shut Down	MWI017 Set Up Book / MWI015 Dryer Verification / MWI028 Process Verificatio	Reject Per QWI001 / Notify Supervisor / Adjust Process
9	80	First / Last Piece Inspection	Injection Molding				All Control Plan In-Process Inspection steps listed	See steps listed	1 Shot	At start up & Shut Down	QWI026 Inprocess Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
10	80	First / Last Piece Inspection	Injection Molding				Verify 1 Last Article Part With Current Production Part	Visual	1 Part	At Start Up	QWI010 First/Last Article	Reject Per QWI010 / Notify Supervisor / Adjust Process
11	90	Manufacturing Verification	Injection Molding	Flash, burn, & Underfill, molding defects			Control samples	Visual	1 Shot	Every Hour	MWI022 Operator Hourly Review	Reject Per QWI001 / Notify Supervisor / Adjust Process
12	100	In-Process Inspection	Injection Molding	Part Cooling			All parts must cool prior to performing any gaging or measurement	Must cool minimum of 30 minutes	All parts	All frequencies	QWI026 In-Process Inspection	Collect new parts / re-cool parts
13	100	In-Process Inspection	Injection Molding	Part Verification			Verify Part Matches Picture In Upper Right Hand Corner	Visual Part To Picture	1 Shot	Every 4 hours	QWI026 In-Process Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
14	100	In-Process Inspection	Injection Molding	Flash, burn, & Underfill, molding defects			Verify No Molding Defects, underfill, flash, burn, warp, etc.	Visual	1 Shot	Every 4 hours	QWI026 Inprocess Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
15	100	In-Process Inspection	Injection Molding	Mate/Demate			Mating Part 3512-01	Manual Mate	1 Shot	Every 4 hours	QWI026 Inprocess Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process

Control Plan

Western Diversified Plastics

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☐ Pre-Launch	☒ Production	☐ Assembly	☐ Safe Launch	Key Contact / Phone				Date (Orig.)		Date (Rev.)	
Job Number 4836 Part				Kellie Garcia 269.668.3393				07/24/2015		10/12/2023	
Part Number 6001483602A/800148360		Rev. Released	Engineering Number 4836-02		Rev. Released	Core Team K. Garcia, D. Swtizer, S. Britton Jr., K. Boeskool, K. Kollin			Customer Engineering Approval / Date (If Req'd)		
Part Name / Description 34 W Wire Dress Cover						Quality Engineering			Customer Quality Approval / Date (If Req'd)		
Supplier / Plant WDP			Supplier Code 609123190			Quality Control			Other Approval / Date (If Req'd)		

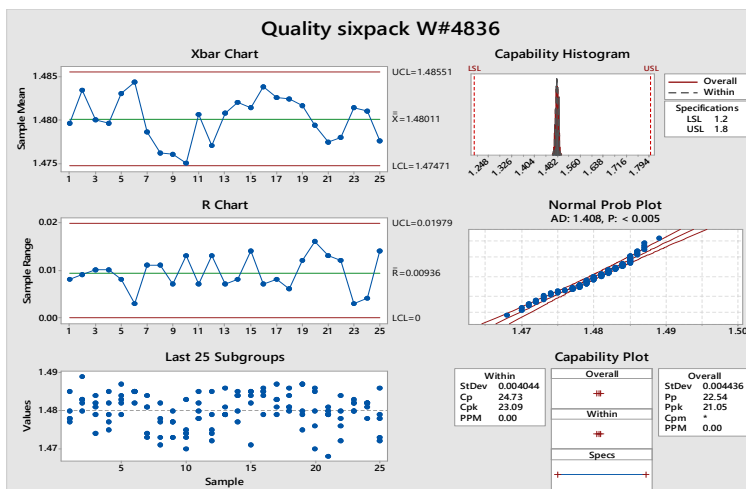
Step No.	Process No.	Process Name Operation / Description	Machine, Device, Jig, or Tool for Manufacturing	Characteristics		Special Char. Class.	Methods					Reaction Plan
				Product	Process		Product / Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
16	100	SPC Inspection	Injection Molding	Dimensional			Wall Thickness 1.5 +/- .3 mm	Measuring Guide / Micrometer	5 Parts / Cavity #3	At start up / Once A Day (Follow Male Sched)	X Bar & R Chart / Gainseeker	QWI 005 Gainseeker Instr. QWI 007 Reaction Plan
17	100	In-Process Inspection	Injection Molding	Carton Identification			Proper label	Visual	All Labels At Point Of Use	At start up / Once A Shift	QWI026 Inprocess Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
18	110	Manufacturing Packaging Verification	Injection Molding	Carton Identification			Proper label	Visual	Each Label	Each carton	MWI004 Label ID & Use	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
19	120	Final Audit	Injection Molding	Flash, burn, & Underfill, molding defects			Verify No Molding Defects, underfill, flash, burn, warp, etc.	Visual Parts From Top, Middle & Bottom Of Carton	10 Parts	Each carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Adjust Process
20	120	Final Audit	Injection Molding	Carton Identification			Proper label	Visual Part To Picture	Each Label	Each carton	QWI016 Final Audit Inspection	Reject Per QWI001 / Notify Supervisor / Re-Print Labels
21	120	Final Audit	Injection Molding	Correct Carton Quantity			Quantity Must Match Label	Audit Scale		Each Carton	QWI012 Using The Scale At Final Audit	Adjust Quantity To Match Label
22	130	Store In-House	Injection Molding	Wire Dress Cover	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
23	140	Shipping	Injection Molding	Wire Dress Cover	Load matches shipper		Scanning System	WHI001	100%	Each Shipment	WHI001 Scanning Product For Shipment	Notify Supervisor / Adjust Process
24	500	Annual Requirement	Layout Equipment	Dimensional			Print Dimensions	Layout	5 Parts	Annual	PDP 21 Annual Layout	Reject Per QWI001 / Notify Supervisor / Adjust Process

Mold #: W4836
 Part #: 4836-02-001A
 Part Name: 34 Way Wire Dress Cover 90° Down
 Date Ran: 01/07/2020
 Material: Chemlon 104H BLK (Mat-087-BLK)
 Lot#: 1208058
 Press:

Spec limits: $1.50 \pm .3\text{mm}$ (1.2 - 1.8)
 Equipment used: GW-0235
 Date of study: 02/03/2020
 Cavity # 3

This 125 piece sample was produced at WDP Mattawan.

Shot #	Wall Thickness
1	1.478
2	1.480
3	1.485
4	1.477
5	1.478
6	1.483
7	1.482
8	1.483
9	1.489
10	1.480
11	1.482
12	1.474
13	1.484
14	1.481
15	1.479
16	1.475
17	1.479
18	1.477
19	1.485
20	1.482
21	1.482
22	1.484
23	1.487
24	1.483
25	1.479
26	1.485
27	1.485
28	1.485
29	1.485
30	1.482
31	1.481
32	1.473
33	1.481
34	1.484
35	1.474
36	1.477
37	1.473
38	1.482
39	1.471
40	1.478
41	1.473
42	1.477
43	1.480
44	1.477
45	1.473
46	1.475
47	1.473
48	1.483
49	1.474
50	1.470
51	1.482
52	1.478
53	1.480
54	1.478
55	1.485
56	1.485
57	1.475
58	1.479
59	1.472
60	1.474



61	1.479
62	1.479
63	1.486
64	1.481
65	1.479
66	1.485
67	1.477
68	1.480
69	1.484
70	1.484
71	1.484
72	1.485
73	1.485
74	1.482
75	1.471
76	1.484
77	1.485
78	1.486
79	1.479
80	1.485
81	1.479
82	1.483
83	1.481
84	1.487
85	1.483
86	1.481
87	1.486
88	1.480
89	1.481
90	1.484
91	1.479
92	1.475
93	1.487
94	1.487
95	1.480
96	1.476
97	1.480
98	1.486
99	1.485
100	1.470
101	1.468
102	1.481
103	1.480
104	1.479
105	1.479
106	1.478
107	1.476
108	1.472
109	1.484
110	1.480
111	1.483
112	1.480
113	1.482
114	1.480
115	1.482
116	1.478
117	1.482
118	1.482
119	1.481
120	1.482
121	1.479
122	1.478
123	1.473
124	1.472
125	1.486
Max	1.487
Min	1.468

AIAG Gauge R&R Study

Alpha value to remove interaction: 0.25
Alpha value to pool Between Operator: 0.1

Term	SS	df	MS	F	p
Parts	3.18	9	0.35	####	0.000
Operators	0.00	2	0.00	0.29	0.754
Op*Part	0.01	18	0.00	7.54	0.000
Repeatability	0.00	80	0.00		
Total	3.19	89			

Not Significant. Use ANOVA Table 3.

Term	VarComp	% Contribution
Parts	0.0392	99.65%
Operators	0.0000	-0.02%
Op*Part	0.0001	0.25%
Repeatability	0.0000	0.12%
Total	0.0394	100.00%

Term	SS	df	MS	F	p
Parts	3.18	9	0.35	####	0.000
Operators	0.00	2	0.00	0.86	0.425
Op*Part	0.01	78	0.00		
Repeatability	0.01	80	0.00		
Total	3.19	89			

Not Significant. Use ANOVA Table 3.
Interaction Significant. Use ANOVA Table 1.

Term	VarComp	% Contribution
Parts	0.0393	99.71%
Operators	0.0000	0.00%
Op*Part	0.0001	0.29%
Repeatability	0.0000	0.00%
Total	0.0394	100.00%

Term	SS	df	MS	F	p
Parts	3.18	9	0.35	####	0.000
Operators	0.01	80	0.00		
Repeatability	0.01	80	0.00		
Total	3.19	89			

Operator to Operator differences are not significant.
Variation has been combined with Repeatability.

Term	VarComp	% Contribution
Parts	0.04	99.71%
Operators	0.00	0.29%
Repeatability	0.00	0.00%
Total	0.04	100.00%

Select ANOVA Table for Report: 1 Note: Table 1 or 2 are the standard AIAG ANOVA tables

Gauge Repeatability and Reproducibility Report

Part No. & Name	W4836 34 W Wire Dress - 90° Dow	Gage Name	GW 0432	Date	09/22/2015
Part Characteristic	Cover	Gage Make	Mitutoyo	Performed By	NM
Total Tolerance	0.6	Gage Model	Mircometer		
USL	1.8	Gage resolution:	0.00001		
LSL	1.2				

Measurement Units appear to be adequate to detect part variation

MEASUREMENT UNIT ANALYSIS	% TOLERANCE ANALYSIS ¹ (for Product Control Decisions)	% STUDY VARIATION ² (for Process Control Decisions)	% CONTRIBUTION ³ (for Improvement Decisions)
REPEATABILITY - EQUIPMENT VARIATION (EV) EV = $\frac{\text{StdDev}}{6 \times \text{StdDev}} = \frac{0.00674043}{0.0404426}$	% EV = 100[(EV)/(TOLERANCE)] % EV = 6.74%	% EV = 100[(EV)/(TV)] % EV = 3.40%	% EV = 100[(s_{EV}^2)/(s_{TV}^2)] % EV = 0.12%
REPRODUCIBILITY - APPRAISER VARIATION (AV) AV = $\frac{\text{StdDev}}{6 \times \text{StdDev}} = \frac{0.00953784}{0.0572227}$	% AV = 100[(AV)/(TOLERANCE)] % AV = 9.54%	% AV = 100[(AV)/(TV)] % AV = 4.81%	% AV = 100[(s_{AV}^2)/(s_{TV}^2)] % AV = 0.23%
REPEATABILITY AND REPRODUCIBILITY (R&R) GRR = $\frac{\text{StdDev}}{6 \times \text{StdDev}} = \frac{0.0116792}{0.0700752}$	P/T Ratio = 100[(R&R)/(TOLERANCE)] P/T Ratio = 11.68%	% GRR = 100[(R&R)/(TV)] % GRR = 5.89%	% GRR = 100[($s_{R\&R}^2$)/(s_{TV}^2)] % GRR = 0.35%
PART VARIATION (PV) PV = $\frac{\text{StdDev}}{6 \times \text{StdDev}} = \frac{0.1980583}{1.1883498}$	% PV = 100[(PV)/(TOLERANCE)] % PV = 198.06%	% PV = 100[(PV)/(TV)] % PV = 99.83%	% PV = 100[(s_{PV}^2)/(s_{TV}^2)] % PV = 99.65%
TOTAL VARIATION (TV) TV = $\frac{\text{StdDev}}{6 \times \text{StdDev}} = \frac{0.19840235}{1.1904141}$	TOTAL VARIATION 198.40%	TOTAL VARIATION 100.00%	TOTAL VARIATION 100.00%
PROBABLE MEASUREMENT ERROR (effective resolution of a single measurement) PME = ± 0.00782506		NUMBER OF DISTINCT CATEGORIES ⁴ 23 DISCRIMINATION RATIO ⁵ DR = 41.54	

¹ Product Control - Answers the question: Is this gauge good enough to inspect this part to this tolerance?
² Process Control - Answers the question: Is this gauge good enough for SPC or statistical analysis?
³ Answers the question: What components of variation are candidates for improvement?
⁴ Based on GRR (Repeatability and Reproducibility)
⁵ Based on EV (Repeatability)
Border/Text Color Key: GREEN = Acceptable, ORANGE = Marginal, RED = Unacceptable



W-No. **W-4836**

Part No. **GU5T-14N003-FA, 6001483602A**

Part Name **34 Way Wire Dress**
90° Down

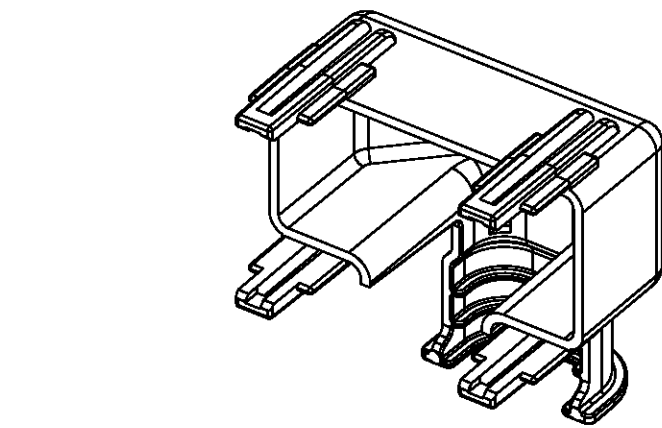
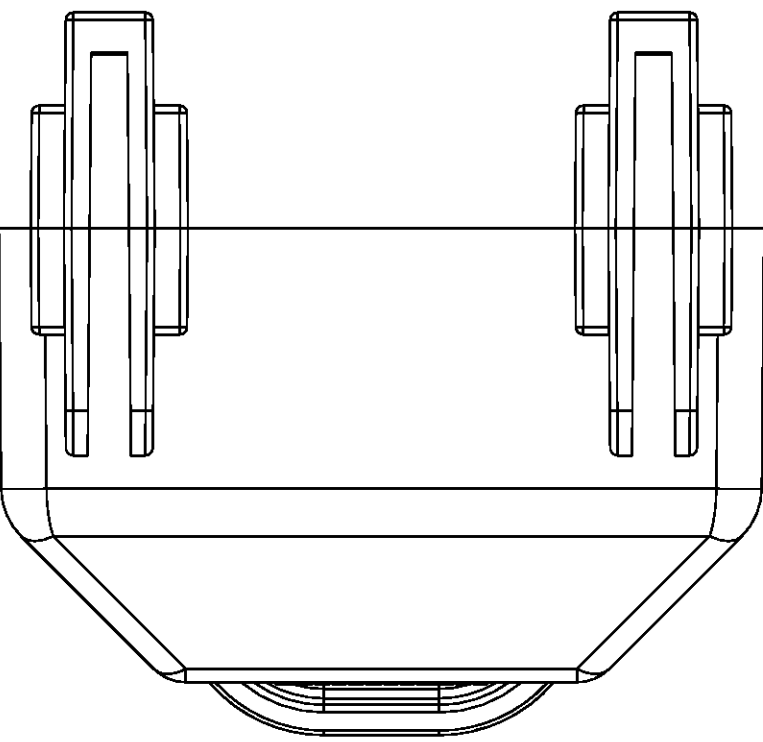
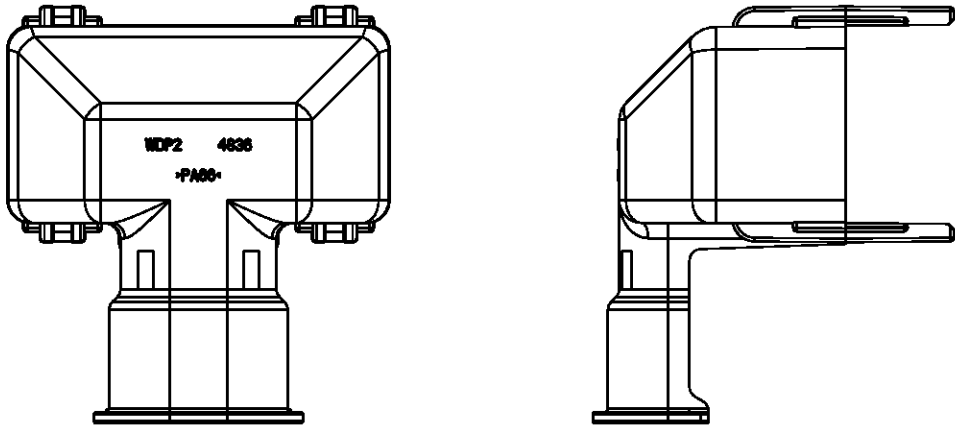
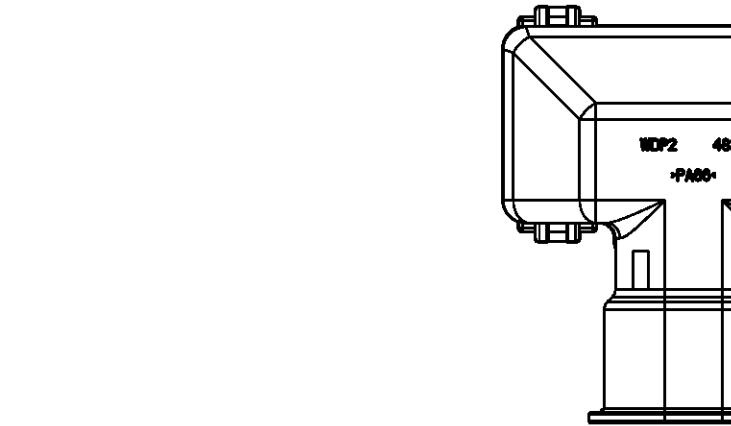
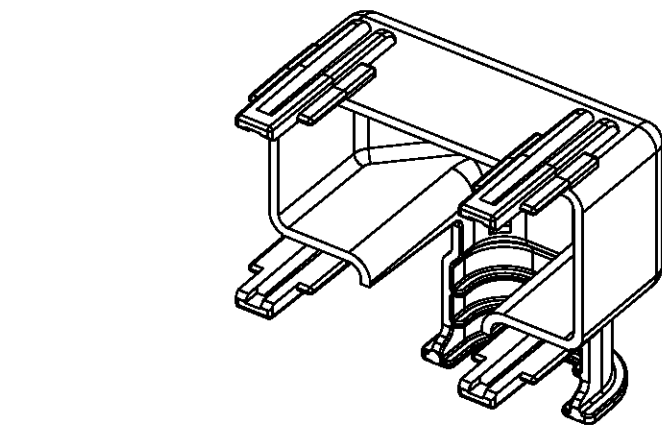
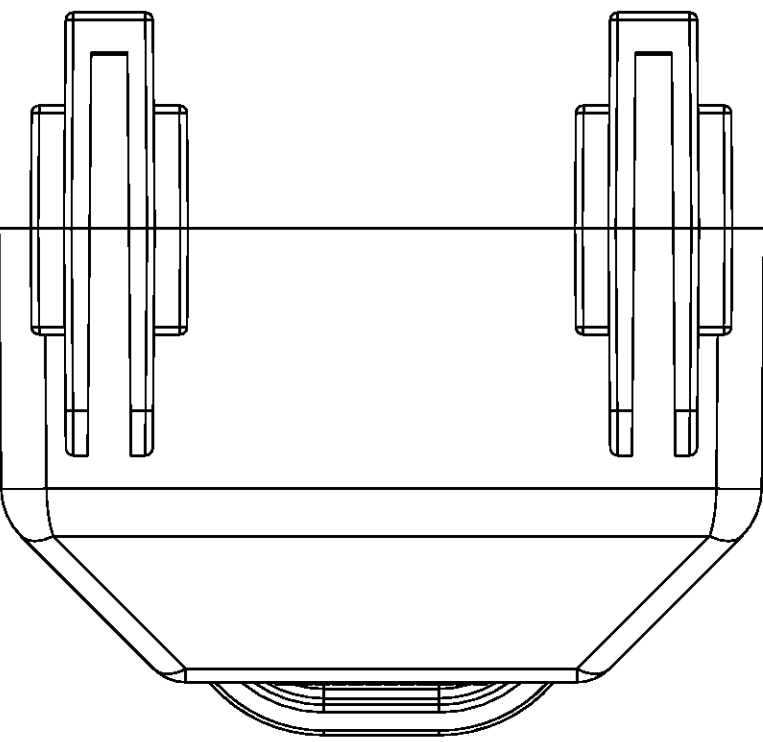
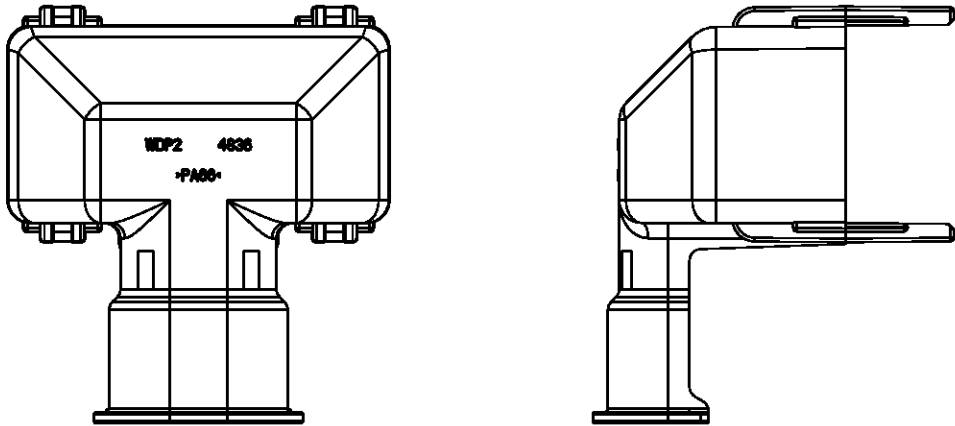
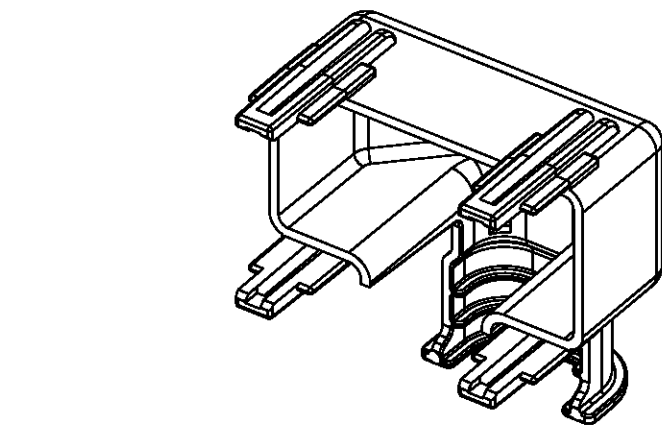
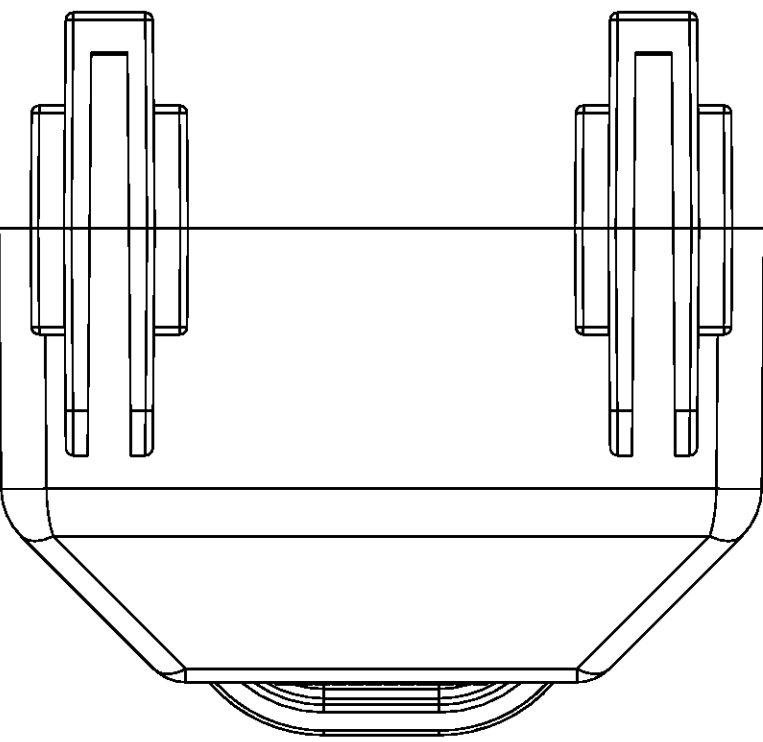
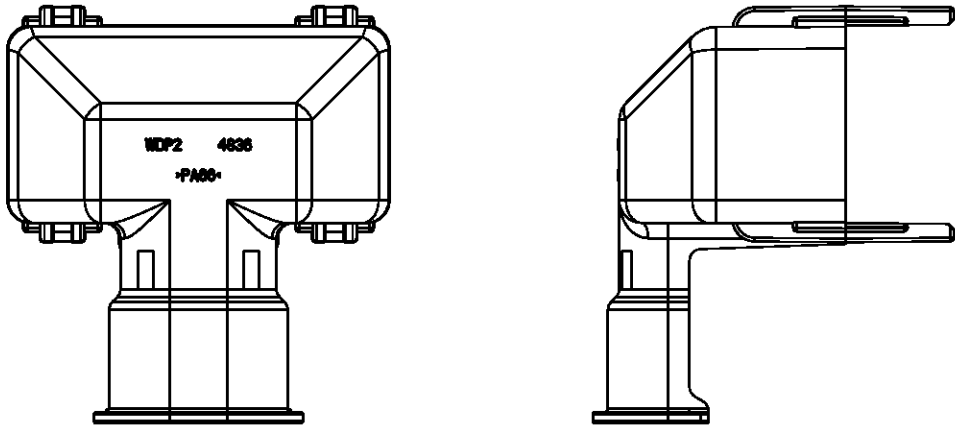
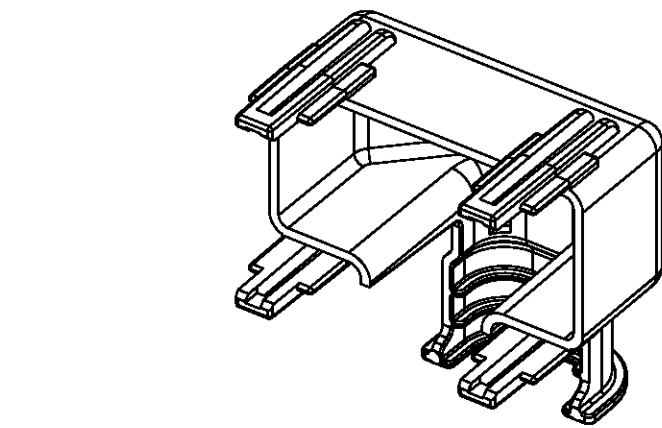
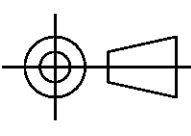
Dimensional Layout Inspection Report

Run Date 01/12/23

Print No. **GU5T-14N003-FA**Revision / Date **Rel. (AELE-E-12035198-352) 10/6/15**Material **PA66**Insp. Date **01/22/23**

Insp. By Phil B

[illegible]

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NOTES: UNLESS OTHERWISE SPECIFIED

- PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION (SDS) VER. 23 DATED 4-17-12 AS NOTED PER DVP&R
- PART CONFORMS TO SAE/USCAR-2 REVISION 4 , MAY 2004 AS NOTED PER DVP&R
- CONNECTOR MATING FORCE: N/A
- TERMINAL EXTRACTION TOOL: N/A
- SEALING SURFACES: N/A
- CONNECTOR ERGONOMIC CLASS: N/A
- CLIP SLOT SPECIFICATION: N/A
- PART MUST MATE WITH ALL ASSEMBLIES ON DRAWINGS
FU5T-14A464-AV*, AU5T-14A464-H*, FU5T-14A624-C*, AU5T-14A624-J*
- MATERIAL: >PA66<
- COLOR: BLACK



Print Date:

Oct 20,2023

CERTIFICATE OF ANALYSIS

TEKNOR APEX TENNESSEE COMPANY
A SUBSIDIARY OF TEKNOR APEX
751-R NORTH DUPREE AVE
BROWNSVILLE, TN 38012
UNITED STATES

Item No: 105705701
Desc: CHEMLON 104 H BK001
Cust Item: MAT-087-BLK

Order Number: 1200341032

Attention:

WESTERN DIVERSIFIED PLASTICS. LLC
53150 NORTH MAIN STREET

Cust PO: WD 035968
Phone#: 1-269-668-3390
Fax#: 1-269-668-4694

MATTAWAN, MI 49071
UNITED STATES

Lot Number: 2000011625

MFG Date: Sep 14,2023

Lot Qty Shipped: 21000.000 LBS

MFG At: BROWNSVILLE ETP

The compound listed within this document is identified as
an approved material under GMP PA66.015, GMP PA66.063,
GMW16447P-PA66-T2, ESF-M4D387-A, ESA-M4D267-A,
ESB-M4D178-A2, WSK-M4D706-A, WSK-M4D706-A2, WSS-M4D706-B1,
MSDB 41-CPN1826, ASTM D6779PA0161, and SAEJ1639 PA0171 (rev
05/95)

Box/Blend	Property	Method	Min	Max	Results
	MELT POINT,DEG C DEG C	ISO 11357	255	265	259
	NOTCHED IMPACT STRENGTH /(IZOD) kJ/m2	ISO 180/A	12		13
	MOISTURE CONTENT %	ASTM D6869		0.20	0.06

Periodic Tests	Property	Method	Min	Max	Results
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Last
Test Date Apr 11,2023

TENSILE STRESS AT YIELD MPa	ISO 527-2/1A	58.0	60.8
FLEXURAL MODULUS GPa	ISO 178/A	1.85	2.46
DEFLECTION TEMPERATURE UNDERLOAD @ 1.8 M DEG C	ISO 75-2/A	60	68

The data above was obtained under laboratory conditions and applies only to the samples of subject material tested, calibrated or sampled. To the best of our knowledge, this data is within the accuracy and precision of the respective tests. Because of testing and sampling variability, we cannot guarantee that other laboratories will obtain the same results and NO WARRANTY IS EXPRESSED OR IMPLIED.
P - indicates the result from a previously pending test



Print Date:

Oct 20,2023

CERTIFICATE OF ANALYSIS

TEKNOR APEX TENNESSEE COMPANY
 A SUBSIDIARY OF TEKNOR APEX
 751-R NORTH DUPREE AVE
 BROWNSVILLE, TN 38012
 UNITED STATES

Item No: 105705701
 Desc: CHEMLON 104 H BK001
 Cust Item: MAT-087-BLK

Order Number: 1200341032

Attention:

WESTERN DIVERSIFIED PLASTICS. LLC
 53150 NORTH MAIN STREET

Cust PO: WD 035968
 Phone#: 1-269-668-3390
 Fax#: 1-269-668-4694

MATTAWAN, MI 49071
 UNITED STATES

Design Tests	Property	Method	Min	Max	Results
	NOTCHED IMPACT STRENGTH /(IZOD)@-20C, kJ/m2	ISO 180/1A	8.0		11.2
	NOTCHED IMPACT STRENGTH /(IZOD)@-40C kJ/m2	ISO 180/1A	8.0		8.9
	DENSITY g/cm3	ISO 1183	1.09	1.10	1.10
	ELONGATION, @ YIELD %	ASTM D638	5		5
	NOTCHED IMPACT STRENGTH /(IZOD) ft-lb/in	ASTM D256	2.00		4.55
	FMVSS 302 BURN TEST in/min				PASSED
	FLAMMABILITY, BURN RATE mm/min	ISO 3795		100.0	16.2

Teknor Apex Tennessee Company
 Quality Control Manager
 Contact No.:(731)772-3690

The data above was obtained under laboratory conditions and applies only to the samples of subject material tested, calibrated or sampled. To the best of our knowledge, this data is within the accuracy and precision of the respective tests. Because of testing and sampling variability, we cannot guarantee that other laboratories will obtain the same results and NO WARRANTY IS EXPRESSED OR IMPLIED.
 P - indicates the result from a previously pending test

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
CERT-08698-2006-AQ-HOU-ANAB

Initial certification date:
01 December, 1993

Valid:
01 June, 2021 – 26 March, 2024

This is to certify that the management system of
Teknor Apex Tennessee Company
751 Dupree Street, Brownsville, TN, 38012, USA
and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:

Manufacture and quality verification of thermoplastic compounds, plasticizer, organic chemicals, ETP compounds and the manufacture of commercial and residential garden hose.

Place and date:
Katy, TX, 01 June, 2021



For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5164, USA



Sherif Mekkawy
Management Representative



DNV

Certificate no.: CERT-08698-2006-AQ-HOU-ANAB
Place and date: Katy, TX, 01 June, 2021

Appendix to Certificate

Teknor Apex Tennessee Company

Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
Teknor Apex Tennessee Company	751 Dupree Street, Brownsville, TN, 38012, USA	Manufacture and quality verification of thermoplastic compounds, plasticizer, organic chemicals, ETP compounds and the manufacture of commercial and residential garden hose.
Teknor Apex Tennessee Warehouse	1667 E. Main, Brownsville, TN, 38012, USA	Shipping, Warehouse - ETP
Teknor Apex Tennessee Company (Blackwell Warehouse)	595 Blackwell, Brownsville, TN, 38012, USA	Shipping, Warehouse for Hose Production

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, Suite200
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 VCS 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/DD Fluke 54II 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 Hongqi0-.41Mpa 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 04/05/2023
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 04/05/2023
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	
TLI002 Internal Test Lab Scope	Page 3 of 3	Revision Date 04/05/2023
Printed Copies are for Reference Only		