HellermannTyton

From: **Quality Assurance HellermannTyton GmbH**

Subject: PPAP Approval signature deadline

Dear customer:

As you are aware the PPAP process is an integral part of our business. With that in mind, we are informing our customers who are requesting a PPAP that there is a 30 day (calendar) deadline to which we are expecting your reply back with a signed copy of the PSW with a disposition regarding it´s validity. It is important that we maintain compliance to the current AIAG PPAP manual.

As a part of compliance a signed and approved PSW is essential for our records.

We reserve the right to consider that PPAP valid and complete, if we do not receive a signed copy of the PSW within 30 days (calendar).

Once you have received our PPAP information please e-mail us a copy of your disposition with the appropriate signatures as soon as possible to the following person:

nescha.lohse@HellermannTyton.de Quality Assistant phone: +49 (0) 4122 701 5726

Your cooperation is greatly appreciated!

Respecting the procedure as described above, the documentation with HellermannTyton PB-No.: **91623** with submission date 29.06.2021 will be considered as complete and valid automatically on **29.07.2021** unless otherwise disposed!

HellermannTyton | HellermannTyton GmbH internal remarks: | PB-No.: **91623**

Part Describtion: BCSFTOVAL2 GPN 160407

Part Submission Warrant

Part Name **BCSFTOVAL2** | Cust. Part Number **GU5T-14E044-EA**

Shown on Drawing No. **16-0407-011-CSU** | Org. Part Number **15101884**

Engineering Change Level **01.2** | Dated **25.01.2017**

Additional Engineering Changes **n/a** | Dated **n/a**

Safety and/or Government Regulation ☐ Yes ☑ No | Purchase Order No. **15101884** | Weight (kg) **0,0010**

Checking Aid No. **n/a** | Checking Aid Engineering Change Level **n/a** | Dated **n/a**

ORGANIZATION MANUFACTURING INFORMATION

HellermannTyton GmbH **DUNS: 315430892**
Organization Name & Supplier/Vendor Code

Großer Moorweg 45
Street Address

Tornesch Region **25436** **Germany**
City Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

Nursan Kablo Donanimlari **(30471)**
Customer Name/Division

Nadiye BARUTÇU
Buyer/Buyer Code

various
Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? ☑ Yes ☐ No ☐ n/a

Submitted by IMDS or other customer format: **786173407**

Are polymeric parts identified with appropriate ISO marking codes? ☐ Yes ☐ No ☑ n/a

REASON FOR SUBMISSION (Check at least one)

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

REQUESTED SUBMISSION LEVEL (Check one)

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

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☑ material and functional tests ☐ appearance criteria ☑ statistical process package

These results meet all design record requirements: ☑ Yes ☐ No (If "No" - Explanation Required)

Mold / Cavity / Production Process **injection moulding / serial mold**

DECLARATION

I 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 confidential - pcs / 24 hours.

I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS:

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

Organization Authorized Signature **i.A.** N. Lohse | Date 29-Jun-21

Print Name **i.A. N. Lohse** | Phone No. +49 (0) 4122 701 5726 | Fax No. +49 4122 701 241

Title **Quality Assistant** | E-mail nescha.lohse@HellermannTyton.de

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature | Date

Print Name | Customer Tracking Number (optional)

Production Part Approval, Dimensional Results

HellermannTyton

Internal PB-No.: **91623**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**GU5T-14E044-EA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**BCSFTOVAL2**
INSPECTION FACILITY:	**QS-Laboratory**	DESIGN RECORD CHANGE LEVEL:	01.2 25.01.2017
		ENGINEERING CHANGE DOCUMENTS:	
		NAME of LABORATORY:	

ITEM	DIMENSION / SPECIFCATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)			OK	NOT OK
					mean	**min**	**max**		
1	**1,5**	**± 0,5**			**1,5**	**1,5**	**1,6**	☑	☐
2	**38,7**	**± 2,0**			**38,6**	**38,6**	**38,7**	☑	☐
3	**11,6**	**± 1,0**			**11,6**	**11,6**	**11,6**	☑	☐
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Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	**TITLE**	**DATE**
i.A. N. Lohse	Quality Assistant	29-Jun-21

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **91623**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**GU5T-14E044-EA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**BCSFTOVAL2**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	01.2 25.01.2017
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.		NAME of LABORATORY:	

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)	OK	NOT OK
						☐	☐
4	**PA66HIRHS**				**Material is PA66 HIRHS**	☑	☐
	Color: natural				**Color of material is natural**	☐	☐
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CREATOR	TITLE	DATE
i.A. N. Lohse	Quality Assistant	29-Jun-21

HellermannTyton

Current Material Certificate

ASCEND PERFORMANCE MATERIALS

HELLERMANN TYTON
6701 W GOOD HOPE
MILWAUKEE WI 53224
Attention : QUALITY DEPARTMENT
Customer Part No: UR0HIRHS9

Ascend Performance Materials Operations LLC
Nylon Plastics and Polymers
3000 Chemstrand Road
Cantonment, FL 32533
Telephone : (850)968-7000

Certificate Date : 02-Jun-21
Delivery No : 382568167
Shipped Qty : 46,020.000 Lbs
20,874.672 Kgs
Customer P.O. No: 146597-29
Container : SLAY 5326

Certificate of Analysis

This certifies that Nylon Resin shipped to you from Ascend Performance Materials Operations LLC has been tested and found to meet required specifications.

This material was produced under a Quality System that meets ISO 9001:2015 and IATF 16949:2016 criteria.

If you have questions or concerns about this Certificate of Analysis, please contact Ascend Performance Materials Customer Operations at 1-888-927-2363.

This product meets the requirements of the following specifications: SAE J1639, SAE J1639 PA0171, ASTM D6779-PA0161-Z1Z2, ASTM 4066 PA0161, FMVSS 302, MS-DB-41 CPN 2055, ESB-M4D178-A2, WSS-M99P23-C1/C2, WSS-M99P9999-A1, WSS-M4D706B1, WSS-M99P1111-A, WSK-M4D706-A, GMW16447P-PA66-T2, GMW16558P-PA66-T1, GMP.PA66.015, Ford WQ 100B.

Material: VYDYNE 47H NT Q527 **Material No:** 10404322 **Batch No:** JE25FY02 **Date of Mfg:** 25-May-2021

Ascend Performance Materials Operations LLC Specification

Lot Data Property	Test Method	Min	Max	Result	Units
Density	ISO 1183	1.09	1.11	1.11	g/cm^3
DTUL, 1.82 MPA	ISO 75 1-2	53.0		72.0	C
Flex Modulus	ISO 178	1900		2613	MPa
Moisture	ASTM D6869	0.05	0.20	0.10	%
Notched Izod	ISO 180 / 1A	12.0		18.9	kJ/m^2
Strength @ Yld	ISO 527 1-2	60		67	MPa

POTENTIAL

FAILURE MODE AND EFFECTS ANALYSIS

(PFMEA)

PFMEA Number: **US-OP-APQP-2**

Part Name: Clips/Mounts/Brackets/Various Materials/Clamps

Process Description: Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging

Process Responsibility: HellermannTyton

Prepared by: Quality Assurance

Model Year(s) / Vehicle(s): NA

Key Date: 12/14/2020

PFMEA Date Org: 12/14/2020

Rev. Date: See Footer

Core Team: Quality Assurance, Manufacturing, Automation, Receiving-Shipping

Rev. Level: See Footer

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
1 QA Receiving Certificate of Analysis (C of A)	HT SPEC and C of A	QA does not receive C of A	Delay in Manufacturing	5		C of A not listed on PO	4	P - WI-PUR-6	2	40	None						0
				5		Supplier forgot to send out C of A to HT QA	5	P - purchase order requirement	2	50	None						0
		Wrong HT SPEC	Delay in manufacturing / Customer Dissatisfaction	5		Incorrect HT SPEC or MTS on PO	4	P-Work instruction D-Visually verify to SPEC in ERP System	2	40	None						0
		Information on C of A does not match HT SPEC	Delay in Customer Shipment	5		HT Spec or MTS does not have the latest released revision.	4	P-Work instruction P-Change management D-Visually verify to SPEC in ERP System	2	40	None						0
				5		Supplier only test to the latest released revision	4	P-Work instruction P-Change management D-Visually verify to SPEC in ERP System	2	40	None						0
				5		Supplier does not test to the latest released revision	4	P-Work instruction P-Change management D-Visually verify to SPEC in ERP System	2	40	None						0
		Timely update of ERP (JDE)	Delay in Customer Shipment	5		Manual operation and no system reminder.	3	P-Work instruction P-Change management D-Visually verify to SPEC in ERP System	2	30	None						0
2 Incoming Receiving, QA Inspection (if required), & Movement to Storage	Verify material / parts have all information per PO	No Label	Loss of Traceability	5		Label falls off	3	D - Incoming Inspection P- Supplier PPAP	2	30	None						0
		Wrong Label	Wrong parts in inventory, delay in manufacturing	5		Wrong product was shipped	2	D - Incoming Inspection P- PO in ERP System	5	50	None						0
		Incorrect material / part	Delay in Customer Shipment	5		Wrong product was shipped	2	D - Incoming Inspection P- PO in ERP System	5	50	None						0
				5		Ordered Part Number entered incorrect	2	D - Incoming Inspection P- PO in ERP System	5	50	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Wrong Quantity	Customer Dissatisfaction	4		Quantity of product shipped by supplier was incorrect	2	D - Incoming Inspection	2	16	None						0
				4		Order quantity entered incorrect	2	D - Incoming Inspection	2	16	None						0
		Incorrect Packaging	Delay in Customer Shippment	5		Product received did not have correct packaging	3	D - Incoming Inspection	2	30	None						0
		Poor material / part Quality	Customer Dissatisfaction	7		Product received is non-conforming	2	D - Incoming Inspection P- Supplier PPAP	7	98	None						0
		Moisture Too High / Low	Delay in Customer Shippment	5		Damaged in transit	4	D - Incoming Inspection P- Supplier C of A D - Moisture Log & Share Point	2	40	None						0
		Wrong colorant received (if required)	Delay in Customer Shippment	5		Wrong product was shipped	2	P - ERP System, WI-SR-10.2-1, WI-QA-10.3-1	4	40	None						0
	Non-Silo resins & purchased components moved to storage	Non-Silo resins & purchased components not moved to storage	Delay in Manufacturing	5		Manual operation / operator error	2	D/P - ERP system / WI-SR-10.2-1	4	40	None						0
	Silo-resins moved to storage	Silo-resins not moved to storage	Delay in Manufacturing	5		Manual operation / operator error	2	D/P - ERP system / WI-MH-1	4	40	None						0
3 Cell Clearance	Clear Cell from Previously run job	Cell not cleared of equipment and / or materials from previously run job	Delay in manufacturing	5		Change over checklist not followed	2	D - Production Control System	4	40	None						0
			Wrong material used for product	8		Change over checklist not followed	2	D - Production Control System	4	64	None						0
4 Resin Movement, Resin Ratio Central Material Handling System Operation	Acceptable resin for production	Unacceptable Moisture Levels	Part Non-Compliance	7		Dryer malfunction	2	D - Dryer Alarms D/P - Moisture Testing P - Filter Cleaning	2	28	None						0
		Contamination	Part Non-Compliance	7		Foreign Matter in Material	2	D - Visual Inspections P - Material Handling Work Instruction w/ color-coded containers	6	84	None						0
			Part Non-Compliance	7		Incorrect resins/colorant Mixed Together	2	D - Visual Inspections P - Material Handling Work Instruction	5	70	None						0
		Incorrect Material	Part Non-Compliance	8		Wrong material hook-up at press	2	D/P - Visual to Work Order	5	80	None						0
5 Injection Molding / Cell, Work Order, Press, & Automation Set-up	Instructions for production	All Non-resin items not present at cell	Delay in Manufacturing	5		WI or ERP system not followed	2	P/D- ERP system & WI-SR-10.2-1	4	40	None						0
		Work order not signed off	Word order has incorrect BOM	8		Incorrect set-up BOM in (JDE)	6	D-Change over checklist P- IE Set-up BOM (IMLS)	2	96	None						0
			Incorrect BOM used	8		Wrong label on material	2	P-Work instruction D-Flag system	2	32	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				8		Operator Error	3	P-Work instruction D-Flag system	2	48	None						0
		Work Order Set Up Incorrectly	Delay in Manufacturing	5		Work Order read incorrectly	2	D/P - Work Order D - Set-up Verification	5	50	None						0
		Wrong work order used	Delay in Manufacturing	5		wrong work order sent to machine	2	D/P - Work Order D - Set-up Verification	5	50	None						0
		Incorrect Blending	Part Non-Compliance / Breakage and Color Match Failures	5		Material blender set incorrectly	2	D/P - Visual to Work Order D- Quality Tree	7	70	None						0
		Excess Plastic on Parts	Part Non-Compliance	6		Hot Excess Runner	2	D - Visual Inspections, Quality Tree P - In-process Inspections	7	84	None						0
				6		Improper start-up	2	D - Visual Inspection, Quality Tree D - LPA D/P - In-process & Cell Inspections	5	60	None						0
		Soft Insertions	Part Non-Compliance	6		Thermolator Malfunction	1	D - Visual Inspections D-Audible alarms added to all Thermolator to detect temp. dev. D - In-process Inspections P - First Piece Approvals D - Hand Insertion	3	18	None						0
				6		Incorrect Tonnage	2	D- Visual Inspections P - First Piece Approvals P - In-process PM's	4	48	None						0
				6		Start-up/Cycle Interruptions	4	D- Visual Inspections D - In-process Inspections D- Hand Insertions	4	96	None						0
				6		Fast Cycle Time	2	D - Visual Inspection, Quality Tree D - In-process Inspections P - First Piece Approvals	4	48	None						0
				6		Leader Pin/Sidelock Wear	2	D - Visual Inspections, Quality Tree D - In-process Inspections P - First Piece Approvals P - In Process PM	4	48	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Plugged Sprue Tips / Gates (Hot Manifold/Valve-Gated Molds)	Part Non-Compliance / Unbalanced Fill	7		Material Contamination	2	D- Visual Inspections, Quality Tree D - In-process Inspections P - Magnets in Hopper and Melt Filters on Nozzle	5	70	None						0
		Start up scrap packaged	Customer Dissatisfaction	4		Automation equipment started too early after start up of process re-start.	4	D - Visual Inspections P - Work Instructions P - Automation disable switch during changeover D/P - In-process & Cell Inspections	5	80	None						0
		Camera stops working	Customer Dissatisfaction	6		Mechanical, power failure, lenses blocked, conveyor belt dirty, component failure.	2	P - Master sample (Known Bad and Good parts)	2	24	None						0
		Auto-degator stops working (if required)	Delay in Manufacturing	4		Mechanical failure	2	D - Visual Inspections D/P - In-process & Cell Inspections P - Automation Sensor	4	32	None						0
		End of Arm Tool stops working (if required)	Delay in manufacturing	4		Mechanical failure	2	D - Visual Inspections D/P - In-process & Cell Inspections P - Automation Sensor	4	32	None						0
		Auxillary Assembly Equipment stops working (if required)	Delay in manufacturing	4		Mechanical failure	2	D - Visual Inspections D/P - In-process & Cell Inspections P - Automation Sensor	4	32	None						0
		Packaging Equipment stops working (if required)	Delay in manufacturing	4		Mechanical failure	2	D - Visual Inspections D/P - In-process & Cell Inspections P - Automation Sensor	4	32	None						0
6 First Piece Approval Injection Molding Process	Manufacturing a conforming part per specifications	Incorrect Blending	Part Non-Compliance / Breakage and Color Match Failures	5		Material Handling Error	2	D/P - Visual to Work Order, Quality Tree	6	60	None						0
		Burnt tips	Part Non-Compliance / Cosmetic Issues / Short	3		Plugged/Worn Vents	3	D- Visual Inspections, Quality Tree P - First Piece Approvals P - In process PM's using Ice Blasting	6	54	None						0
		Sticking in mold	Part Non-Compliance / Mold Damage	5		Excessive Mold Temperatures	2	D- Visual Inspections P - First Piece Approvals D - Audible alarms added to all Thermolators to detect temp. dev.	5	50	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Excessive Hold Pressure	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	60	None						0
				5		Residue Build-Up	2	D- Visual Inspections, Quality Tree P - First Piece Approvals D - Audible alarms added to all Thermolators to detect temp. dev.	5	50	None						0
				5		Water hooked up incorrectly	2	D-Visual Inspections	6	60	None						0
				3		Packaging interruptions Degator Jams	3	D- Visual Inspections P - First Piece Approvals	8	72	None						0
				5		Heater band malfunctions	2	D- Visual Inspections D - In-process Inspections P - PM	5	50	None						0
		Excess Plastic on Parts	Part Non-Compliance	5		Hot Excess Runner	2	D - Visual Inspections, Quality Tree P - In-process Inspections P- First Piece Approvals	5	50	None						0
		Shorts	Part Non-Compliance / Cosmetic	5		Insufficient Injection Pressure compatibility of Press / mold	3	D- Visual Inspections P - First Piece Approvals P - In-process PM's	5	75	None						0
				5		Plugged/Worn Vents	3	D- Visual Inspections P - First Piece Approvals P - In-process PM's	5	75	None						0
				5		Residue Build-Up	2	D- Visual Inspections P - First Piece Approvals P - In-process PM's using Ice Blasting for mold cleaning	5	50	None						0
				5		Lot / Moisture Variations	2	D- Visual Inspections D - First Piece Approvals P - Material Certs P - Moisture Analysis	5	50	None						0
				5		Process Interruption	2	D- Visual Inspections D - First Piece Approvals P - Material Certs P - Moisture Analysis	5	50	None						0
		Flash	Part Non-Compliance / Insertion Failures / Cosmetic	5		Excessive Injection Pressure	3	D- Visual Inspections, Quality Tree P - First Piece Approvals P - In-process PM's	5	75	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Incorrect Tonnage	2	D- Visual Inspections P - First Piece Approvals P - In-process PM's P - Press Size Callout on Routing	5	50	None						0
				5		Water hook up incorrect on sub gated tools	4	D- Visual Inspections D - In-process Inspections	4	80	None						0
				5		Start-up/Cycle Interruptions	3	D- Visual Inspections D - In-process Inspections	4	60	None						0
				5		Clamp pressure on press	3	D- Visual Inspections D - In-process Inspections	4	60	None						0
				5		Worn inserts	4	D- Visual Inspections D - Tool Tests D - In-process Inspections	3	60	None						0
				5		Broken Insert/Ejector Blade	3	D- Visual Inspections, Quality Tree D - In-process Inspections	5	75	None						0
		Mold Mismatch	Part Non-Compliance/High Insertion Force	6		Poor Mold Alignment	2	D - Visual Inspections, Quality Tree D - In-process Inspections P - First Piece Approvals P - In-process PM	5	60	None						0
				6		Leader Pin/Sidelock Wear	1	D - Visual Inspections, Quality Tree D - In-process Inspections P - First Piece Approvals P - In-process PM	6	36	None						0
		Deep ejector pins	Part Non-Compliance/High Insertion Force	3		Excessive Hold Pressure	3	D - Visual Inspections D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	4	36	None						0
				3		Thermolator Malfunction	2	D - Visual Inspections D - In-process Inspections P - First Piece Approvals P - In-process PM	4	24	None						0
				3		Fast Cycle Time	2	D - Visual Inspections, Quality Tree D - In-process Inspections P - First Piece Approvals P - In-process PM	4	24	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Plugged Sprue Tips / Gates (Hot Manifold/Valve-Gated Molds)	Part Non-Compliance / Unbalanced Fill	3		Material Contamination	2	D- Visual Inspections D - In-process Inspections P - Magnets in Hopper and Melt Filters on Nozzle	5	30	None						0
				3		Mold Heater Malfunction	2	D- Visual Inspections D - In-process Inspections	5	30	None						0
				3		Valve Gate Malfunction	2	D- Visual Inspections D - In-process Inspections	5	30	None						0
		Elongated Sprues	Part Non-Compliance / Cut Hoses and Missing Parts	6		Inadequate Cooling	2	D- Visual Inspections D - In-process Inspections	5	60	None						0
		Start up scrap packaged	Customer Dissatisfaction	3		Automation equipment started too early after start up of process re-start.	3	P - Visual Inspections, Quality Tree P - Work Instructions, Training Manual P - Automation disable switch during changeover P - Inspections at the cell D - In-process Inspections	5	45	None						0
		Dimensional check shows out of tolerance condition (if required)	Part Non-Compliance	5		Excessive mold wear	2	P - Dimensional verification using calibrated gauging	4	40	None						0
				5		Process sheet not followed	2	P - Dimensional verification using calibrated gauging	4	40	None						0
		First Piece Not Hung	Delay in Manufacturing	3		Failure to hang First Piece	2	D/P - Tool Evaluation Sheet	6	36	None						0
		Functional check (if required) shows part has damage	Part Non-Compliance	6		Process sheet not followed	2	D - First Piece Acceptance Hung at the Cell	6	72	None						0
		Performance Testing (if required) shows part does not meet specifications	Part Non-Compliance	6		Process sheet not followed	2	P - Performance verification using calibrated gauging	4	48	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Incorrect revision level produced	Customer Dissatisfaction	5		Work Order not compared to latest revision level drawing in JDE	2	D - First Piece Acceptance Hung at the Cell	6	60	None						0
	Product Conforms per specifications before production	Product not properly packaged or labeled	Customer Dissatisfaction	5		Work Order or WI not followed	2	P/D - Visual to Work Order / WI-PRD-200	6	60	None						0
	Revision level	Product not properly packaged or labeled	Customer Dissatisfaction	5		Work Order or WI not followed	2	P/D - Visual to Work Order / WI-PRD-200	6	60	None						0
7 Assembly	Automated Assembly (if required)	Parts not assembled properly	Part Non-Compliance	6		Mechanical Failure	2	D - Visual Inspections D/P - In-process & Cell Inspections P - Automation Sensor	4	48	None						0
	Manual Assembly (if required)	Parts not assembled properly	Part Non-Compliance	6		Work Order or WI not followed	2	D - Visual Inspections D/P - In-process & Cell Inspections	6	72	None						0
8 Packaging & Labeling	Manual placement of parts onto cooling fixture or cooling conveyor (if required)	Parts not placed on cooling fixture or conveyor	Part Non-Compliance	5		Work Order or WI not followed	2	P/D - Visual to Work Order / WI	7	70	None						0
	Automated Packaging	Product not properly packaged or labeled	Customer Dissatisfaction	5		Work Order or WI not followed	2	P/D - Visual to Work Order / WI-PRD-200	6	60	None						0
	Manual Packaging + water (if required)	Product not properly packaged or labeled	Customer Dissatisfaction	5		Work Order or WI not followed	2	P/D - Visual to Work Order / WI-PRD-200	6	60	None						0
9 In-Process Checks	Package product per customers specifications	Incorrect or Missing Date Code on the Bag	Traceability Loss	3		Printer Malfunction	3	D - Visual Inspections P - Inspections at the cell P - Date Code Calendar	5	45	None						0
				3		Wrong/no date code on packaging - Operator Error	3	D - Visual Inspections P - Inspections at the cell P - Date Code Calendar P - Work Instructions	5	45	None						0
		Degator Jams	Part Non-Compliance	5		Parts Not Aligned/cut heads	4	D - Visual Inspection p - Degator Guides P - Machine Alarms	4	80	None						0
			Loss Production	5		Dull Cutter Blades	2	D - Visual Inspection D - In-process Inspections P - PM P - Warped Sprue Detection	6	60	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Cylinder Failure	2	D - Visual Inspection D - In-process Inspections P - PM	3	30	None						0
		Incorrect Degator alignment	Part Non-Compliance	5		Improper Set-up	2	D- Visual Inspection D - In-process Inspections P - Degator Guides - PM	5	50	None						0
						Manual Degator Jams	4	D- Visual Inspection D - In-process Inspections P - PM	4	80	None						0
						Automated Degator Jams	3	D- Visual Inspection D - In-process Inspections P - PM P- Degater Alarm	4	60	None						0
						Improper part feed	2	D- Visual Inspection D - In-process Inspections P - PM P- Degater Guides w/ Alarms	4	40	None						0
						Part missing from lead in edge of runner	2	D- Visual Inspection D - In-process Inspections P - PM P- Degater Alarm	4	40	None						0
		Greasy Parts Packaged	Part Non-Compliance	4		Robot Drags the Parts Across the Leader Pins	2	D - Visual Inspection D - In-process Inspections P - PM	5	40	None						0
		Functional check (if required) shows part does not perform as intended	Part Non-Compliance	6		Process sheet not followed	2	D-Operator check every other hour. D-Process Tech check every other hour. P-Prouction Control System/Work Order Log P-Work instruction /Process sheet	4	48	None						0
		Functional check (if required) shows part has damage	Part Non-Compliance	6		Process sheet not followed	2	D-Operator check every other hour. D-Process Tech check every other hour. P-Prouction Control System/Work Order Log P-Work instruction /Process sheet	4	48	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Incorrect Moisture in Bags	Part Non-Compliance / Parts Conditioned Incorrectly	5		Water Dosing system failure	2	D - Monitoring Water P - Inspections at the cell P - Preventative Maintenance P - dosing system monitors flow	4	40	None						0
				5		Water Supply Not On	2	D - Monitoring Water P - Inspections at the cell P - Preventative Maintenance P - dosing system monitors flow	6	60	None						0
				5		Dirty or Clogged Filter	2	D - Monitoring Water P - Inspections at the cell P - Preventative Maintenance P - dosing system monitors flow	4	40	None						0
				5		Improper Timer Setting	3	D - Monitoring Water P-dosing system monitors flow	4	60	None						0
				5		Bad Bag Seals leak water	2	D - Visual Inspection D - Monitoring Water P - Inspections at the cell P - Preventative Maintenance	5	50	None						0
		Mis-labeling	Customer Dissatisfaction	3		Printer Ribbon not Inserted Properly	2	D - Visual Inspections P - Inspections at the cell P-Work order sign-off	7	42	None						0
				3		Wrong Labels Placed on Product	4	D - Visual Inspections P - Inspections at the cell P - LPA P-Work order sign-off	7	84	None						0
				3		Wrong Pre-labeled Bag for Product	4	D - Visual Inspections P - Inspections at the cell P - LPA P-Work order sign-off	7	84	None						0
				3		Excess Labels not Removed From Production Area	4	D - Visual Inspections P - Inspections at the cell P - LPA P-Work order sign-off	7	84	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				3		Wrong label provided	3	D - Visual Inspections P - Inspections at the cell P - LPA P-Work order sign-off	7	63	None						0
		Insufficient Bag Seals	Part Non-Compliance	3		Sealer Tape Worn	4	D - Visual Inspection P - Inspections at the cell P - Electronic Shift Log	6	72	None						0
				3		Bag Wrinkled/Bag Mil Thickness Inconsistencies	4	D - Visual Inspection P - Inspections at the cell	7	84	None						0
				3		Sealer Malfunctions	2	D - Visual Inspection P - Inspections at the cell	7	42	None						0
				3		Material stuck on sealer	4	D - Visual Inspection P - Inspections at the cell P - Incoming Inspection	7	84	None						0
				3		Improperly Adjusted Timer	4	P - Work Instruction D - Visual Inspection	7	84	None						0
				3		Teflon coating worn (Rennco baggers)	2	P - Work Instruction D - Visual Inspection P- In-process PM's	6	36	None						0
		Insufficient Packaging	Customer Dissatisfaction	3		Issues with the Bag Stock (Not Quantity)	3	D - Visual Inspection P - Inspections at the cell	7	63	None						0
				3		Insufficient Packaging Supplies	4	D - Visual Inspection P - Inspections at the cell	7	84	None						0
		Incorrect Quantity in Bag	Customer Dissatisfaction	4		Robot grippers failed to place parts	3	D - Visual Inspection P - Inspections at the cell	7	84	None						0
				4		Pick and Place Grippers Drop Parts	3	D - Visual Inspection P - Inspections at the cell	7	84	None						0
				4		Degator Jams	3	D - Visual Inspection P - Inspections at the cell	7	84	None						0
				4		Inconsistent Bag Width	2	P/D - Visual Inspection	8	64	None						0
		Missing or Incorrect Hang Hole	Customer Dissatisfaction	4		Bag register mark Inconsistencies	2	P/D - Visual Inspection	8	64	None						0
				4		Bags not Webbed Correctly	2	P/D - Visual Inspection	8	64	None						0
				4		Too Much Air in Bag	2	P/D - Visual Inspection	8	64	None						0
				4		Cylinder Failure	2	D - Visual Inspection P - PM	7	56	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Incorrect Quantity in Boxes	Customer Dissatisfaction	4		Improper Scale Set Up	3	D - Visual Inspections P Inspections at the cell P - Bag Counter (T18R-C)	7	84	None						0
				4		Scale Out of Calibration	2	D - Visual Inspections P - Inspections at the cell P - Calibration Schedule	5	40	None						0
		Parts mixed	Customer Dissatisfaction	4		Operator mixed product from previous work order	2	D - Visual Inspection P - Inspections at the cell	7	56	None						0
10 QA Testing	Validation and documentation of product per specifications	Audit Missed	Part Non-Compliance	7		Auditor error or improperly trained auditior	2	P - Auditor training & LPA form F-PRD-9	4	56	None						0
		Audit errors and/or incomplete audit	Part Non-Compliance	7		Auditor error or improperly trained auditior	2	P - Auditor training & LPA form F-PRD-10	4	56	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
11 Layered Process Audit	Audit Production Process per Questions on LPA form F-PRD-9	Audit Missed	Part Non-Compliance	7		Auditor error or improperly trained auditior	2	P - Auditor training & LPA form F-PRD-9	4	56	None						0
		Audit errors and/or incomplete audit	Part Non-Compliance	7		Auditor error or improperly trained auditior	2	P - Auditor training & LPA form F-PRD-10	4	56	None						0
12 Inspection at the Cell	Product conforms per specifications throughout production run.	Mis-labeling	Customer Dissatisfaction	3		Wrong Labels Placed on Product	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				3		Wrong Pre-labeled Bag for Product	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				3		Excess Labels not Removed From Production Area	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				3		Wrong label provided	3	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	54	None						0
		Water Verification Incomplete	Part Non-Compliance	6		Water not Verified During Process Inspection	2	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
		Insufficiant Bag Seals	Part non-compliance	3		Sealer Tape Worn	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				3		Bag Wrinkled/Bag Mil Thickness Inconsistencies	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				3		Sealer Malfunctions	2	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	36	None						0
				3		Material stuck on sealer	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				3		Improperly Adjusted Timer	4	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
		Incorrect Quantity in Bags	Customer Dissatisfaction	4		Scale issue	3	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off P - Calibration Schedule	5	60	None						0
				4		Operator error	3	P - Work Instructions D - Visual verification D- Share Point/Shift Log	5	60	None						0
		Incorrect Quantity in Boxes	Customer Dissatisfaction	4		Improper Scale Set Up	3	D - Visual Inspections P Share Point P - Bag Counter (T18R-C)	5	60	None						0
				4		Scale Out of Calibration	2	D - Visual Inspections P - Share Point P - Calibration Schedule	5	40	None						0
		Insufficiant Packaging	Customer Dissatisfaction	3		Issues with the Bag Stock (Not Quantity)	3	D - Visual Inspection P - Share Point	7	63	None						0
				3		Insufficient Packaging Supplies	4	D - Visual Inspection P - Share Point	7	84	None						0
		Incorrect or Missing Date Code on the Box	Traceability Loss	3		Operator error	3	D - Visual Inspections P - Date Code Calendar P - Work Instructions P-Share Point/Shift Log	5	45	None						0
		Annual Validation not Completed	Customer Dissatisfaction	5		Customer Specific Requirements Not Met	2	D/P - PPAP Matrix P-Training Quality Personnel	3	30	None						0
		Good product put in Hold	Delay shipment to customer	5		Incorrect cone put on product at Molding Work Station	2	D - Visual Inspections P -Hold ticket attached P-Work instructions	3	30	None						0
13 Validation Testing (Annually if required)	Meet customer requirements	Annual Validation not Completed	Customer Dissatisfaction	5		Customer Specific Requirements Not Met	2	D/P - PPAP Matrix P-Training Quality Personnel	3	30	None						0
14 Finished Goods Movement	Move products from Injection Molding work station to Stock or Shipping Dock	Good product put in Hold	Delay shipment to customer	5		Incorrect cone put on product at Molding Work Station	2	D - Visual Inspections P -Hold ticket attached P-Work instructions	3	30	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Bad Product Shipped	Customer Dissatisfaction	7		Incorrect cone put on product at Molding Work Station	2	D - Visual Inspections P -Hold ticket attached P-Work instructions	6	84	None						0
	FIFO, Physical Inventory Location, ERP (JDE)	Incorrect receive in ERP	Inaccurate Inventory-Delay Production	5		Operator error	3	P-Work instructions D-Accounting verification D-Inventory cycle count	5	75	None						0
		Inventory put on wrong location	Inaccurate Inventory-Delay Production	5		Operator error	3	P-Rack label D-Inventory cycle count	5	75	None						0
		Damage during transfer	Delay in Customer Shippment	5		Operator error	3	P-Operator training D-Visual Inspections	6	90	None						0
15 Shipping to Warehouse or Customer	Ship Parts per Shipping Specifications	Shipped Incorrectly	Customer Dissatisfaction	4		Late Shipment	3	D/P - Visual Inspections	7	84	None						0
				5		Damaged from Handling	2	D/P - Visual Inspections	7	70	None						0
				5		Damaged Shipment in transit	2	D/P - Visual Inspections	7	70	None						0
				5		Customer Specific Requirements Not Met	2	P-Customer specific packaging requirement P-Work instructions D-Visual inspections	6	60	None						0
	Sales order	Incorrect data on Sales order	Customer Dissatisfaction	5		Operator error	2	D-Visual inspection D-ASN	5	50	None						0
	Manual shipping request	Incorrect data entered in ERP	Customer Dissatisfaction	5		Operator error	2	D-Visual inspection D-ASN	5	50	None						0
	Product package per specifications	Wrong Parts Picked	Customer Dissatisfaction	5		Operator Error	2	D - Staging Visual Inspection P - Pick List	5	50	None						0
		Wrong Quantity Picked	Customer Dissatisfaction	5		Wrong Quantity of Parts Picked	2	D- Visual inspection & sign off P - Staging Inspection	6	60	None						0
		Incorrect Packaging	Customer Dissatisfaction	5		Incorrect Packaging Specifications on Pick List	3	D - Staging Visual Inspection P - Pick List	5	75	None						0
	Product/box label per specifications	Put Label on Wrong Box	Customer Dissatisfaction	5		Operator error	3	D-Visual inspection & sign off D-Scan barcode D-ASN	4	60	None						0
	Ship product per customer requirements	No inventory available	Customer Dissatisfaction	5		Production delay-No FG inventory/Customer order late	3	D- ERP System P - Customer service communication to customer	4	60	None						0

PROCESS FLOW DIAGRAM

Part Description:	Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging	Program Name:	Clips/Mounts/Brackets/Various Materials/Clamps
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/14/20
Customer Name:	Various	PFD Number:	US-OP-APQP-2

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
1	■				QA Receiving Certificate of Analysis	Material Resin Characteristics / Purchased Components	ERP System / WI-QA-7.4
2	■				Incoming Receiving	Non-Silo Resin - Gaylord/Bags Only (Quantity)	ERP System
	■					Non-Silo Resin - Gaylord/Bags Only (Packaging Requirements)	WI-SR-10.2-1
	■				Incoming Receiving (Silo Storage System)	Resin - Silo only	Moisture Log & Share Point
	■				Incoming Receiving (Purchased Components)	Purchased Parts, Customer Returned Product (RGA), Customer Tools Needing Service (RGA), Tooling Components, MRO Items (Quantity)	ERP System
	■					Packaging Requirements	WI-SR-10.2-1
				☒	QA Inspection (if required)	Resin - Colorant	ERP system WI-SR-10.3-1
		◆			Movement to Storage	Non-Silo Resins & Purchased Components	ERP System
		◆				Silo-Resins	ERP System
3	■				Cell Clearance	Clear cell from previously run job	Change over checklist QS-WI-INJ-01
4		◆			Resin Movement	Move Resins to Material Handling System and Check Moistures in Resin Dryers	Material Process Log F-PRD-8.1-4 and Raw Material Moisture Content Test Log F-QA-10.3-9
	■				Resin Ratio	Resin Ratio and Colorant	Material Process Log F-PRD-8.1-4
5	■				Injection Molding / Cell Set-up - Manual Assembly Equipment (if required)	Inventory Parts - Transfer & Move Non-resin items to cell, In-process part assembly	ERP System / Signed Set-up Stamp on Work Order

PROCESS FLOW DIAGRAM

Part Description:	Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging	Program Name:	Clips/Mounts/Brackets/Various Materials/Clamps
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/14/20
Customer Name:	Various	PFD Number:	US-OP-APQP-2

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
	■				Injection Molding / Work Order Set-Up	Ensuring supplies on work order ready at cell, ensure scale & water set-up (if required)	Signed Set-up Stamp on Work Order / WI-PRD-200
	■				Injection Molding / Press Set-up	Mold Installation, Machine Set-up, Cooling Fixture or Cooling Conveyor Set-up (if required)	Work Order / WI-PRD-9.0-2, Part specific Process Sheet F-PRD-9.6-1 and PLC
	■				Automation Set-up - Camera / Vision System Inspection (if required)	In-process Cable Tie Inspection	Run Master Sample through the vision system (1X) per day (MP2)
	■				Automation Set-up - Degator (if required)	In-process automatic runner degator	Signed Set-up Stamp on Work Order
	■				Automation Set-up - EOAT (if required)	In-process End Of Arm Tool used to grab parts and / or runners	Signed Set-up Stamp on Work Order
	■				Automation Set-up - Part Seperator (if required)	In-process part seperator	Signed Set-up Stamp on Work Order
	■				Automation Set-up - Auxillary Assembly Equipment (if required)	In-process part assembly	Signed Set-up Stamp on Work Order
	■				Automation Set-up - Packaging Equipment (if required)	In-process part packaging	Signed Set-up Stamp on Work Order
6				☒	First Piece Approval - Visual Part Quality, Dimensionals and Functional, and Performance Checks (if required), Revision Level	Part Quality and Revision Level	First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3, and Hung at Press
7	■				Assembly / Automated & Manually	Automated and/or Manual In-process Part Assembly	Work Order and/or Drawing

PROCESS FLOW DIAGRAM

Part Description:	Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging	Program Name:	Clips/Mounts/Brackets/Various Materials/Clamps
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/14/20
Customer Name:	Various	PFD Number:	US-OP-APQP-2

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
8	■				Packaging and Labeling / Automated & Manually	Automated Packaging / Manual Packaging + water (if required)	Per work order / WI-PRD-200
9				☒	In Process Checks / Visual Process set-up, Part Quality	Process Set-up, Part Quality - Visual Appearance	Production Control System
				☒	In-Process Checks	Apply part to Cooling Fixture or Cooling Conveyor (if required), Visual Appearance, Amount of Water Added Per Bag (if required), Proper Bag Seal, Date Code Stamp, Bag and Box Labels, Hole Punch (if required), Scale / Conveyor Verification for Count	Inspection Label (Date Code Stamped & Operator ID) / Production Control System
10				☒	QA Testing	Part Quality - Dimensional Check, Functional Check, and Performance Testing, (if required)	SPC Software
11				☒	Layered Process Audit	Production Process	Layered Process Audit Form F-PRD-9
12				☒	Inspection at the Cell	Part Quality, Box Label, Bag Label, Water Verification (if required), Proper Bag Seal, Quantity in Box, Packaging Requirements, Date Code Stamp / Printer	Share Point
13				☒	Validation Testing (Annually if Required)	Push In / Push On, Pull Out / Pull Off (if required), Dimensional, Functional (if required)	SPC Software / WI, and Dimensional Study F-QA-10.4-2
14		◆			Finished Goods Movement	Move Parts to Stock or Shipping Dock	ERP System

PROCESS FLOW DIAGRAM

Part Description:	Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging	Program Name:	Clips/Mounts/Brackets/Various Materials/Clamps
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/14/20
Customer Name:	Various	PFD Number:	US-OP-APQP-2

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
15		◆		☒	Shipping to Warehouse or Customer	Finished Goods Product, Label, Ship Wrap Material, Shipping Documents, ERP System	ERP System and Shipping Manifest (F-SR-15.1-3

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan

Control Plan Number:	Key Contact/Phone:	Date (Orig.)	Date (Rev.)
US-OP-APQP-2	**414.355.1130**	**12/14/20**	**See Footer**

Part Number/Latest Change Level:	Core Team:	Customer Engineering Approval/Date (If Req'd)
Clips/Mounts/Brackets/Various Materials/Clamps	**Quality Assurance, Engineering, Manufacturing, Processing**	**N/A**

Process Description	Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd)
Inj Molding + Dim / Func / Performance FP + Assy (Auto or Manual) + Packaging	**12/14/20**	**N/A**

Supplier/Plant:	Supplier Code:	Other Approval/Date (If Req'd)	Other Approval/Date (If Req'd)
HellermannTyton MKE	**N/A**	**N/A**	**N/A**

Quality Assurance	Automation Technician	Material Handler/ICC	Process/Mold Technician	Operator	Cell Lead and/or Team Supervisor	Shipping or Receiving

Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS			Special Char. Class	METHODS					Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
									Size	Freq		
1	QA Receiving Certificate of Analysis		1	Material resin Characteristics			Certificate of Analysis verify per MTS and DTL/D of FMVSS302	Visual Material Cert	Each Lot	Each Lot	ERP System / WI-QA-7.4	Notify purchasing Isolate Lot per PR-QA-13.1-2
			2	Purchased Components			Certificate of Analysis verify per MTS	Visual Material Cert	Each Lot	Each Lot	ERP System / WI-QA-7.4	Notify purchasing Isolate Lot per PR-QA-13.1-2
2	Incoming Receiving	Resin	1	Resin			Per Packing List and WI-SR-10.2-1, WI-MH-1	Visual Material #, Lot#, and Quantity / QA Approval in ERP system	Each Gaylord	Each Lot	ERP System	Notify purchasing and QA Isolate Lot per PR-QA-13.1-2
			2	Non-Silo Resin - Gaylord/Bags only (Packaging Requirements)			No damage on packaging	Gaylord/Bag Visual	Each Gaylord/Bag	Each Gaylord/Bag	WI-SR-10.2-1	Notify purchasing and QA Isolate Lot per PR-QA-13.1-2
			3	Resin -Silo only			Material SPEC WI-MH-1	Perform Moisture Test per TS-WI-MAX400XL	Each Lot	Each Lot	Moisture Log and Share Point	Notify purchasing and plant management / Do Not Unload
		Purchased Components	4	Purchased Parts, Customer Returned Product (RGA), Customer Tools needing Service (RGA), Tooling/Components, MRO Items (Quantity)			Per Quantity of Product on Packing List and PO	Visual Material #, Lot#, and Quantity / QA Approval in ERP system	Each Lot	Each Lot	ERP System	Notify purchasing and QA Isolate Lot per PR-QA-13.1-2
			5	Packaging Requirements			No damage on packaging	Visual	Each Lot	Each Lot	WI-SR-10.2-1	Notify purchasing and QA Isolate Lot per PR-QA-13.1-2
	QA Inspection (If Required)		6	Resin - Colorant			Per Color Chip and WI-SR-10.2-1	Material Visual	Each drum	Each drum	ERP System / WI-QA-10.3-1	Notify purchasing and QA Isolate Lot per PR-QA-13.1-2
	Movement to Storage		7	Non-silo resins & purchased components			Per WI-SR-10.2-1	Visual	Each packaging unit	Each pacakaging unit	ERP System	Notify Supervisor
			8	Silo - resins			Per WI-MH-1	Visual	Each Load	Each Load	ERP System	Notify-Supervisor

Quality Assurance		Automation Technician	Material Handler/ICC			Process/Mold Technician	Operator			Cell Lead and/or Team Supervisor	Shipping or Receiving
			CHARACTERISTICS				METHODS				
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	NO.	PRODUCT	PROCESS	Special Char. Class	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	Reaction Plan
									Size	Freq		
3	Cell Clearance		1		Clear Cell from Previously run job		Remove all equipment and materials used for previous production run.	Visual / Manually	Each set-up	Each set-up	Production Control System	Notify Supervisor
4	Resin Movement	Material Handling System	1		Move Resin to Material Handling System		Correct Resin is set up in the Material Handling System per Work Order	Visual	Each Resin Change	Each Resin Change	Material Process Log F-PRD-8.1-4	Notify Team Supervisor and QA, Isolate Lot per WI-PRD-13.1-3 & PR-QA-13.1-2
			2		Check moistures in Resin Dryers		Perform Moisture Test per TS-WI-MAX400XL	Computrac Max 4000XL	1 Sample/ Dryer	One /Shift	Raw Material Moisture Content Test Log F-QA-10.3-9, Production Control System	Notify Production Team Supervisor and QA, Adjust Dryers and Re-check. Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
	Resin Ratio	Material Handling System	3		Resin Ratio		Set up Per Process sheet	Visual machine setting	Each Resin Change	Each Resin Change	Material Process Log F-PRD-8.1-4	Notify Production Team Supervisor and QA, Adjust Ratio Isolate, Product per WI-PRD-13.1-3 & PR-QA-13.1-2
			4		Colorant (if Required)		Mix Ratio Setting According to S-PRD 9.1-19 / Set Up Per Work Order	Visual machine setting	Each Lot	Each Colorant	Material Process Log F-PRD-8.1-4	Notify Production Team Supervisor and QA, Adjust Ratio, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
5	Injection Molding / Cell Set-up		1	Inventory Parts	Transfer & Move Non-resin items to Cell		WI-SR-10.2-1 and ERP System	Visual	Each Work Order	Each Work Order	ERP System	Notify Supervisor
		Manual Assembly Equipment (if Required)	2		In-process part assembly		Part assembled per work order and/or drawing	Visual	Each Work Order	Each Work Order	Signed Setup stamp on work order	Notify Supervisor
	Injection Molding / Work Order Set-Up		3		Ensuring supplies on work order ready at cell		Validate supplies per work order	Visual	Each Work Order	Each Work Order	Signed Set-Up Stamp on Work Order	Notify Supervisor / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
			4		Ensure scale & Water set-up (if required)		WI-PRD-200	Visual	Each Work Order	Each Work Order	Signed Set-Up Stamp on Work Order / WI-PRD-200	Notify Supervisor
	Injection Molding / Press Set-up	Mold Installation	5		Mold Installation		Per Work Order	WI-PRD-9.1-2	Each Set Up	Each Set Up	Work Order / WI-PRD-9.1-2	Notify Supervisor
		Injection Molding Machine	6		Machine Set-Up		Mattec, F-PRD-9.6-1: Part specific Process Sheet, WI-PRD-202: Process Technician Training Manual, F-PM-9.8-3, WI-PRD-9.1-10	Review of Set-Up Specs and fill out applicable sections of F-PM-9.8-3	Each Set Up	Each Set Up	Part specific Process Sheet F-PRD-9.6-1 and PLC	Adjust Process/Recheck, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Cooling fixture or Cooling conveyor (if required)	7		Set-up cooling fixture or cooling conveyor (if required)		Parts cool on fixture or conveyor per work order	Visual	Each Set Up	Each Set Up	Work Order	Adjust Process/Recheck, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
	Injection Molding / Automation Set-up	Camera / Vision System Inspection (If Required)	8		In-process Inspection		Produced parts match master sample	Vision system	Each Part	100%	Run Master Sample through the Vision System (1X) per day (MP2)	Adjust Process/Recheck, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Degator (if Required)	9		In-process automatic runner degator		Runners removed with no part damage	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor

Quality Assurance		Automation Technician	Material Handler/ICC			Process/Mold Technician	Operator			Cell Lead and/or Team Supervisor	Shipping or Receiving
			CHARACTERISTICS				METHODS				
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	NO.	PRODUCT	PROCESS	Special Char. Class	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE Size	SIZE Freq	Control Method	Reaction Plan
		EOAT (if Required)	10		In-process End Of Arm Tool used to grab parts and/or runners		Parts and/or runner grabbed and placed as required	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor
		Part Seperator (if required)	11		In-process part seperator		Parts seperated as required	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor
		Assembly Equipment (if Required)	12		In-process part assembly		Part assembled per work order and/or drawing	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor
		Packaging Equipment (If Required)	13		In-process part packaging		Package parts per work order	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor
6	First Piece Approval	First Piece Approval - Visual	1	Part Quality			Check For Flash, Shorts, Mismatch, Color(If Required)	Visual	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3 and Hung at Press	Notify Team Supervisor/Process Tech, Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		First Piece Approval - Dimensionals Check (dimensions to drawing - if Required)	2	Part Quality			Per Drawing / SPC Software	Calibrated Gauging	1 Shot	Each Set Up	SPC Software, First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3 and Hung at Press	Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		First Piece Approval - Functional Check (functional check per SPC Software or WI - if required)	3	Part Quality			Per SPC Software or WI (if required)	Manually or with fixtures (if required)	1 Shot	Each Set up	SPC Software, WI, First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3 and Hung at Press	Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		First Piece Approval - Performance Testing (performance test per SPC Software, WI, and/or ITS - if required)	4	Part Quality			Per SPC Software, WI and/or ITS (if required)	Force Tester - Specific ITS	1 Shot	Each Set up	SPC Software, WI, ITS, First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3 and Hung at Press	Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-3
		Revision Level	5	Revision Level			Comparison of Drawing in JDE to Revision on Work Order	Visual	Each Set-up	Each Set-up	First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3 and Hung at Press	Notify Engineering
7	Assembly	Automated (if required)	1		Automated In-process part assembly		Part assembled per work order and/or drawing	Visual	Each Assembly	Each Assembly	Work order and/or drawing	Notify Automation Technician Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2

Quality Assurance		Automation Technician	Material Handler/ICC			Process/Mold Technician	Operator			Cell Lead and/or Team Supervisor	Shipping or Receiving
			CHARACTERISTICS				METHODS				
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	NO.	PRODUCT	PROCESS	Special Char. Class	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE Size	SIZE Freq	Control Method	Reaction Plan
		Manually (if required)	2		Manual In-process part assembly		Part assembled per work order and/or drawing	Visual	Each Assembly	Each Assembly	Work order and/or drawing	Notify Supervisor / Technician Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
8	Packaging and Labeling	Automated	1		Automated Packaging		Per Work Order	Visual	Each packaging unit	Each packaging unit	Per work order / WI-PRD-200	Notify Automation Technician Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Cooling fixture or Cooling conveyor (if required)	2	Part Quality			Apply part to cooling fixture or conveyor (if required)	Visual	Each part	Each part	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Notify Supervisor, Processing Tech and QA (WI-PRD-13.1-3) Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Manually	3		Manual Packaging + water (if required)		Per Work Order	Visual	Each packaging unit	Each packaging unit	Per work order / WI-PRD-200	Notify Supervisor / Technician Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
9	In-Process Checks	Injection Molding Machine	1	Process Set-Up			Check control parameters, Work Order Matches MIU / Cavity Count Matches Actual / Cycle Time is to Standard or Adjusted Notes	Visual	Once	Per Shift	Production Control System	WI-QA-10.3-2, WI-PRD-9.1-14, Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine	2	Part Quality			Check For Flash, Shorts, Mismatch, Burning/Splay, Broken Insert/Pin, and Color(If Required)	Visual	1 Shot	Every two hours (1X) per each start-up	Production Control System	WI-QA-10.3-2, WI-PRD-9.1-14, Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine	3	Visual Appearance			Check Parts for Visual Defects - Flash, Shorts, Mismatch, Burning/Splay, Broken insert/Pin, and Color (if required) WI-PRD-200: Packaging Operator Training Manual	Visual	1 Shot	Every two hours	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Notify Supervisor, Processing Tech and QA (WI-PRD-13.1-3) Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Water in Bag (if required)	4	Amount of Water Added Per Bag			Per Work Order	Manually measure.	1 measurement	Twice Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Notify Supervisor and Quality Assurance / Adjust Process Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2

Quality Assurance		Automation Technician	Material Handler/ICC			Process/Mold Technician	Operator			Cell Lead and/or Team Supervisor	Shipping or Receiving
			CHARACTERISTICS				METHODS				
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	NO.	PRODUCT	PROCESS	Special Char. Class	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE Size	SIZE Freq	Control Method	Reaction Plan
		Sealer	5	Proper Bag Seal			Bag Must Have a Complete and Un-Wrinkled Seal	Visual and Pull at Seams	1 bag	Twice Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Adjust Process/ Notify Supervisor or QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Date Code	6	Date Code Stamp / Printer			Operator inspection Sticker Must Have Correct Date Code S-PRD-8.1-6	Visual	1 Label	Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels	7	Bag and Box Labels			Bag and Box Labels Must Match Work Order	Visual	One box One bag	Twice Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Packaging Equipment	8	Hole Punch (Where Applicable)			Hole Punch Must Be Within Header Boundaries and Complete	Visual	1 bag	Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Scale / Conveyor Check (if required)	9	Scale / Conveyor Verification for Count			Verify Scale is Counting Correctly / Conveyor has correct number of parts	Using Scales to Package Product WI-PRD-16 or Hand Count	1 Scale	Twice Per Shift	Inspection Label (Date Code Stamped & Operator ID) / Production Control System	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
10	QA Testing	Injection Molding Machine	1	Dimensionals Check (dimensions to drawing/SPC software - if Required)			Per SPC Software or WI (if required)	Calibrated Gauging	per SPC software or WI	per SPC software or WI	SPC Software or WI	Notify Team Supervisor/Process Tech Adjust Process Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
			2	Functional Check (functional check per SPC Software or WI - if required)			Per SPC Software or WI (if required)	Manually or with fixtures (if required)	per SPC software or WI	per SPC software or WI	SPC Software or WI	Notify Team Supervisor/Process Tech Adjust Process Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
			3	Performance Testing (performance test per SPC Software, WI, and/or ITS - if required)			Per SPC Software, WI, or ITS (if required)	Force Tester - Specific ITS	per SPC software, WI, and/or ITS	per SPC software, WI, and/or ITS	SPC Software, WI, and/or ITS	Notify Team Supervisor/Process Tech Adjust Process Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
11	Layered Process Audit	Production Process	1		Production Process		Per questions on LPA form F-PRD-9	Visual	1	Shift	Layered Process Audit Form F-PRD-9	Adjust Process, Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2 (if applicable)
12	Inspection at Cell	Injection Molding Machine	1	Part Quality			Check for Burns, Shorts, Flash and Warp	Work Order	1 Shot	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Labels	2	Box Label			Per Work Order Check for Correct Label Placement; if Required	Visual match	1 label	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2

Quality Assurance		Automation Technician	Material Handler/ICC			Process/Mold Technician	Operator			Cell Lead and/or Team Supervisor	Shipping or Receiving
			CHARACTERISTICS				METHODS				
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	NO.	PRODUCT	PROCESS	Special Char. Class	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	Reaction Plan
									Size	Freq		
		Labels	3	Bag Label			Per Work Order Check for Correct Label Placement; if Required	Visual match	1 label	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Waters in Bag	4	Water Verification (if required)			Verify Water is in Bag where required	Visual	1 Bag	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Sealer	5	Proper Bag Seal			Bag Must Have a Complete Seal Where Required	Visual and Pull at Seams	1 bag	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Correct Amount of Parts in Box	6	Quantity in Box			Boxes Must Have Specified Amount of Bags per Box	Hand Count	1 Sample	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Packaging	7	Packaging Requirements			Verify per Work Order correct Box	Visual	1 check	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
		Stamp	8	Date Code Stamp / Printer			S-PRD-8.1-6	Visual match	1 check	Shift	Share Point	Control of Non-Conforming Product PR-QA-13.1-2
13	Validation Testing (Annually if required)	Injection Molding Machine	1	Dimensional			Perform Dimensional on the Part per Drawing	Calibrated Gauging	1 shot	At Annual	Dimensional Study F-QA-10.4-2 / Drawing	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	2	Functional Check (if required)			Perform Functional check per SPC Software or WI (if required)	Manually or with fixtures (if required)	1 shot	At Annual	SPC Software / WI	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	3	Performance Testing (If Required)			Perform Performance Testing Per Drawing / SPC Software, ITS (if required)	Force Tester - Specific ITS	1 Shot	At Annual	SPC Software, ITS / Drawing	Control of Non-Conforming Product/PR-QA-13.1-2
14	Finished Goods Movement		1		Move Parts to Stock or Shipping Dock		Per ERP System	Visual	Each Skid	Each Skid	ERP System	Notify Supervisor
15	Shipping to Warehouse or Customer	Move	1	Finished Goods Product			WI-SR-15.2-1, F-SR-15.1-3 and ERP System	Visual Per Pick List	Each Order	Per Pick List	ERP System and Shipping Manifest (F-SR-15.1-3)	Notify Shipping/Receiving Supervisor. Isolate products per Control of Non-Conforming Product PR-QA-13.1-2
		Final Wrap and Label	2	Product, Label, and Ship Wrap Material			WI-SR-15.2-1, F-SR-15.1-3 and ERP System	Visual Per Pick List	Each Order	Per Pick List	ERP System and Shipping Manifest (F-SR-15.1-3)	Notify Shipping/Receiving Supervisor. Isolate products per Control of Non-Conforming Product PR-QA-13.1-2
		Shipping	3	Product, Shipping Documents, ERP System	Ship to customer		WI-SR-15.2-1, F-SR-15.1-3 and ERP System	Per Packing Slip	Each Package	Per Shipment	ERP System and Shipping Manifest (F-SR-15.1-3)	Notify Shipping/Receiving Supervisor. Isolate products per Control of Non-Conforming Product PR-QA-13.1-2

HellermannTyton

Initial Process Study

HT Part No.	Customer Part No.	Part Description	Supplier
BCSFTOVAL2-PA66HIRHS-NA (151-01884)	15101884	TAPE CLIP WITH SHORT OVAL FIR TREE	HellermannTyton

Drawing No.	Drawing Date	Drawing Revision
16-0407-011-CSU	1/25/2017	1.2

Production Date	Material	Inspection Facility	Inspector
2/10/2020	UR0HIRHS9	HT-Milwaukee	Marreall Evans

Study	Sample	Data								
Dimension & Tolerance 38.7+/-2.0 mm	1-9	38.59	38.63	38.59	38.60	38.62	38.63	38.59	38.59	38.59
	10-18	38.63	38.60	38.59	38.59	38.59	38.63	38.59	38.61	38.59
	19-27	38.61	38.59	38.58	38.61	38.59	38.60	38.60	38.58	38.61
	28-36	38.59	38.59	38.61	38.59	38.58	38.62	38.60	38.59	38.58
	37-45	38.59	38.59	38.61	38.59	38.60	38.61	38.61	38.61	38.61
	46-54	38.60	38.60	38.59	38.58	38.60	38.60	38.61	38.61	38.63
	55-63	38.60	38.63	38.62	38.60	38.61	38.60	38.60	38.58	38.63
	64-72	38.62	38.61	38.61	38.61	38.61	38.62	38.63	38.61	38.61
	73-81	38.62	38.61	38.61	38.61	38.60	38.63	38.62	38.61	38.60
	82-90	38.60	38.61	38.61	38.62	38.62	38.62	38.62	38.62	38.59
	91-99	38.63	38.62	38.59	38.60	38.61	38.59	38.62	38.63	38.61
	100-108	38.64								

R&R Study Results Using Specifications

1/11/2021

Gage number:	TGM-888	Done by:	April Gary
Gage description:	Digital Caliper	Part name:	BS6U
Gage type:	Caliper	Characteristics:	Height
Study name:	Annual Gage R & R	Specifications:	LSL=19.5 Nominal=21.5 USL=23.5
Study date:	01/07/2021	Number of Distinct Cate	57.2191

Objective:

Comment:

	Interpretation guidelines
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)/

Repeatability - Equipment Variation (EV)
EV = 0.01594824

%EV = 2.392236

Reproducibility - Appraiser Variation (AV)
AV = 0.003920693

%AV = 0.588104

Repeatability & Reproducibility (R&R)
R&R = 0.0164231

%R&R = 2.463464

Part Variation (PV)
PV = 0.6664644

%PV = 99.96966

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.6666667

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	21.43	21.42	21.44	21.41	21.43	21.44	21.43	21.43	21.41	21.45
April	2	21.45	21.42	21.43	21.44	21.43	21.45	21.4	21.46	21.41	21.44
April	3	21.43	21.44	21.46	21.42	21.39	21.45	21.41	21.43	21.42	21.45
Sam	1	21.46	21.43	21.45	21.43	21.43	21.41	21.42	21.42	21.44	21.41
Sam	2	21.44	21.42	21.42	21.4	21.44	21.38	21.41	21.45	21.39	21.39
Sam	3	21.44	21.43	21.4	21.43	21.43	21.43	21.41	21.43	21.38	21.42
Felicia	1	21.46	21.43	21.44	21.44	21.4	21.43	21.4	21.43	21.39	21.44
Felicia	2	21.43	21.41	21.43	21.42	21.43	21.4	21.42	21.44	21.44	21.43
Felicia	3	21.43	21.42	21.41	21.42	21.4	21.42	21.4	21.41	21.4	21.45

R&R Study Results Using Specifications

1/7/2021

Gage number:	TGM-917	Done by:	April Gary
Gage description:	Digital Scale	Part name:	133-01340
Gage type:	Scale	Characteristics:	weight
Study name:	Annual Gage R & R	Specifications:	LSL=141.3 Nominal=143.4 USL=145.5
Study date:	01/07/2021	Number of Distinct Cate	14.34138

Objective:

Comment:

	Interpretation guidelines
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)10%

Repeatability - Equipment Variation (EV)
EV = 0.05512843

%EV = 7.875495

Reproducibility - Appraiser Variation (AV)
AV = 0.04064414

%AV = 5.80631

Repeatability & Reproducibility (R&R)
R&R = 0.06849153

%R&R = 9.784511

Part Variation (PV)
PV = 0.6966407

%PV = 99.52016

Specification Spread (USL-LSL)/
(USL - LSL)10% = 0.6999995

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	145.5	143.7	145.4	143.6	145.5	143.6	145.4	143.6	145.3	143.6
April	2	145.5	143.8	145.5	143.5	145.5	143.6	145.4	143.7	145.5	143.6
April	3	145.5	143.7	145.4	143.6	145.4	143.7	145.3	143.6	145.5	143.7
Sam	1	145.4	143.6	145.3	143.5	145.3	143.6	145.4	143.4	145.3	143.6
Sam	2	145.5	143.7	145.4	143.4	145.4	143.6	145.3	143.5	145.4	143.5
Sam	3	145.5	143.7	145.4	143.5	145.4	143.6	145.2	143.5	145.4	143.5
Felicia	1	145.4	143.6	145.3	143.5	145.5	143.6	145.4	143.5	145.3	143.5
Felicia	2	145.4	143.6	145.4	143.5	145.4	143.6	145.3	143.6	145.5	143.5
Felicia	3	145.5	143.6	145.4	143.5	145.4	143.6	145.3	143.6	145.4	143.4

R&R Study Results Using Specifications

1/8/2021

Gage number:	TGM-966	Done by:	April Gary
Gage description:	Global Performance 7-10-7	Part name:	133-00878
Gage type:	CMM Coordinate Measuring Machine	Characteristics:	
Study name:	Annual Gage R & R	Specifications:	LSL=97.65 Nominal=97.85 USL=98.05
Study date:	01/08/2021	Number of Distinct Cate	20.41457

Objective:

Comment:

	Interpretation guidelines
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis — Specification Spread (USL-LSL)/

Repeatability - Equipment Variation (EV)
EV = 0.00228942 — %EV = 3.434116

Reproducibility - Appraiser Variation (AV)
AV = 0.003982459 — %AV = 5.973665

Repeatability & Reproducibility (R&R)
R&R = 0.004593628 — %R&R = 6.890416

Part Variation (PV)
PV = 0.06650847 — %PV = 99.76232

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.06666692

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Kelly	1	97.9652	98.0049	98.131	97.9914	98.1238	98.0363	97.9892	97.9869	97.9821	98.1249
Kelly	2	97.9665	98.008	98.1287	97.9873	98.121	98.0342	97.9864	97.9812	97.9795	98.1267
Kelly	3	97.9688	98.0012	98.136	97.9943	98.1274	98.035	97.994	97.9872	97.9838	98.1318
Sam	1	97.9715	97.9991	98.1284	97.9866	98.1199	98.0331	97.9847	97.9768	97.9745	98.1231
Sam	2	97.9661	98.006	98.1283	97.9869	98.1215	98.0332	97.986	97.9781	97.9759	98.1242
Sam	3	97.969	98.0022	98.1312	97.9886	98.1216	98.0327	97.987	97.9785	97.976	98.1254
Rob	1	97.9659	98.0004	98.1248	97.9803	98.1176	98.0313	97.9783	97.9688	97.9747	98.1231
Rob	2	97.9653	98.0029	98.1251	97.9791	98.1125	98.0301	97.9803	97.9748	97.9726	98.1209
Rob	3	97.9655	97.9981	98.1231	97.9794	98.1137	98.0282	97.981	97.9738	97.9713	98.1227

R&R Study Results Using Specifications

1/11/2021

Gage number:	TGM-983	Done by:	April Gary
Gage description:	Indicator	Part name:	SBS6U
Gage type:	Indicator	Characteristics:	HEIGHT
Study name:	Annual Gage R & R	Specifications:	LSL=19.5 Nominal=21.5 USL=23.5
Study date:	01/07/2021	Number of Distinct Cate	70.28216

Objective:

Comment:

	Interpretation guidelines
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)/

Repeatability - Equipment Variation (EV)
EV = 0.01191175

%EV = 1.786762

Reproducibility - Appraiser Variation (AV)
AV = 0.006076173

%AV = 0.9114259

Repeatability & Reproducibility (R&R)
R&R = 0.01337197

%R&R = 2.005795

Part Variation (PV)
PV = 0.6665326

%PV = 99.97988

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.6666667

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	21.474	21.451	21.47	21.4	21.417	21.48	21.423	21.441	21.439	21.501
April	2	21.463	21.46	21.488	21.4	21.421	21.453	21.443	21.433	21.41	21.484
April	3	21.466	21.459	21.458	21.417	21.418	21.456	21.417	21.439	21.427	21.495
Felicia	1	21.441	21.444	21.451	21.413	21.421	21.42	21.419	21.443	21.421	21.451
Felicia	2	21.441	21.441	21.449	21.429	21.413	21.437	21.441	21.415	21.439	21.455
Felicia	3	21.46	21.448	21.451	21.427	21.417	21.452	21.442	21.423	21.424	21.424
Sam	1	21.444	21.449	21.459	21.427	21.403	21.45	21.426	21.431	21.396	21.464
Sam	2	21.484	21.445	21.446	21.395	21.411	21.481	21.407	21.408	21.414	21.471
Sam	3	21.447	21.443	21.454	21.426	21.404	21.478	21.396	21.421	21.419	21.434

R&R Study Results Using Specifications

1/8/2021

Gage number:	TGM-1325	Done by:	April Gary
Gage description:	Artifact	Part name:	133-00878
Gage type:	CT Scannner Artifact	Characteristics:	WIDTH
Study name:	Annual Gage R & R	Specifications:	LSL=10.6 Nominal=10.85 USL=11.1
Study date:	01/08/2021	Number of Distinct Cate	29.50656

Objective:

Comment:

	Interpretation guidelines
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)/

Repeatability - Equipment Variation (EV)
EV = 0.003815655

%EV = 4.578786

Reproducibility - Appraiser Variation (AV)
AV = 0.001123519

%AV = 1.348223

Repeatability & Reproducibility (R&R)
R&R = 0.003977627

%R&R = 4.773152

Part Variation (PV)
PV = 0.08323835

%PV = 99.88602

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.08333334

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Joeseph	1	10.9022	10.9052	10.884	10.7757	10.8663	10.9206	10.8999	10.8872	10.4341	10.8906
Joeseph	2	10.8957	10.8979	10.8891	10.7747	10.8642	10.9109	10.8994	10.8843	10.4421	10.8888
Joeseph	3	10.9	10.8977	10.8845	10.7671	10.861	10.9172	10.9031	10.8912	10.4337	10.8862
James	1	10.903	10.9058	10.8884	10.7642	10.8687	10.9198	10.8952	10.8934	10.4378	10.8846
James	2	10.9	10.9009	10.8799	10.7704	10.8745	10.9239	10.9056	10.8957	10.435	10.8914
James	3	10.906	10.8987	10.8826	10.7722	10.8674	10.9228	10.9021	10.8944	10.4372	10.889
Gwen	1	10.899	10.9032	10.8839	10.7697	10.8662	10.9298	10.9077	10.8861	10.4401	10.8865
Gwen	2	10.9051	10.9005	10.8813	10.774	10.8761	10.9188	10.9035	10.891	10.4345	10.8855
Gwen	3	10.9032	10.9035	10.885	10.775	10.875	10.9212	10.9029	10.8949	10.4353	10.8919

R&R Study Results Using Specifications

4/14/2021

Gage number:	TGM-850	Done by:	April Gary
Gage description:	Tensile Tester	Part name:	T18R
Gage type:	Tensile Tester	Characteristics:	Tensile Strength
Study name:	Annual Gage R & R	Specifications:	LSL=18 Nominal=36 USL=54
Study date:	10/23/2020	Number of Distinct Cate	16.30064

Objective:

Comment:

Interpretation guidelines	
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)/

Repeatability - Equipment Variation (EV)
EV = 0.296377

%EV = 4.939616

Reproducibility - Appraiser Variation (AV)
AV = 0.423697

%AV = 7.061616

Repeatability & Reproducibility (R&R)
R&R = 0.5170671

%R&R = 8.617785

Part Variation (PV)
PV = 5.977679

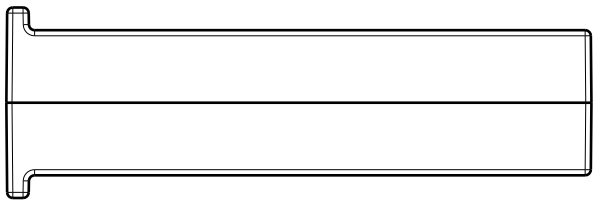
%PV = 99.62798

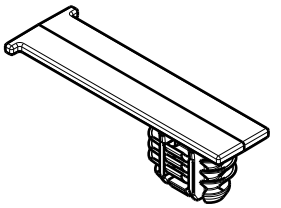
Specification Spread (USL-LSL)/
(USL - LSL)/ = 6

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	35.193	35.364	37.392	36.27	35.722	35.702	37.358	35.158	34.85	35.237
April	2	35.306	35.075	37.281	36.271	35.815	35.342	37.768	35.937	34.853	35.295
April	3	35.983	35.075	37.642	36.643	35.781	35.843	37.421	35.973	34.397	35.542
Tamera	1	37.242	38.914	37.151	36.151	36.991	37.517	36.959	37.334	34.718	35.335
Tamera	2	37.351	38.387	37.058	36.589	36.438	37.11	36.813	37.005	34.438	35.837
Tamera	3	37.3	38.574	36.905	36.877	36.365	37.709	36.366	37.276	34.046	35.221
Danielle	1	37.599	35.238	35.046	36.083	35.729	36.806	36.156	36.746	34.373	37.046
Danielle	2	37.18	35.061	35.561	36.303	35.04	36.687	36.44	36.194	34.134	37.654
Danielle	3	37.228	35.049	35.86	36.859	35.181	36.315	36.146	36.473	34.919	37.067

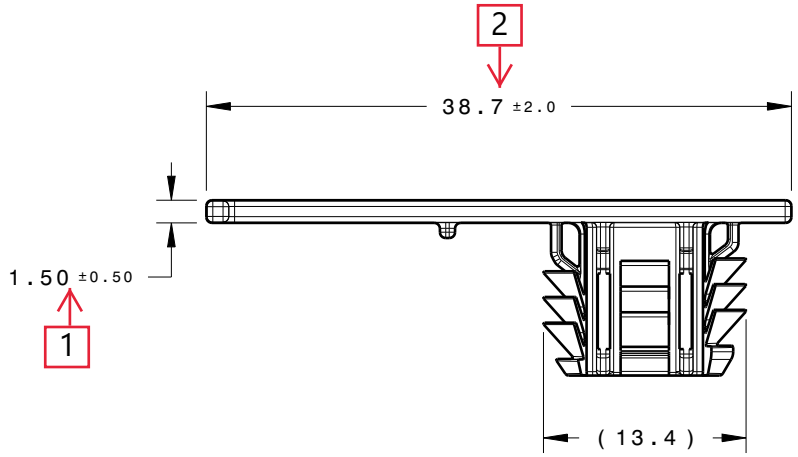
CATIA V5

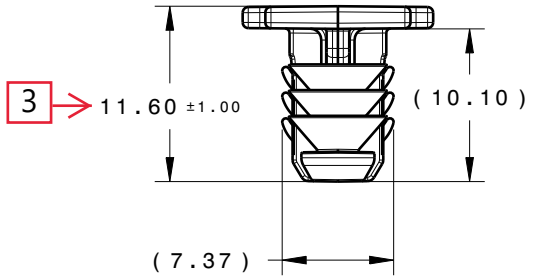
Revision Level			Revision Record	Changed	Date	Approved	Date
Drawing	State	Part					
01.2	Design Release	C	SEE ECN# 013690	CJR	1/25/17	EJH	1/25/17





ISOMETRIC VIEW
(SCALE 1:1)





REFERENCE:
PERFORMANCE REQUIREMENTS AT DRY AS MOLDED:
1. FIR TREE PUSH IN FORCE: REF. 10 LBS MAX IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm
2. FIR TREE PULL OUT FORCE: REF. 25 LBS MIN IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm
3. SHEET METAL THICKNESS RANGE: 0.60mm - 2.5mm
4. APPLICABLE OVAL HOLE SIZES:
   A. 6.2 X 12.2mm
   B. 6.5 x 12.5mm
   C. 6.5 x 13.0mm
   D. 7.0 x 12.0mm

01.2

Material
PA66HIRHS
COLOR: NATURAL
01.2
4

Units **millimeters**

Tolerance defined on each dimension

Drawn	CJR	6/14/16
Approved	SJA	6/14/16

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Article/Type-No BCSFTOVAL2/ 151-01884

Title
TAPE CLIP WITH SHORT OVAL FIR TREE

Drawing-No PRODUCTION : Phase
16-0407-011-CSU

Scale 2:1
Project Number 16-0407
Format AH
Sheet 1/1