HellermannTyton

HellermannTyton GmbH internal remarks: PB-No.: **104204**

Part Describtion: T50RMOC8SADBSET GPN 191062

Part Submission Warrant

Part Name **T50RMOC8SADBSET** Cust. Part Number **FU5T-14G545-JC**

Shown on Drawing No. **16-0316-188-CSU** Org. Part Number **15602736**

Engineering Change Level **00.3** Dated **20.06.2019**

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

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. **15602736** Weight (kg) **0,0026**

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: **1066730269**

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 7-Sep-23

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

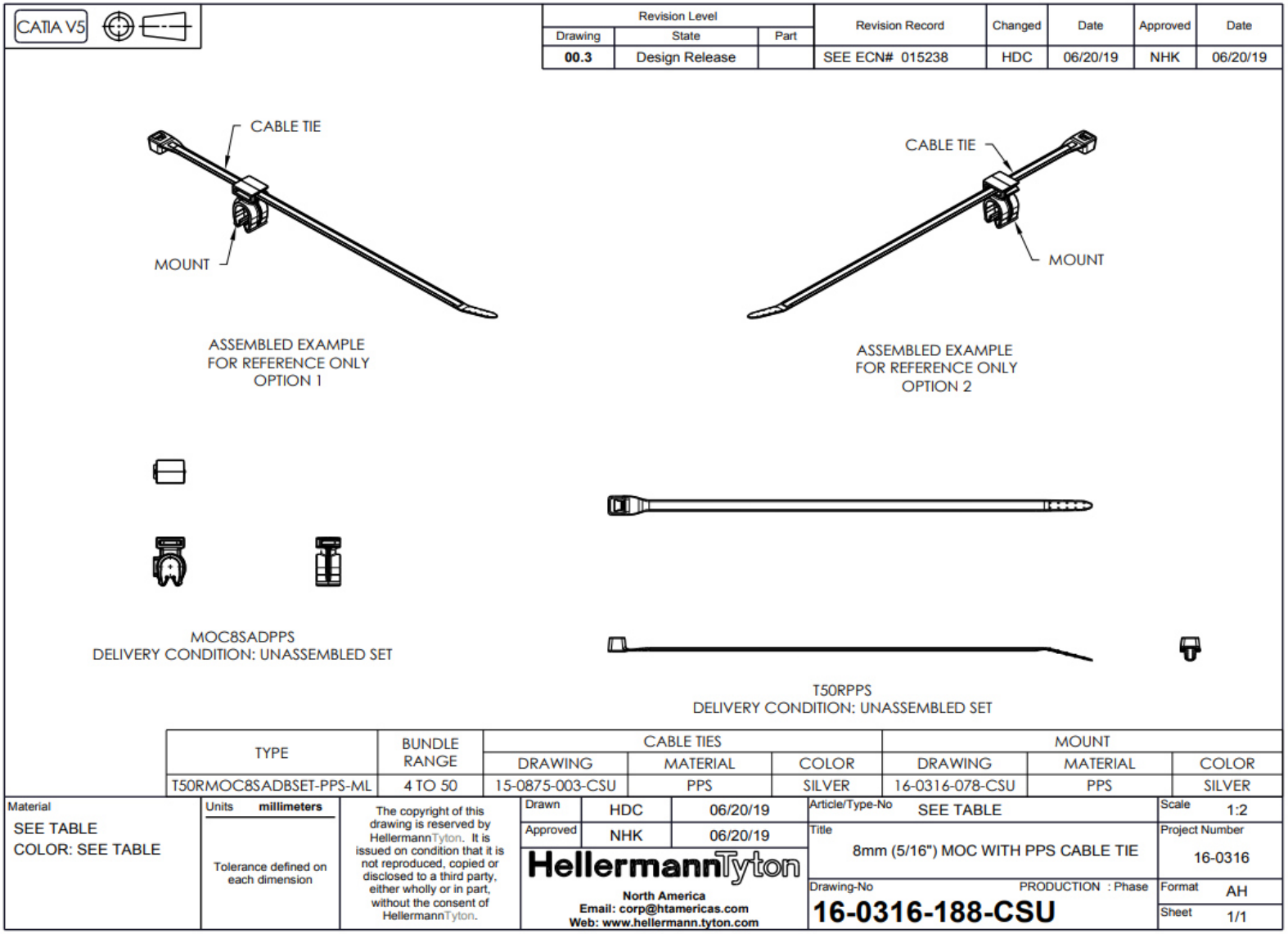
FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

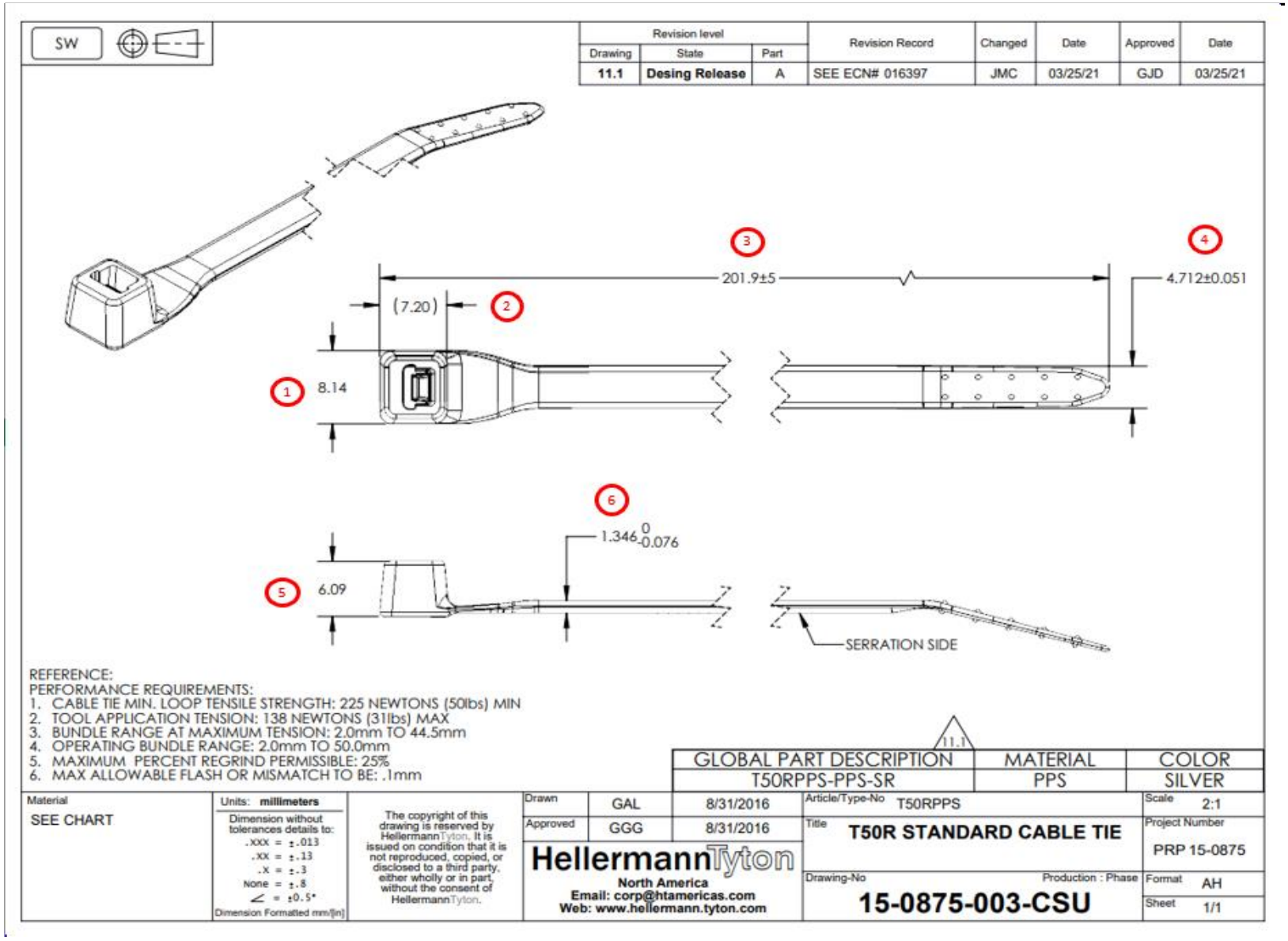
Customer Signature Date

Print Name Customer Tracking Number (optional)

Assembly Drawing



Part Drawing



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Dimensional Results

HT Part/Item No.	Part Description	Internal No.
T50RPPS-PPS-SR (111-02203)	T50R STANDARD CABLE TIE	N/A

Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	15-0875-003-CSU	3/25/2021	11.1

Production Date	Material	Inspection Facility	Inspector
7/21/2022	URPPS001	HT-Milwaukee	TM

Unit of Measurement: **mm**

Item #	1	2	3	4	5	6				
Gage ID	TGM-988	TGM-988	TGM-1219	TGM-988	TGM-988	TGM-988				
Gage Type	Caliper	Caliper	Caliper	Caliper	Caliper	Caliper				
Dim	8.14	7.20	201.90	4.712	6.09	1.346				
Tol +	REF	REF	5.00	0.051	REF	0.00				
Tol -	REF	REF	5.00	0.051	REF	0.076				
Sample										
1	8.12	7.02	202.24	4.750	6.09	1.310				
2	8.13	6.94	202.03	4.740	6.11	1.310				
3	8.12	7.00	201.78	4.740	6.11	1.310				
4	8.09	6.98	201.99	4.750	6.10	1.300				
5	8.13	6.96	201.80	4.730	6.06	1.300				
6	8.13	6.97	202.02	4.730	6.08	1.310				
7	8.13	7.01	202.03	4.690	6.08	1.300				
8	8.13	6.99	202.06	4.710	6.07	1.290				
9	8.11	6.92	202.00	4.680	6.08	1.300				
10	8.11	6.98	201.93	4.740	6.09	1.300				
11	8.11	6.99	202.01	4.710	6.07	1.290				
12	8.09	7.01	201.71	4.690	6.10	1.300				
13	8.14	6.98	202.00	4.710	6.09	1.290				
14	8.12	6.98	201.77	4.720	6.09	1.300				
15	8.10	7.02	201.83	4.700	6.11	1.290				
16	8.06	6.96	201.75	4.730	6.10	1.290				
OK	REF	REF	X	X	REF	X				
NOT OK	REF	REF			REF					

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HT Part/Item No.	Part Description	Internal No.
T50RPPS-PPS-SR (111-02203)	T50R STANDARD CABLE TIE	N/A

Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	15-0875-003-CSU	3/25/2021	11.1

Production Date	Material	Inspection Facility	Inspector
7/21/2022	URPPS001	HT-Milwaukee	TM

Item/Note #	Note Description	Specification (If Applicable)	Result	OK	NOT OK
Material					
	Material	FX32T4L	FORTRON	X	
	Color	Silver	Silver	X	
	Regrind			X	
Performance/Reference					
1	CABLE TIE MIN. LOOP TENSILE STRENGTH: 225 NEWTONS (50lbs) MIN			X	
2	TOOL APPLICATION TENSION: 138 NEWTONS (31lbs) MAX			X	
3	BUNDLE RANGE AT MAXIMUM TENSION: 2.0mm TO 44.5mm			X	
4	OPERATING BUNDLE RANGE: 2.0mm TO 50.0mm			X	
5	MAXIMUM PERCENT REGRIND PERMISSIBLE: 25%			X	
6	MAX ALLOWABLE FLASH OR MISMATCH TO BE: .1mm			X	

HELLERMANN TYTON
6701 W GOOD HOPE RD
MILWAUKEE WI 53223
USA

Celanese

The Verst Group
Ticona Polymers
1100 Burlington Pike
FLORENCE KY 41042
USA

Type 2 Certificate of Analysis

FORTRON FX32T4L SD3051 BLACK A3

Formula No.:	FX32T4L	**Cert Issue Date:**	31 Aug 2021
Catalog:	21039955	**Qty Shipped:**	15,432.000 LB
Color No.:	SD3051	**Order Item /date:**	2485900 10 / 14 May 2021
Produced at:	Florence, KY, USA	**Delivery item/date:**	87183226 900001 / 07 Sep 2021
		Account #:	2092090
		Customer PO No.:	152380
		Rail car:	See Senders Inst.

Batch 0001557483
In reference to the above, this is to advise you that this is a standard product and meets the following requirements:

BATCH RELEASE DATA	UoM	Value
Melt Viscosity	Poise	1178

Note: This certificate is generated and controlled by electronic means. No signature required. This document cannot be reproduced except in full without written consent of Celanese.

These test data are determined based on standard ISO and/or ASTM testing procedures.

Fortron Global Business Line

If you have questions regarding this letter, please call your Customer Service Team at 800-526-4960.

Current Material Certificate

HELLERMANN TYTON
7930 N. FAULKNER ROAD
MILWAUKEE WI 53224
USA

CHRIS BURBANK
Fax: 414-362-8338

Celanese

The Verst Group
Ticona Polymers
1100 Burlington Pike
FLORENCE KY 41042
USA

Type 2 Certificate of Analysis

FORTRON FX32T4L SD3051 BLACK A3

Customer Part No.:	URPPS001	**Cert Issue Date:**	03 Oct 2022
Formula No.:	FX32T4L	**Qty Shipped:**	6,614.000 LB
Catalog:	21039956	**Order Item /date:**	2652945 10 / 01 Jun 2022
Color No.:	SD3051	**Delivery item/date:**	87723881 900001 / 07 Oct 2022
		Account #:	2066607
		Customer PO No.:	162753
		Rail car:	See Senders Inst.

Batch 0001745238
In reference to the above, this is to advise you that this is a standard product and meets the following requirements:

BATCH RELEASE DATA	UoM	Value
Melt Viscosity	Poise	1031

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These test data are determined based on standard ISO and/or ASTM testing procedures.

Fortron Global Business Line

If you have questions regarding this letter, please call your Customer Service Team at 800-526-4960.

Page 1 of 1

Current Material Certificate

Avient Colorants USA LLC
926 Elliot Road
Albion, MI, 49224

AVIENT

Hellermann Tyton Corp
COA Recipient1
7930 North Faulkner Rd
Milwaukee WI 53224-3423

Certificate of Analysis Date: 06/28/2022
Page: 1 / 1

Your order from 04/11/2022
Order No. : 161516
Material No. : GUR66NC8
Delivery no./Pos. : 53339611 / 900002
Order : 15487865
Material : GREY NY ASCEND 21 SP
Old Material No. : AB73632643
Material-no. : AB73632643
Batch No. : USPC058701
Quantity : 476.272 KG
On the batch, of which the consignment is a part, the following values were determined.

Inspection characteristic/-method	Specification	Result
COLOR - VISUAL		
CONTAMINATION - VISUAL		
PELLET COUNT		37 Pel./g
PELLET LENGTH		0.130 IN
PELLET DIAMETER		0.109 IN
Let Down Ratio (%)		2

The above particulars do not release the customer from the obligation to carry out an inspection of goods received.

This report does not require a signature.
Management System Certified according to ISO 9001, ISO 14001 and OHSAS 18001

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Initial Process Study

HT Part/Item No.	Part Description	Internal No.
T50RPPS-PPS-SR (111-02203)	T50R STANDARD CABLE TIE	N/A

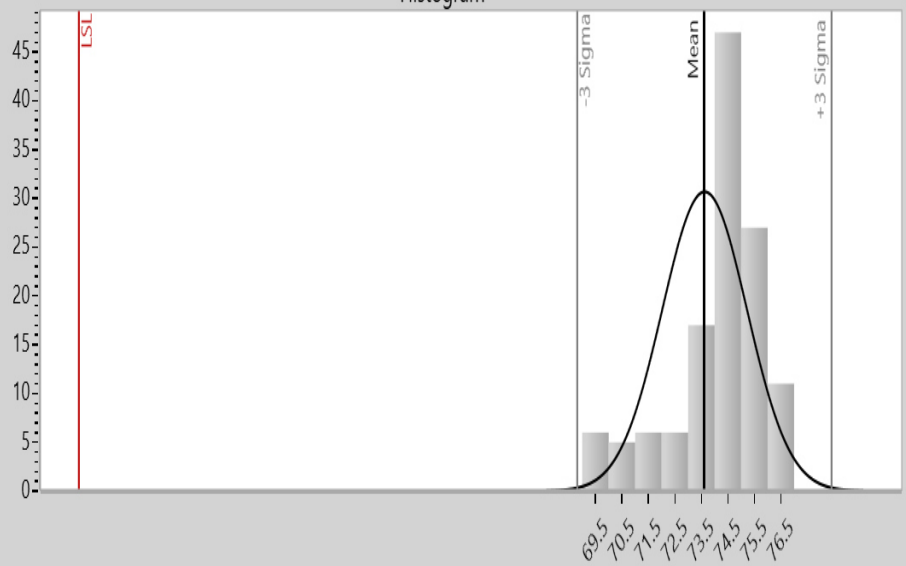
Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	15-0875-003-CSU	3/25/2021	11.1

Production Date	Material	Inspection Facility	Inspector
7/21/2022	URPPS001	HT-Milwaukee	TM

Study	Sample	Data								
Loop Tensile Strength Min 50 lbf	1-9	74.00	72.00	74.00	76.00	74.00	75.00	69.00	74.00	74.00
	10-18	74.00	69.00	74.00	74.00	74.00	70.00	71.00	73.00	73.00
	19-27	74.00	74.00	74.00	74.00	75.00	73.00	72.00	74.00	75.00
	28-36	76.00	73.00	74.00	73.00	76.00	73.00	74.00	75.00	70.00
	37-45	76.00	74.00	75.00	71.00	75.00	74.00	74.00	74.00	74.00
	46-54	74.00	70.00	74.00	75.00	75.00	75.00	75.00	73.00	74.00
	55-63	72.00	74.00	69.00	73.00	74.00	73.00	74.00	74.00	74.00
	64-72	75.00	71.00	73.00	69.00	74.00	74.00	74.00	75.00	75.00
	73-81	76.00	76.00	75.00	73.00	73.00	75.00	70.00	74.00	74.00
	82-90	75.00	76.00	75.00	74.00	74.00	72.00	70.00	75.00	75.00
	91-99	75.00	74.00	74.00	72.00	74.00	73.00	76.00	74.00	76.00
	100-108	71.00	75.00	75.00	74.00	76.00	74.00	72.00	71.00	74.00
	109-117	69.00	75.00	76.00	75.00	74.00	71.00	74.00	69.00	73.00
	118-125	73.00	73.00	75.00	75.00	74.00	75.00	73.00	74.00	

TENSILE CAPABILITY Tensile Strength (lbf)

Histogram



Statistics

Basic Statistics

125 data values	
Maximum	76
Mean	73.616
Minimum	69
Sigma of the individuals	1.745
Dpm (e)	0
Within 1 Sigma (e)	72.800%
Within 2 Sigma (e)	91.200%
Within 3 Sigma (e)	100.000%

Capability Statistics

Cp	N/A
Cpk	4.916
Cpm	N/A

Specifications

Upper Spec	
Target Spec	
Lower Spec	50

Subgroup Statistics

	mR = 2
Estimated Sigma	1.601

Out-of-spec

Below	0.000%
Total	0.000%

Performance Statistics

Pp	N/A
Ppk	4.511

Footnotes

(e) = Uses Estimated sigma

PROCESS FLOW DIAGRAM

Process Description:	Inj Molding + Dim / Func / Performance FP + Packaging (w/hand insertion, auto & manual pack, water dosification if required)	Program Name:	Cable Ties
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/10/20
Customer Name:	Various	PFD Number:	US-OP-APQP-1

	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	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 - (Material Color)	ERP system WI-SR-10.3-1
		◆			Movement to Storage	Non-Silo Resins & Purchased Components	ERP System, WI-SR-10.2-1
		◆			Movement to Storage	Silo-Resins	ERP System, WI-MH-1
3	■				Cell Clearance	Clear cell from previously run job	Production Control System
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 (if required)	Material Process Log F-PRD-8.1-4, and S-PRD 9.1-19

PROCESS FLOW DIAGRAM

Process Description:	Inj Molding + Dim / Func / Performance FP + Packaging (w/hand insertion, auto & manual pack, water dosification if required)	Program Name:	Cable Ties
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/10/20
Customer Name:	Various	PFD Number:	US-OP-APQP-1

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
5	■				Injection Molding / Cell Set-up	Inventory Parts - Transfer & Move Non-resin items to cell	ERP System
	■				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	Work Order / WI-PRD-9.0-2, Part specific Process Sheet F-PRD-9.6-1 and PLC
	■				Injection Molding / 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) - Settings in document: Head Camera Pixel Setting Master (QMS-S 1000).
	■				Injection Molding / Automation Set-up - Degator (if required)	In-process automatic runner degator	Signed Set-up Stamp on Work Order
	■				Injection Molding / 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
	■				Injection Molding / Automation Set-up - Auxillary Assembly Equipment (if required)	In-process part assembly	Signed Set-up Stamp on Work Order
	■				Injection Molding / 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, Hand Insertions, Dimensionals Functional, and performance Checks (if required), Revision Level	Part Quality and Insertion Properties of Cable Ties, Revision Level	First Piece Acceptance F-QA-10.3-5, WI-QA-10.3-3, and Hung at Press

PROCESS FLOW DIAGRAM

Process Description:	Inj Molding + Dim / Func / Performance FP + Packaging (w/hand insertion, auto & manual pack, water dosification if required)	Program Name:	Cable Ties
HT Dwg.# and Rev:	Various	Created By:	QA PRP Team
Customer P/N and Rev:	Various	Creation Date:	12/10/20
Customer Name:	Various	PFD Number:	US-OP-APQP-1

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
7	■				Packaging and Labeling / Automated & Manually	Automated Packaging / Manual Packaging + water (if required)	Per work order / WI-PRD-200
8				☒	In Process Checks, Completed Hand Insertion, Visual Process set-up, Part Quality	Hand Insertions, Process Set-up, Part Quality - Visual Appearance	Production Control System, WI-PRD-200.7
	■				In-Process Checks	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
9				☒	QA Testing	Part Quality, Test for Minimum Wire Bundle, Test for Tensile Strength, Force Testing - Push On, Push In, Pull Off, Pull Out (if required)	SPC Software, and / or F-QA-10.3-8
10				☒	Layered Process Audit	Production Process	Layered Process Audit Form F-PRD-9
11				☒	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
12				☒	Validation Testing (Annually if Required)	Push In / Push On, Pull Out / Pull Off (if required), Dimensional, Test for Minimum Wire Bundle, Tensile Strength	SPC Software and Dimensional Study F-QA-10.4-10
13		◆			Finished Goods Movement	Move Parts to Stock or Shipping Dock	ERP System
14		◆		☒	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

HellermannTyton

Control Plan

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan Number:	Key Contact/Phone:	Date (Orig.)	Date & Revision
US-OP-APQP-1	**Plant Quality Manger - 414.355.1130**	**12/10/20**	**See Footer**

Process Description/Part Number	Core Team:	Customer Engineering Approval/Date (If Req'd)
+ Packaging (W/hand insertion, auto & manual pack, water dosification if required) / Various	**Quality Assurance, Manufacturing, Automation, Receiving-Shipping**	**NA**
Part Name/Description: **Cable Ties**	Supplier/Plant Approval/Date: **N/A**	Customer Quality Approval/Date (If Req'd): **NA**
Supplier/Plant: **HellermannTyton-MKE** / Supplier Code: **NA**	Other Approval/Date (If Req'd): **NA**	Other Approval/Date (If Req'd): **NA**

Quality Assurance		Material Handler/ICC	Automation Technician			Operator		Process/Mold Technician			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		
1	QA Receiving Certificate of Analysis			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
				Purchased Components			Certificate of Analysis	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		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
				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
				Resin -Silo only			Material SPEC WI-MH-1	Perform Moisture Test per TS-WI-MAX4000XL	Each Lot	Each Lot	Moisture Log and Share Point	Notify purchasing and plant management / Do Not Unload
		Purchased Components		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
				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)			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			Non-silo resins & purchased components			Per WI-SR-10.2-1	Visual	Each packaging unit	Each pacakaging unit	ERP System	Notify Supervisor

Quality Assurance		Material Handler/ICC	Automation Technician			Operator	Process/Mold Technician			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		
				Silo - resins			Per WI-MH-1	Visual	Each Load	Each Load	ERP System	Notify-Supervisor
3	Cell Clearance				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			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
					Check moistures in Resin Dryers		Perform Moisture Test per TS-WI-MAX4000XL	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			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
					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			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
	Injection Molding / Work Order Set-Up				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
					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			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			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
	Injection Molding / Automation Set-up	Camera / Vision System Inspection (If Required)			In-process Cable Tie Inspection		No blocked Head or Missing Pawl	Vision system	Each cable tie	100%	Run Master Sample through the vision system (1X) per day (MP2) - Settings in document: Head Camera Pixel Setting Master (QMS-S 1000).	Adjust Process/Recheck, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Degator (if Required)			In-process automatic runner degator		Runners removed with no cut heads	Visual	One Shot	Setup	Signed Setup stamp on work order	Notify Supervisor

Quality Assurance		Material Handler/ICC	Automation Technician			Operator	Process/Mold Technician			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)			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
		Auxillary Assembly Equipment (if Required)			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)			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		Part Quality			Check For Flash, Shorts, Blocked/cut Heads, 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 Hand Insertion		Insertion Properties of Cable Tie			No Hard Insertions, Slippage or Cracked Inserts Allowed. Breakage Testing According to ITS-0033	Hand Insertion Process Inspection Check Per ITS-0033	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 Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		First Piece Approval - Dimensionals Check (dimensions to drawing/SPC software - if Required)		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)		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)		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		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

Quality Assurance		Material Handler/ICC	Automation Technician			Operator	Process/Mold Technician			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		
7	Packaging and Labeling	Automated			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
		Manually			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
8	In-Process Checks	Injection Molding Machine		Hand Insertions			No Hard Insertions, Slippage or Cracked Inserts Allowed. Breakage Testing According to WI-PRD-200.7	Hand Insertion Process Inspection Check Per WI-PRD-200.7	1 Shot	Every two hours	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		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		Part Quality			Check For Flash, Shorts, Mismatch, Blocked/cut Heads, Missing Pawl/Fir Tree, 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		Visual Appearance			Check Ties for Visual Defects - 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
		Sealer		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		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

Quality Assurance		Material Handler/ICC	Automation Technician			Operator		Process/Mold Technician			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		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		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)		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
9	QA Testing	Injection Molding Machine		Part Quality			T18RA and T30RA ran through a tool with no issues	Tool	4 pcs welded together	Daily	Weekly Matrix F-QA-10.3-8 / SPC Software	Notify Team Supervisor/Process Tech Adjust Process Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine		Test for Minimum Wire Bundle			Minimum Wire Bundle Requirements Per Print	Wire Bundle Test - ITS-0023	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
		Injection Molding Machine		Test for Tensile Strength			Tensile Strength of Tie Must Meet Minimum Requirements Per Print	Tensile Tester - ITS-0011	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
		Injection Molding Machine		Force Testing - Push On, Push In, Pull Off, Pull Out (If Required)			Per Print	Tensile Tester - ITS-0005 & ITS-0006	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
10	Layered Process Audit	Production Process			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)
11	Inspection at the Cell	Injection Molding Machine		Part Quality			Check For Flash, Shorts, Blocked/cut Heads, Mismatch, Color (If Required)	Visual	1 Shot	Shift	Share Point	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2

Quality Assurance		Material Handler/ICC	Automation Technician			Operator	Process/Mold Technician			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		Box Label			Per Work Order Check for Correct Label Placement; (if Required)	Visual match	1 label	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels		Bag Label			Per Work Order Check for Correct Label Placement; (if Required)	Visual match	1 label	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Waters in Bag		Water Verification			Verify Water is in Bag (if Required)	Visual	1 Bag	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Sealer		Proper Bag Seal			Bag Must Have a Complete Seal (if Required)	Visual and Pull at Seams	1 bag	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Correct Amount of Parts in Box		Quantity in Box			Boxes Must Have Specified Amount of Bags and/or parts per Box	Hand Count / Scale verification	1 Sample	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Packaging		Packaging Requirements			Verify per Work Order correct Box	Visual	1 check	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Date Code		Date Code Stamp / Printer			Date Code Calendar S-PRD-8.1-6	Visual match	1 check	Shift	Share Point	Notify Team Supervisor Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
12	Validation Testing (Annually if required)	Injection Molding Machine		Push In / Push On Force (If Required)			Per Drawing / SPC Software	Tensile Tester - ITS-0005 & ITS-0006	1 Shot / minimum 5pcs	At Annual	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine		Pull Out/Pull Off Force (If Required)			Per Drawing / SPC Software	Tensile Tester - ITS-0005 & ITS-0006	1 Shot / minimum 5pcs	At Annual	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine		Dimensional			Perform Dimensional on the Part per Print	Calibrated Gages per Dimensional Study	1 Shot / minimum 5pcs	At Annual	Dimensional Study F-QA-10.4-10	Control of Non-Conforming Product/PR-QA-13.1-2

Quality Assurance		Material Handler/ICC	Automation Technician			Operator		Process/Mold Technician			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		
		Injection Molding Machine		Test for Minimum Wire Bundle			Minimum Wire Bundle Requirements Per Print	Wire Bundle Test - ITS-0023	1 Shot / minimum 5pcs	At Annual	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine		Tensile Strength			Tensile Strength of Tie Must Meet Minimum Requirements Per Print	Tensile Tester ITS-0011	125pcs minimum	At Annual	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
13	Finished Goods Movement				Move Parts to Stock or Shipping Dock		Per ERP System	Visual	Each Skid	Each Skid	ERP System	Notify Supervisor
14	Shipping to Warehouse or Customer	Move		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		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		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

Notes: See Parts and Engineering Change Level on US-OP-APQP-1-PARTS & ENG. LEVEL.

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PFMEA)

Part Description: Cable Ties
PFMEA Number: **US-OP-APQP-1**
Process Description: Inj Molding + Dim / Func / Performance FP + Packaging (w/hand insertion, auto & manual pack, water dosification if required)
Process Responsibility: HellermannTyton
Prepared by: QA PRP Team
Model Year(s) / Vehicle(s): NA
Key Date: 12/10/2020
PFMEA Date Org: 12/10/2020
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 or MTS and C of A	QA does not receive C of A	Delay in Manufacturing	5		C of A not listed on PO	3	P - WI-PUR-6	5	75	None						0
				5		Supplier forgot to send out C of A to HT QA	3	P - purchase order requirement	5	75	None						0
		Wrong HT Spec or MTS	Delay in manufacturing / Customer Dissatisfaction	5		Incorrect HT Spec or MTS on PO	3	P-Work instruction D-Visually verify to HT Spec or MTS in ERP System	5	75	None						0
		Information on C of A does not match HT Spec or MTS	Delay in Customer Shipment	5		HT Spec or MTS does not have the latest released revision.	3	P-Work instruction P-Change management D-Visually verify to HT Spec or MTS in ERP System	5	75	None						0
				5		Supplier only test to the latest released revision	3	P-Work instruction P-Change management D-Visually verify to HT Spec or MTS in ERP System	5	75	None						0
				5		Supplier does not test to the latest released revision	3	P-Work instruction P-Change management D-Visually verify to HT Spec or MTS in ERP System	5	75	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 HT Spec or MTS in ERP System	5	75	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	5	75	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
		Wrong Quantity	Customer Dissatisfaction	4		Quantity of product shipped by supplier was incorrect	2	D - Incoming Inspection	7	56	None						0
				4		Order quantity entered incorrect	2	D - Incoming Inspection	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 Packaging	Delay in Customer Shipment	5		Product received did not have correct packaging	2	D - Incoming Inspection	7	70	None						0
		Poor material / part Quality	Customer Dissatisfaction	5		Product received is non-conforming	2	D - Incoming Inspection P- Supplier PPAP	7	70	None						0
		Miosture Too High / Low	Delay in Customer Shipment	5		Damaged in transit	2	D - Incoming Inspection P- Supplier C of A D - Moisture Log & Share Point	7	70	None						0
		Wrong colorant received (if required)	Delay in Customer Shipment	5		Wrong product was shipped	2	D/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	3	D/P - ERP system / WI-SR-10.2-1	4	60	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		Cell clearance not followed per Production Control System	2	D - Production Control System	4	40	None						0
			Wrong material used for product	8		Cell clearance not followed per Production Control System	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	Work order has incorrect BOM	7		Incorrect set-up BOM in (JDE)	4	D-Change over checklist P- IE Set-up BOM (IMLS)	3	84	None						0
			Incorrect BOM used	7		Wrong label on material	3	P-Work instruction D-Flag system	3	63	None						0
				7		Operator Error	3	P-Work instruction D-Flag system	3	63	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

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 Blending	Part Non-Compliance / Breakage and Color Match Failures	7		Material blender set incorrectly	2	D/P - Visual to Work Order D- Quality Tree P - First Piece Approvals	5	70	None						0
		Excess Plastic on Ties	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 P - First Piece Approvals	5	60	None						0
		Soft Insertions	Part Non-Compliance	6		Thermolator Malfunction	2	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	36	None						0
				6		Incorrect Tonnage	2	D- Visual Inspections D- Hand Insertions P - First Piece Approvals P - In-process PM's	6	72	None						0
				6		Fast Cycle Time	2	D - Visual Inspection, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals	6	72	None						0
				6		Leader Pin/Sidelock Wear	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	6	72	None						0
		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)	5	60	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
		Pass Blocked Head, and Missing Pawl on part	Part non-compliance	7		Mechanical failure and background light	2	P - Master sample (Known Bad and Good parts)	5	70	None						0
		Rejecting Non-blocked Head and part with Pawl	High scrap rate	4		Mechanical failure and background light	2	P - Master sample (Known Bad and Good parts)	5	40	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	Sinks in heads and straps	Part Non-Compliance Tensile and Wire Bundle Failures	5		Insufficient Hold Pressure	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	60	None						0
				5		Cycle Time Too Fast	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	60	None						0
		Incorrect Blending	Part Non-Compliance / Breakage and Color Match Failures	5		Material Handling Error	2	D/P - Visual to Work Order, Quality Tree P - First Piece Approvals	6	60	None						0
		Burnt tips	Part Non-Compliance / Cosmetic Issues / Short	4		Plugged/Worn Vents	3	D- Visual Inspections, Quality Tree P - First Piece Approvals P - In process PM's using Ice Blasting	5	60	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.	4	40	None						0
				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.	4	40	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Water hooked up incorrectly	2	D-Visual Inspections	7	70	None						0
				5		Packaging interruptions Degator Jams	3	D- Visual Inspections P - First Piece Approvals	5	75	None						0
				5		Heater band malfunctions	2	D- Visual Inspections D - In-process Inspections P - PM	5	50	None						0
		Excess Plastic on Ties	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
		Blocked / Misformed Head	Part Non-Compliance	5		Broken Insert/Ejector Blade	2	D - Visual Inspections, Quality Tree P - Final Inspection P - First Piece Approvals	5	50	None						0
		Cut Head	Part Non-Compliance	5		Automation Malfunction	2	D - Visual Inspections P - Inspections at the cell P - First Piece Approvals D - Alarms allowing Operators to scrap parts after cups are emptied	4	40	None						0
		Missing or Extended Pawl	Part Non-Compliance	5		Thermolator Malfunction	2	D - Visual Inspections D - In-process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolator to detect temp. dev.	4	40	None						0
				5		Restart(Mold Cleaning)	2	D/P- Visual Inspections D/P - Hand Insertion	5	50	None						0
				5		Improper start-up	2	D - Visual Inspections, Quality Tree D - LPA at startup P - Inspections at the cell	5	50	None						0
				5		Cycle Time Too Fast	2	D - Visual Inspections, Quality Tree P - Inspections at the cell	6	60	None						0
				5		Worn inserts	2	D - Visual Inspections P - Inspections at the cell P - PM Schedule	6	60	None						0
		Soft Insertions	Part Non-Compliance	5		Thermolator Malfunction	2	D - Visual Inspections D - In-process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolators to detect temp. dev.	4	40	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Cycle Time Too Fast	2	D - First Piece Approvals D - Visual Inspections, Quality Tree P - In-process Inspections	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 D- Hand Insertions P - First Piece Approvals P - In-process PM's	5	75	None						0
				5		Incorrect Tonnage	2	D- Visual Inspections D- Hand Insertions 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	3	D- Visual Inspections D - In-process Inspections D- Hand Insertions P - First Piece Approvals	5	75	None						0
				5		Start-up/Cycle Interruptions	3	D- Visual Inspections D - In-process Inspections D- Hand Insertions P - First Piece Approvals	5	75	None						0
				5		Clamp pressure on press	3	D- Visual Inspections D - In-process Inspections D- Hand Insertions P - First Piece Approvals	5	75	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Worn inserts	2	D- Visual Inspections D - Tool Tests D - In-process Inspections D- Hand Insertions P - First Piece Approvals	4	40	None						0
				5		Broken Insert/Ejector Blade	3	D- Visual Inspections, Quality Tree D - In-process Inspections D- Hand Insertions P - First Piece Approvals	5	75	None						0
		Breakage	Part Non-Compliance	5		Thermolator Malfunction	2	D - Visual Inspections D - Process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolators to detect temp. dev.	4	40	None						0
				5		Barrel Heat Malfunction	4	D - Visual Inspections D - In-process Inspections D - Parameter/Heat Checks D - Hand Insertions P - First Piece Approvals P - SPC Set-up to Trigger Faults	4	80	None						0
		Slippage	Part Non-Compliance / Strap Engagement Failure	6		Worn inserts	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals	6	72	None						0
				6		Fast Cycle Time	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals	6	72	None						0
				6		Dirty Inserts	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions D - Parameter/Heat Checks P - First Piece Approvals P - In-process PM	5	60	None						0
				6		High oil temperature on press due to insufficient water to cool	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In-process PM	5	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
		Mold Mismatch	Part Non-Compliance/High Insertion Force	6		Poor Mold Alignment	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In-process PM	5	60	None						0
				6		Leader Pin/Sidelock Wear	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In-process PM	5	60	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	5	45	None						0
				3		Thermolator Malfunction	2	D - Visual Inspections D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In-process PM	5	30	None						0
				3		Fast Cycle Time	2	D - Visual Inspections, Quality Tree D - In-process Inspections D - Hand Insertions P - First Piece Approvals P - In-process PM	5	30	None						0
		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 P - First Piece Approvals	5	30	None						0
				3		Mold Heater Malfunction	2	D- Visual Inspections D - In-process Inspections P - First Piece Approvals	5	30	None						0
				3		Valve Gate Malfunction	2	D- Visual Inspections D - In-process Inspections P - First Piece Approvals	5	30	None						0
		Elongated Sprues	Part Non-Compliance / Cut Heads and Missing Pawls	6		Inadequate Cooling	2	D- Visual Inspections D - In-process Inspections P - First Piece Approvals	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	4	36	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
		Dimensional check shows out of tolerance condition (if required)	Part Non-Compliance	5		Excessive mold wear	2	P - Dimensional verification using calibrated gauging	5	50	None						0
				5		Process sheet not followed	2	P - Dimensional verification using calibrated gauging	5	50	None						0
		Functional check (if required) shows part does not perform as intended	Part Non-Compliance	6		Process sheet not followed	2	D - First Piece Acceptance Hung at the Cell	6	72	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	5	60	None						0
	Product Conforms per specifications before production	First Piece Not Hung	Delay in Manufacturing	3		Failure to hang First Piece	2	D/P - Tool Evaluation Sheet	6	36	None						0
	Revision level	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
7 Packaging & Labeling	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
8 In-process Checks	In-process checks for hand insertions, process set-up, part quality - visual appearance	Checks not completed	Non-conforming products ship to customer	6		Process issues/Operator error	3	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	5	90	None						0
		Incorrect or Missing work order number on Bag	Traceability Loss	3		Printer Malfunction	3	D - Visual Inspections P - Inspections at the cell P - Date Code Calendar	5	45	None						0
				3		Operator error	3	D - Visual Inspections P - Inspections at the cell P - Date Code Calendar	5	45	None						0
		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

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													Actions Taken	Severity	Occurrence	Detection	RPN
		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	4	40	None						0
				5		Cylinder Failure	2	D - Visual Inspection D - In-process Inspections P - PM	6	60	None						0
		Incorrect Degator alignment	Cut Heads	5		Improper Set-up	2	D- Visual Inspection D - In-process Inspections P - Degator Guides - PM	5	50	None						0
						Manual Degator Jams	3	D- Visual Inspection D - In-process Inspections P - PM	5	75	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	6	48	None						0
		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	4	40	None						0

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													Actions Taken	Severity	Occurrence	Detection	RPN
				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	Implement work order log system for label check.	Trent Carlson 09/16/21	New work order log in place to verify per box correct label.	3	3	3	27
				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
		Insufficient Bag Seals	Customer Dissatisfaction	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

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													Actions Taken	Severity	Occurrence	Detection	RPN
		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
		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
9 QA Testing	Validation and documentation of product per specifications	Testing Incomplete	Part Non-Compliance	7		Testing Not Performed by QA	2	D/P - SPC software or WI, First Piece Acceptance. P- Daily Production Meeting	5	70	None						0
10 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	5	70	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-9	5	70	None						0
11 Inspection at the Cell	Product conforms per specifications throughout production run.	Bad Product Shipped	Customer Dissatisfaction	6		Inspections Not Performed	2	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
				6		Bad Product not Found in Random Sampling	2	D - Visual Inspections P - Share Point P - LPA P-Work order sign-off	6	72	None						0
		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

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													Actions Taken	Severity	Occurrence	Detection	RPN
				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
				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/Work Order 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

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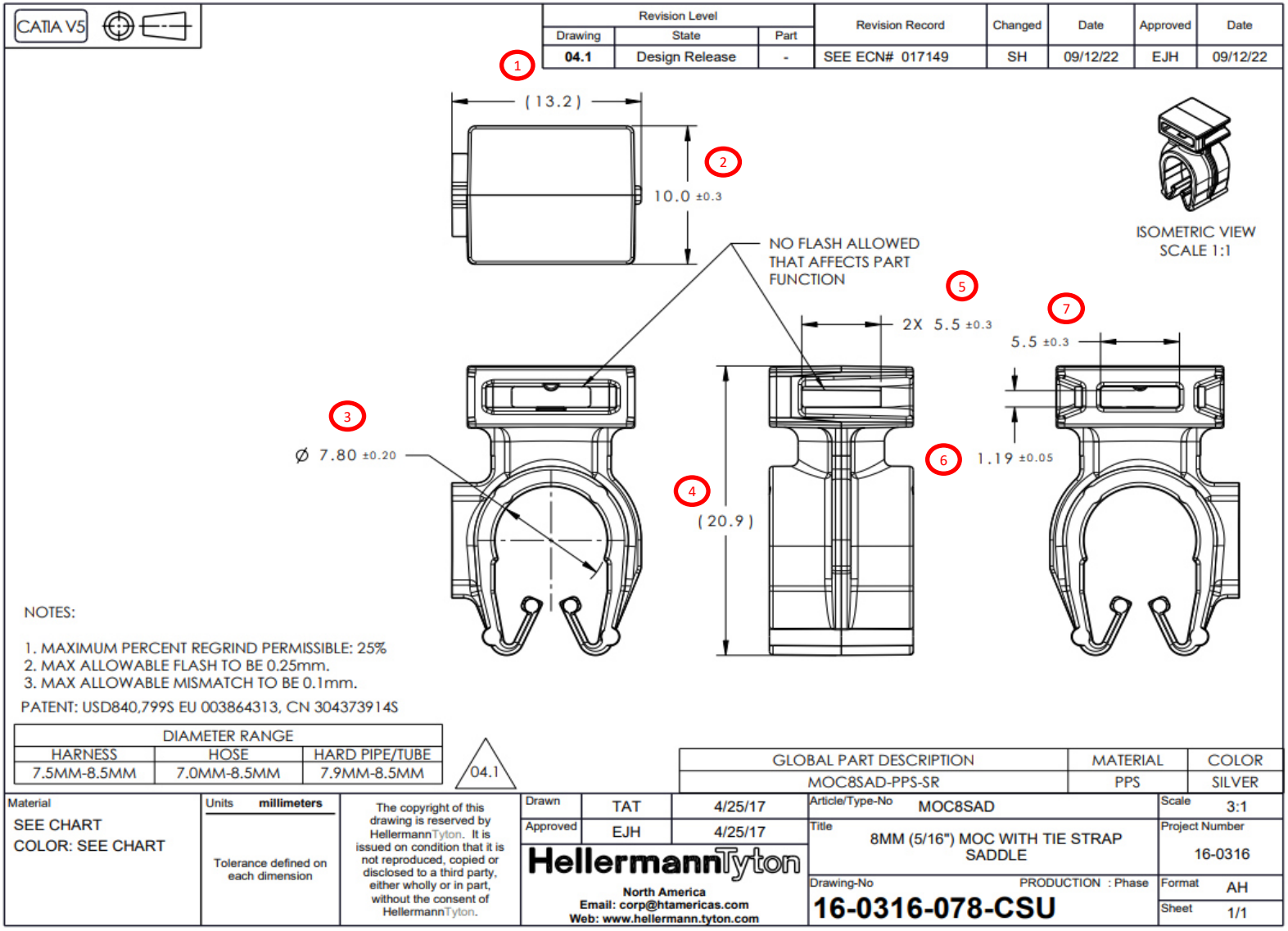
													Actions Taken	Severity	Occurrence	Detection	RPN
				3		Insufficient Packaging Supplies	4	D - Visual Inspection P - Share Point	7	84	None						0
		Incorrect or Missing Date Code on the Box	Traceability Loss	3		Operator error	3	D - Visual Inspections P - Date Code Calendar P - Work Instructions P-Share Point/Work Order Log	5	45	None						0
12 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	6	60	None						0
13 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	6	60	None						0
		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	6	90	None						0
		Inventory put on wrong location	Inaccurate Inventory-Delay Production	5		Operator error	3	P-Rack label D-Inventory cycle count	6	90	None						0
		Damage during transfer	Delay in Customer Shipment	5		Operator error	3	P-Operator training D-Visual Inspections	6	90	None						0
14 Shipping to Warehouse or Customer	Ship Parts per Shipping Specifications	Shipped Incorrectly	Customer Dissatisfaction	5		Late Shipment	2	D/P - Visual Inspections	7	70	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	6	60	None						0
	Manual shipping request	Incorrect data entered in ERP	Customer Dissatisfaction	5		Operator error	2	D-Visual inspection D-ASN	6	60	None						0
	Product package per specifications	Wrong Parts Picked	Customer Dissatisfaction	5		Operator Error	2	D - Staging Visual Inspection P - Pick List	6	60	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

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
	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	5	75	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	5	75	None						0

Part Drawing



HellermannTyton

Dimensional Results

HT Part/Item No.	Part Description	Internal No.
MOC8SAD-PPS-SR (133-02381)	8MM (5/16") MOC WITH TIE STRAP SADDLE	N/A

Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	16-0316-078-CSU	9/12/2022	04.1

Production Date	Material	Inspection Facility	Inspector
1/22/2022	UR0PPSFX72T6	HT-Monterrey	LUIS ALCALA

Unit of Measurement: **mm**

Item #	1	2	3	4	5-1	5-2	6	7		
Gage ID	**LM-VD-008**	**LM-VD-008**	**LM-EV-002**	**LM-MA-002**	**LM-VD-008**	**LM-VD-008**	**LM-EV-002**	**LM-VD-008**		
Gage Type	Caliper	Caliper	Vision	Indicator	Caliper	Caliper	Vision	Caliper		
Dim	13.20	10.00	7.80	20.90	5.50	5.50	1.19	5.50		
Tol +	REF	0.30	0.20	REF	0.30	0.30	0.05	REF		
Tol -	REF	0.30	0.20	REF	0.30	0.30	0.05	REF		
Sample										
1	13.05	10.03	7.876	20.98	5.57	5.56	1.206	5.57		
2	13.04	10.03	7.883	21.00	5.57	5.56	1.228	5.58		
3	13.05	10.04	7.876	21.02	5.58	5.57	1.208	5.58		
4	13.03	10.04	7.884	21.00	5.57	5.57	1.217	5.55		
5	13.03	10.04	7.880	21.00	5.54	5.57	1.211	5.57		
6	13.04	10.04	7.877	20.98	5.57	5.54	1.225	5.58		
7	13.06	10.02	7.883	21.03	5.54	5.54	1.207	5.56		
8	13.06	10.04	7.879	21.00	5.54	5.58	1.222	5.57		
OK	REF	X	X	REF	X	X	X	REF		
NOT OK	REF			REF				REF		

HellermannTyton

HT Part No.	Part Description	Internal No.
MOC8SAD-PPS-SR (133-02381)	8MM (5/16") MOC WITH TIE STRAP SADDLE	N/A

Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	16-0316-078-CSU	9/12/2022	04.1

Production Date	Material	Inspection Facility	Inspector
1/22/2022	UR0PPSFX72T6	HT-Monterrey	LUIS ALCALA

Item/Note #	Note Description	Specification (If Applicable)	Result	OK	NOT OK
Material					
	Material	PPS	Fortron FX72T6	X	
	Color	Gray	Gray	X	
	Regrind			X	
Performance/Reference					
1	MAXIMUM PERCENT REGRIND PERMISSIBLE: 25%			X	
2	MAX ALLOWABLE FLASH TO BE 0.25mm.			X	
3	MAX ALLOWABLE MISMATCH TO BE 0.1mm.			X	

Current Material Certificate

Celanese

HELLERMANN TYTON
6701 W GOOD HOPE RD
MILWAUKEE WI 53223
USA

CHRIS BURBANK
Fax: 414-362-8324

The Verst Group
Ticona Polymers
1100 Burlington Pike
FLORENCE KY 41042
USA

Type 4 Certificate of Analysis

FORTRON FX72T6 SD3002 BLACK A1

Customer Part No.:	UROPPSFX72T6	**Cert Issue Date:**	23 Nov 2021
Formula No.:	FX72T6	**Qty Shipped:**	6,614.000 LB
Catalog:	21020809	**Order Item /date:**	2486006 30 / 14 May 2021
Color No.:	SD3002	**Delivery item/date:**	87304334 900001 / 02 Dec 2021
		Account #:	2092090
		Customer PO No.:	152343
		Rail car:	x

Batch 0001603125
In reference to the above, this is to advise you that this is a standard product and meets the following requirements:

SPECIFICATIONS: WSS-M4D1063-A2

BATCH RELEASE DATA	UoM	Value	Limit
Melt Viscosity, apparent, 1200sec-1	Poise	909	600 - 1200
Tensile Stress at break	MPa	38.5	min. 35.0
Charpy Notched Impact Strength	kJ/m²	8.30	min. 3.00

ANNUAL TESTS (REVISED ON)	UoM	Value	Limit
Flexural modulus (24 Jun 2021)	MPa	1580	min. 1400

COMMENTS

These test data are determined based on standard ISO and/or ASTM testing procedures.

Fortron Global Business Line

If you have questions regarding this letter, please call your Customer Service Team at 800-526-4960.

Page 1 of 1

Current Material Certificate

HELLERMANN TYTON
7930 N. FAULKNER ROAD
MILWAUKEE WI 53224
USA

CHRIS BURBANK
Fax: 414-362-8338

Celanese

The Verst Group
Ticona Polymers
1100 Burlington Pike
FLORENCE KY 41042
USA

Type 2 Certificate of Analysis

FORTRON FX72T6 SD3002 BLACK A1

Customer Part No.:	UR0PPSFX72T6	**Cert Issue Date:**	21 Oct 2022
Formula No.:	FX72T6	**Qty Shipped:**	5,401.000 LB
Catalog:	21020809	**Order Item /date:**	2671941 10 / 21 Jul 2022
Color No.:	SD3002	**Delivery item/date:**	87726469 900002 / 15 Oct 2022
		Account #:	2066607
		Customer PO No.:	PO 161974
		Rail car:	00654014340 / 00654014340

Batch 0001748290
In reference to the above, this is to advise you that this is a standard product and meets the following requirements:

BATCH RELEASE DATA	UoM	Value
Melt Viscosity	Poise	760

Note: This certificate is generated and controlled by electronic means. No signature required. This document cannot be reproduced except in full without written consent of Celanese.

These test data are determined based on standard ISO and/or ASTM testing procedures.

Fortron Global Business Line

If you have questions regarding this letter, please call your Customer Service Team at 800-526-4960.

Current Material Certificate

Avient Colorants USA LLC
926 Elliot Road
Albion, MI, 49224

AVIENT

Hellermann Tyton Corp
COA Recipient1
7930 North Faulkner Rd
Milwaukee WI 53224-3423

C e r t i f i c a t e o f A n a l y s i s Date: 02/01/2022
Page: 1 / 1

Your order from 12/21/2021
Order No. : 158458
Material No. : GUR66NC8
Delivery no./Pos. : 53217127 / 900001
Order : 15389856
Material : GREY NY ASCEND 21 SP
Old Material No. : AB73632643
Material-no. : AB73632643
Batch No. : USPC054490
Quantity : 113.398 KG
On the batch, of which the consignment is a part, the following values were determined.

Inspection characteristic/-method	Specification	Result
COLOR - VISUAL		
CONTAMINATION - VISUAL		
PELLET COUNT		46 Pel./g
PELLET LENGTH		0.110 IN
PELLET DIAMETER		0.090 IN
Let Down Ratio (%)		2

The above particulars do not release the customer from the obligation to carry out an inspection of goods received.

This report does not require a signature.
Management System Certified according to ISO 9001, ISO 14001 and OHSAS 18001

HellermannTyton

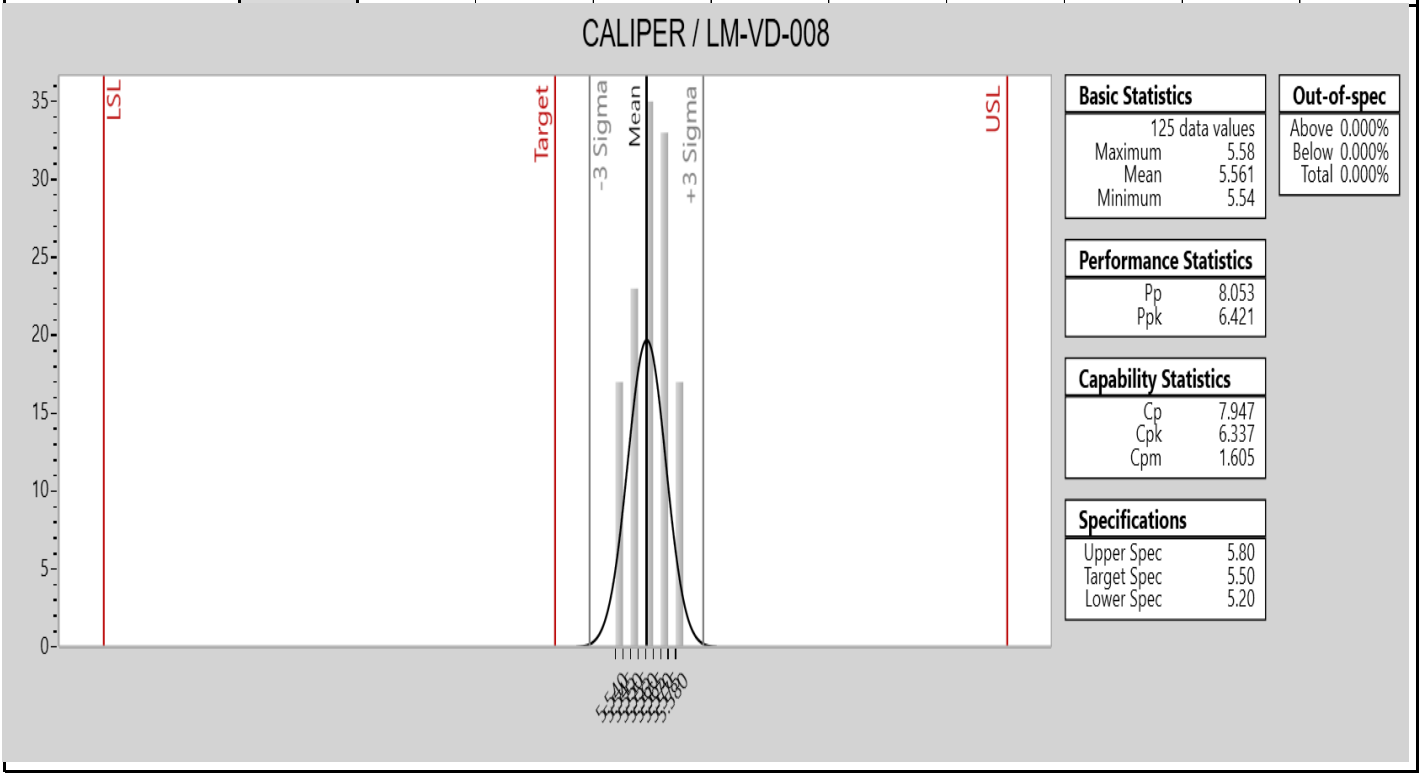
Initial Process Study

HT Part/Item No.	Part Description	Internal No.
MOC8SAD-PPS-SR (133-02381)	8MM (5/16") MOC WITH TIE STRAP SADDLE	N/A

Customer Part No.	Drawing No.	Drawing Date	Drawing Revision
15602736	16-0316-078-CSU	9/12/2022	04.1

Production Date	Material	Inspection Facility	Inspector
1/22/2022	UR0PPSFX72T6	HT-Monterrey	LUIS ALCALA

Study	Sample	Data								
Dimension & Tolerance 5.50 +/- 0.30 mm	1-9	5.58	5.55	5.57	5.55	5.57	5.55	5.57	5.54	5.56
	10-18	5.56	5.58	5.54	5.58	5.55	5.56	5.56	5.56	5.57
	19-27	5.57	5.56	5.57	5.57	5.57	5.55	5.56	5.58	5.56
	28-36	5.55	5.55	5.58	5.55	5.56	5.56	5.55	5.58	5.54
	37-45	5.54	5.54	5.57	5.57	5.55	5.57	5.58	5.56	5.58
	46-54	5.57	5.58	5.55	5.55	5.55	5.57	5.56	5.56	5.54
	55-63	5.57	5.58	5.56	5.56	5.57	5.57	5.56	5.57	5.56
	64-72	5.57	5.55	5.57	5.57	5.57	5.56	5.54	5.56	5.56
	73-81	5.55	5.56	5.54	5.54	5.56	5.57	5.56	5.57	5.55
	82-90	5.57	5.57	5.56	5.56	5.55	5.54	5.56	5.54	5.56
	91-99	5.56	5.58	5.54	5.57	5.57	5.56	5.57	5.56	5.56
	100-108	5.57	5.55	5.58	5.58	5.55	5.58	5.58	5.56	5.57
	109-117	5.58	5.54	5.58	5.54	5.57	5.56	5.56	5.55	5.55
	118-125	5.55	5.57	5.57	5.54	5.54	5.56	5.55	5.54	



R&R Study Results Using Specifications

1/11/2022

Gage number:	TGM-330	Done by:	April Gary
Gage description:	Caliper-6"	Part name:	151-01153
Gage type:	Caliper	Characteristics:	Length
Study name:	Annual Gage R & R	Specifications:	LSL=34 Nominal=35.5 USL=37
Study date:	01/11/2022	Number of Distinct Cate: 11.3	

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)/6

Repeatability - Equipment Variation (EV)
EV = 0.005316 — %EV = 1.063

Reproducibility - Appraiser Variation (AV)
AV = 0.002612 — %AV = 0.5224

Repeatability & Reproducibility (R&R)
R&R = 0.005923 — %R&R = 1.185

Part Variation (PV)
PV = 0.5 — %PV = 99.99

Specification Spread (USL-LSL)/%10
(USL - LSL)0.5

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	35.45	35.44	35.45	35.45	35.47	35.5	35.3	35.54	35.47	35.43
April	2	35.46	35.44	35.45	35.45	35.46	35.49	35.29	35.54	35.47	35.43
April	3	35.46	35.42	35.42	35.46	35.47	35.5	35.3	35.54	35.46	35.43
Marreall	1	35.46	35.43	35.43	35.45	35.45	35.5	35.28	35.53	35.46	35.43
Marreall	2	35.46	35.44	35.43	35.45	35.46	35.48	35.28	35.53	35.46	35.43
Marreall	3	35.47	35.42	35.43	35.46	35.46	35.5	35.29	35.53	35.46	35.43
Felicia	1	35.45	35.44	35.42	35.45	35.46	35.5	35.3	35.53	35.47	35.43
Felicia	2	35.46	35.43	35.42	35.45	35.46	35.5	35.27	35.53	35.46	35.43
Felicia	3	35.46	35.43	35.41	35.45	35.46	35.51	35.28	35.53	35.46	35.43

GAGE pack

R&R Study Results Using Specifications

1/11/2022

Gage number:	TGM-760	Done by:	April Gary
Gage description:	Micro-Vu	Part name:	133-03809
Gage type:	Micro-Vu	Characteristics:	Length-Vision System
Study name:	Annual Gage R & R	Specifications:	LSL=39 Nominal=40 USL=41
Study date:	01/11/2022	Number of Distinct Cate	37.87838

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 = 0.01059283 — %EV = 3.177848

Reproducibility - Appraiser Variation (AV)
AV = 0.006445212 — %AV = 1.933564

Repeatability & Reproducibility (R&R)
R&R = 0.01239955 — %R&R = 3.719864

Part Variation (PV)
PV = 0.3331026 — %PV = 99.93079

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.3333333

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Rob S.	1	39.388	39.594	39.212	39.643	39.636	39.746	39.647	39.76	39.755	39.754
Rob S.	2	39.38	39.589	39.142	39.634	39.629	39.739	39.666	39.766	39.773	39.755
Rob S.	3	39.386	39.588	39.135	39.636	39.673	39.754	39.668	39.777	39.772	39.758
Sam M.	1	39.375	39.582	39.141	39.633	39.625	39.739	39.658	39.754	39.737	39.749
Sam M.	2	39.376	39.584	39.129	39.632	39.627	39.741	39.655	39.764	39.765	39.752
Sam M.	3	39.382	39.587	39.136	39.631	39.629	39.74	39.651	39.766	39.675	39.754
April G.	1	39.372	39.586	39.141	39.637	39.631	39.743	39.649	39.769	39.737	39.751
April G.	2	39.376	39.588	39.141	39.637	39.63	39.745	39.657	39.75	39.756	39.751
April G.	3	39.376	39.487	39.14	39.636	39.629	39.739	39.656	39.768	39.768	39.751

GAGE pack

R&R Study Results Using Specifications

1/11/2022

Gage number:	TGM-850	Done by:	April Gary
Gage description:	Tensile Tester	Part name:	T30L
Gage type:	Tensile Tester	Characteristics:	Tensile Strength
Study name:	Annual Gage R & R	Specifications:	LSL=30 Nominal=80 USL=130
Study date:	01/10/2022	Number of Distinct Cate	19.14576

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 = 1.18734

%EV = 7.124041

Reproducibility - Appraiser Variation (AV)
AV = 0.2977762

%AV = 1.786657

Repeatability & Reproducibility (R&R)
R&R = 1.224111

%R&R = 7.344665

Part Variation (PV)
PV = 16.62165

%PV = 99.7299

Specification Spread (USL-LSL)/
(USL - LSL)/ = 16.66667

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
April	1	54.641	56.102	51.765	51.187	50.959	50.051	51.567	49.102	49.628	48.566
April	2	54.819	56.19	52.352	51.425	48.538	50.544	50.13	49.605	51.879	48.018
April	3	53.191	55.972	52.223	52.87	52.502	52.725	52.259	51.16	50.35	50.48
Tamera	1	54.73	56.253	52.969	51.991	50.07	52.008	49.454	49.32	47.165	48.872
Tamera	2	53.913	55.003	52.11	49.633	51.468	49.594	48.458	50.673	49.348	49.969
Tamera	3	54.424	56.53	52.079	52.529	51.257	49.013	50.464	50.203	49.676	48.271
Marreall	1	54.515	56.371	50.573	50.161	51.652	48.507	51.987	49.378	50.964	51.958
Marreall	2	54.823	57.02	52.859	52.732	52.714	50.898	51.528	52.338	52.585	50.354
Marreall	3	52.751	56.443	53.168	52.174	47.928	50.357	51.051	49.128	50.839	50.807

GAGE pack

R&R Study Results Using Specifications

1/12/2022

Gage number:	TGM-983	Done by:	April Gary
Gage description:	Indicator	Part name:	151-01043
Gage type:	Indicator	Characteristics:	Height
Study name:	Annual Gage R & R	Specifications:	LSL=28.7 Nominal=29.7 USL=30.7
Study date:	01/12/2022	Number of Distinct Cate	21.17149

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 = 0.008761562 — %EV = 2.628469

Reproducibility - Appraiser Variation (AV)
AV = 0.02034414 — %AV = 6.103242

Repeatability & Reproducibility (R&R)
R&R = 0.0221506 — %R&R = 6.64518

Part Variation (PV)
PV = 0.3325966 — %PV = 99.77897

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.3333333

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Tamera M	1	29.55	29.615	29.594	28.7	29.192	29.622	29	29.601	29.618	29.617
Tamera M	2	29.605	29.612	29.596	28.747	29.179	29.614	29.018	29.62	29.624	29.612
Tamera M	3	29.607	29.61	29.597	28.728	29.196	29.633	29.044	29.62	29.629	29.615
April G	1	29.636	29.631	29.634	28.702	29.198	29.633	29.037	29.655	29.62	29.639
April G	2	29.643	29.635	29.634	28.756	29.196	29.631	29.031	29.657	29.621	29.646
April G	3	29.635	29.639	29.637	28.761	29.19	29.625	29.047	29.65	29.641	29.643
Sam M	1	29.646	29.639	29.65	28.759	29.197	29.659	29.066	29.667	29.664	29.649
Sam M	2	29.656	29.648	29.659	28.75	29.199	29.655	29.055	29.664	29.664	29.652
Sam M	3	29.644	29.636	29.658	28.755	29.194	29.657	29.056	29.666	29.665	29.656

GAGE pack

R&R Study Results Using Specifications

1/11/2022

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:	01/11/2022	Number of Distinct Cate	21.86764

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 = 0.005099388 — %EV = 6.119265

Reproducibility - Appraiser Variation (AV)
AV = 0.001657823 — %AV = 1.989388

Repeatability & Reproducibility (R&R)
R&R = 0.005362102 — %R&R = 6.434522

Part Variation (PV)
PV = 0.08316065 — %PV = 99.79277

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
Joseph F	1	10.908	10.912	10.893	10.273	10.87	10.916	10.899	10.902	10.429	10.887
Joseph F	2	10.904	10.911	10.88	10.268	10.876	10.912	10.891	10.889	10.429	10.894
Joseph F	3	10.917	10.912	10.892	10.275	10.871	10.91	10.906	10.887	10.431	10.897
James P	1	10.908	10.904	10.89	10.285	10.873	10.925	10.899	10.9	10.442	10.895
James P	2	10.911	10.911	10.889	10.267	10.878	10.927	10.905	10.898	10.432	10.903
James P	3	10.898	10.915	10.893	10.27	10.865	10.93	10.903	10.899	10.436	10.899
Nick K	1	10.912	10.901	10.885	10.261	10.87	10.92	10.9	10.888	10.428	10.89
Nick K	2	10.912	10.908	10.89	10.272	10.881	10.92	10.912	10.893	10.429	10.896
Nick K	3	10.911	10.915	10.891	10.276	10.874	10.924	10.905	10.89	10.435	10.894

GAGE pack

R&R Study Results Using Specifications

2/2/2022

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:	Width
Study name:	Annual Gage R & R	Specifications:	LSL=92 Nominal=92.2 USL=92.4
Study date:	02/01/2022	Number of Distinct Cate	26.96861

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)/6

Repeatability - Equipment Variation (EV)
EV = 0.002740363 — %EV = 4.110529

Reproducibility - Appraiser Variation (AV)
AV = 0.002146237 — %AV = 3.219342

Repeatability & Reproducibility (R&R)
R&R = 0.003480793 — %R&R = 5.22117

Part Variation (PV)
PV = 0.066576 — %PV = 99.86361

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
Rob S	1	92.1929	92.2152	92.2189	91.9201	92.2519	92.2244	92.1938	92.0249	92.2016	92.218
Rob S	2	92.1952	92.2132	92.2165	91.9193	92.2522	92.2293	92.1957	92.0237	92.2005	92.2198
Rob S	3	92.1906	92.219	92.2214	91.9209	92.2548	92.2294	92.1993	92.0237	92.2005	92.214
Sam M	1	92.1902	92.2104	92.2151	91.9194	92.2495	92.2209	92.1889	92.0335	92.195	92.2123
Sam M	2	92.1889	92.2116	92.2142	91.9187	92.2456	92.22	92.1887	92.0309	92.1939	92.2085
Sam M	3	92.1864	92.2112	92.2157	91.9192	92.2449	92.22	92.1881	92.0278	92.19559	92.2091
Nick K	1	92.1913	92.2089	92.2145	91.92	92.2462	92.2203	92.191	92.0315	92.194	92.21
Nick K	2	92.1868	92.2121	92.2167	91.9202	92.2554	92.2234	92.1941	92.0227	92.2004	92.2163
Nick K	3	92.1978	92.2168	92.22	91.9208	92.2536	92.2277	92.1938	92.0235	92.2084	92.218

GAGE pack

R&R Study Results Using Specifications

1/4/2022

Gage number:	LM-VD-007	Done by:	MTY-QALab
Gage description:	DIMENCIONAL	Part name:	111-02428
Gage type:	VERNIER 6"	Characteristics:	DISTANCE
Study name:	GR&R Y ANOVA (2022)	Specifications:	LSL=4.6 Nominal=4.7 USL=4.8
Study date:	01/04/2022	Number of Distinct Cate	26.48587

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 = 0.001772024 — %EV = 5.316065

Reproducibility - Appraiser Variation (AV)
AV = 0 — %AV = 0

Repeatability & Reproducibility (R&R)
R&R = 0.001772024 — %R&R = 5.316065

Part Variation (PV)
PV = 0.03328624 — %PV = 99.85859

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.03333338

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
ROLANDO R	1	4.71	4.71	4.7	4.7	4.81	4.7	4.71	4.7	4.71	4.81
ROLANDO R	2	4.71	4.71	4.7	4.7	4.81	4.7	4.7	4.7	4.7	4.81
ROLANDO R	3	4.71	4.71	4.7	4.7	4.81	4.7	4.7	4.7	4.7	4.8
JORGE U.	1	4.71	4.71	4.71	4.71	4.81	4.7	4.7	4.7	4.7	4.81
JORGE U.	2	4.71	4.71	4.7	4.7	4.8	4.7	4.7	4.7	4.7	4.81
JORGE U.	3	4.71	4.71	4.7	4.7	4.81	4.7	4.7	4.7	4.7	4.81
LUIS A.	1	4.71	4.7	4.7	4.7	4.81	4.71	4.7	4.7	4.7	4.81
LUIS A.	2	4.71	4.71	4.7	4.7	4.81	4.71	4.7	4.7	4.7	4.81
LUIS A.	3	4.7	4.71	4.7	4.7	4.81	4.7	4.7	4.7	4.7	4.81

GAGE pack

R&R Study Results Using Specifications

1/5/2022

Gage number:	LM-MA-002	Done by:	MTY-QALab
Gage description:	DIMENCIONAL	Part name:	133-07017
Gage type:	MEDIDOR DE ALTURA	Characteristics:	HEIGHT
Study name:	GR&R Y ANOVA (2022)	Specifications:	LSL=12.9 Nominal=13 USL=13.1
Study date:	01/05/2022	Number of Distinct Cate	45.67499

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 = 0.0009844683 — %EV = 2.953393

Reproducibility - Appraiser Variation (AV)
AV = 0.0002977963 — %AV = 0.8933855

Repeatability & Reproducibility (R&R)
R&R = 0.001028523 — %R&R = 3.085558

Part Variation (PV)
PV = 0.03331759 — %PV = 99.95238

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.03333346

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
LUIS A.	1	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
LUIS A.	2	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
LUIS A.	3	13.08	13.07	13.09	13.08	13.07	13.07	13.09	13.07	13.08	13.06
GERARDO	1	13.08	13.08	13.08	13.08	13.07	13.08	13.09	13.08	13.08	13.06
GERARDO	2	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
GERARDO	3	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
ROLANDO R	1	13.09	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
ROLANDO R	2	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06
ROLANDO R	3	13.08	13.07	13.08	13.08	13.07	13.07	13.09	13.08	13.08	13.06

GAGE pack

R&R Study Results Using Specifications

1/5/2022

Gage number:	LM-ID-001	Done by:	MTY-QALab
Gage description:	MEDICION	Part name:	151-01773
Gage type:	INDICADOR DIGITAL	Characteristics:	DISTANCE
Study name:	GR&R Annual (2022)	Specifications:	LSL=9.9 Nominal=10 USL=10.1
Study date:	01/05/2022	Number of Distinct Cate	25.72264

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 = 0.001378218 — %EV = 4.134639

Reproducibility - Appraiser Variation (AV)
AV = 0.001195466 — %AV = 3.586386

Repeatability & Reproducibility (R&R)
R&R = 0.001824452 — %R&R = 5.473335

Part Variation (PV)
PV = 0.03328349 — %PV = 99.8501

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.03333346

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
LUIS A	1	9.99	9.98	10.01	9.99	10.11	10.02	10	9.92	10.11	10.01
LUIS A	2	9.99	9.98	10.01	9.99	10.11	10.02	10	9.91	10.11	10.01
LUIS A	3	9.99	9.98	10.01	9.99	10.11	10.02	10	9.91	10.11	10.01
JORGE U	1	9.99	9.98	10	9.98	10.11	10.02	10	9.92	10.11	10
JORGE U	2	9.98	9.98	10	9.99	10.11	10.02	10	9.92	10.11	10
JORGE U	3	9.99	9.98	10	9.99	10.1	10.02	10	9.92	10.11	10
ROLANDO R	1	9.99	9.99	10	9.99	10.11	10.02	10	9.92	10.1	10
ROLANDO R	2	9.99	9.99	10	9.99	10.11	10.02	10	9.92	10.11	10
ROLANDO R	3	9.99	9.99	10.01	9.99	10.11	10.01	10	9.92	10.11	10

GAGE pack

R&R Study Results Using Specifications

1/7/2022

Gage number:	LM-SC-001	Done by:	MTY-QALab
Gage description:	MEDICION	Part name:	111-01564
Gage type:	SCANER AICON STEREO SCAN	Characteristics:	mm
Study name:	GR&R Y ANOVA (2022	Specifications:	LSL=1.1 Nominal=1.2 USL=1.3
Study date:	01/07/2022	Number of Distinct Cate	33.72898

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 = 0.001338857 — %EV = 4.016573

Reproducibility - Appraiser Variation (AV)
AV = 0.0003818429 — %AV = 1.145529

Repeatability & Reproducibility (R&R)
R&R = 0.001392244 — %R&R = 4.176733

Part Variation (PV)
PV = 0.03330423 — %PV = 99.91273

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.03333332

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
JORGE U.	1	1.312	1.313	1.405	1.331	1.331	1.317	1.315	1.412	1.309	1.311
JORGE U.	2	1.318	1.315	1.402	1.329	1.332	1.317	1.315	1.41	1.31	1.311
JORGE U.	3	1.311	1.314	1.406	1.33	1.331	1.318	1.314	1.415	1.311	1.31
LUIS A.	1	1.319	1.314	1.404	1.33	1.332	1.316	1.314	1.413	1.311	1.311
LUIS A.	2	1.323	1.315	1.403	1.331	1.331	1.316	1.315	1.416	1.31	1.312
LUIS A.	3	1.316	1.314	1.401	1.331	1.331	1.317	1.315	1.411	1.312	1.311
ROLANDO R	1	1.316	1.314	1.406	1.33	1.331	1.317	1.315	1.418	1.31	1.312
ROLANDO R	2	1.317	1.315	1.404	1.33	1.331	1.316	1.315	1.415	1.31	1.312
ROLANDO R	3	1.321	1.315	1.401	1.33	1.331	1.317	1.315	1.413	1.312	1.312

GAGE pack

R&R Study Results
Using Study Parameters

1/6/2022

Gage number:	LM-LT-001	Done by:	MTY-QALab
Gage description:	MEDICION	Part name:	T255S0HIRX2
Gage type:	CELDA DE CARGA	Characteristics:	Tensile
Study name:	GR&R ANNUAL 2022	Specifications:	
Study date:	01/06/2022	Number of Distinct Cate	61.68499

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 study parameters

Measurement Unit Analysis — Total Variation (TV)

Repeatability - Equipment Variation (EV)
EV = 0.2939734 — %EV = 2.28521

Reproducibility - Appraiser Variation (AV)
AV = 0 — %AV = 0

Repeatability & Reproducibility (R&R)
R&R = 0.2939734 — %R&R = 2.28521

Part Variation (PV)
PV = 12.86081 — %PV = 99.97388

Total Variation (TV)
TV = 12.86417

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Luis A.	1	1831.581	1810.183	1841.178	1837.092	1815.849	1820.833	1828.609	1800.328	1813.9	1815.036
Luis A.	2	1831.826	1810.977	1841.479	1837.335	1815.738	1820.085	1828.42	1800.022	1813.784	1815.218
Luis A.	3	1831.691	1810.376	1841.911	1837.758	1815.042	1820.202	1828.967	1800.751	1813.483	1815.501
Rolando R.	1	1831.334	1810.99	1841.267	1837.083	1815.185	1820.946	1828.861	1800.673	1813.218	1815.375
Rolando R.	2	1831.913	1810.992	1841.864	1837.7	1815.124	1820.67	1828.084	1800.894	1813.242	1815.257
Rolando R.	3	1831.931	1810.99	1841.598	1837.754	1815.459	1820.986	1828.001	1800.949	1813.051	1815.18
Gerardo G.	1	1831.691	1810.632	1841.653	1837.105	1815.391	1820.097	1828.963	1800.834	1813.376	1815.598
Gerardo G.	2	1831.394	1810.112	1841.005	1837.41	1815.111	1820.636	1828.722	1800.454	1813.745	1815.53
Gerardo G.	3	1831.935	1810.328	1841.811	1837.457	1815.554	1820.033	1828.872	1800.899	1813.279	1815.275

Appraiser	Replicati	Part 11	Part 12	Part 13	Part 14	Part 15	Part 16	Part 17	Part 18	Part 19	Part 20
Luis A.	1										
Luis A.	2										
Luis A.	3										

GAGE pack

R&R Study Results Using Specifications

1/5/2022

Gage number:	LM-EV-001	Done by:	MTY-QALab
Gage description:	DIMENSIONAL	Part name:	111-01564
Gage type:	EQUIPO DE VISION SWIFT BLUE	Characteristics:	Distance
Study name:	GR&R Y ANOVA (2022) .10	Specifications:	LSL=1.1 Nominal=1.2 USL=1.3
Study date:	01/05/2022	Number of Distinct Cate	33.72898

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 = 0.001338857

%EV = 4.016573

Reproducibility - Appraiser Variation (AV)
AV = 0.0003818429

%AV = 1.145529

Repeatability & Reproducibility (R&R)
R&R = 0.001392244

%R&R = 4.176733

Part Variation (PV)
PV = 0.03330423

%PV = 99.91273

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.03333332

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Rolando R.	1	1.312	1.313	1.405	1.331	1.331	1.317	1.315	1.412	1.309	1.311
Rolando R.	2	1.318	1.315	1.402	1.329	1.332	1.317	1.315	1.41	1.31	1.311
Rolando R.	3	1.311	1.314	1.406	1.33	1.331	1.318	1.314	1.415	1.311	1.31
Luis A.	1	1.319	1.314	1.404	1.33	1.332	1.316	1.314	1.413	1.311	1.311
Luis A.	2	1.323	1.315	1.403	1.331	1.331	1.316	1.315	1.416	1.31	1.312
Luis A.	3	1.316	1.314	1.401	1.331	1.331	1.317	1.315	1.411	1.312	1.311
Jorge U.	1	1.316	1.314	1.406	1.33	1.331	1.317	1.315	1.418	1.31	1.312
Jorge U.	2	1.317	1.315	1.404	1.33	1.331	1.316	1.315	1.415	1.31	1.312
Jorge U.	3	1.321	1.315	1.401	1.33	1.331	1.317	1.315	1.413	1.312	1.312

GAGE pack

Lab Scope

HellermannTyton QA Laboratory Testing

The scope of functions that HellermannTyton QA lab provides are as follows:

-Provide inspection and testing for production.

-Perform capability, dimensional, and performance testing and analysis to meet PPAP, Regulatory, and Customer Requirements

-Perform special testing of new products and materials, and any other testing that is required meeting business needs.

-Coordinate the calibration of gages, measuring, and test equipment.

HellermannTyton inspection and testing capabilities are as follows (includes but not limited to):

Visual Analysis	Moisture Analysis
Dimensional Analysis	Wire Bundle Analysis
Insertion/Push In, Pull Out	
Tensile Strength	

HellermannTyton equipment for inspection and testing is as follows (includes but not limited to):

Equipment Type	Parameter	Range	Calibration/ Measurement Capability
Outside Micrometer	Linear Dimension	0-1 in	± 0.001 in
Ruler	Linear Dimension	0-12 in	± 0.250 in
Tape Measure	Linear Dimension	Up to 26 ft	± 0.062 in
Caliper	Linear Dimension	Up to 40 in	± 0.001 in
Water Bath	Condition Parts	Up to 212°C	± 2° (Verification Only)
Tensile Tester and Load Cell	Tensile Strength	Up to 1000 lbs	± 1 lb
Vacuum Oven	Moisture Analysis	Temp.: Ambient - 280°C Vacuum: Atmosphere - 30"Hg	± 5°C
Thermometer (for Oven)	Temperature	Up To 300°C	± 1°C
Thickness Gauge	Linear Dimension	0.0001 - 0.05 in	± 0.001 in
Torque Wrench	Torque	0 - 250 ft/lbs	± 1 ft/lb
Digital Indicator	Linear Dimension	0 - 0.500 in	± 0.001 in
Micro-Vu	Linear Dimension	X: 16 in, Y: 19 in, Z: 8.5 in	± 0.001 in
Moisture Analyzer	Moisture Analysis	25° - 275°C	± 0.001%
Force Gauge	Force	0 - 100 lbs	± 0.1 lb
Scale	Weight	0 - 2000 g	± 0.0001 g
CMM	Linear Dimension	X: 28 in, Y: 40 in, Z: 28 in	± 0.0005 in
Height Gauge	Linear Dimension	0 - 24 in	± 0.001 in
Dial Indicator	Linear Dimension	0.003 - 0.03 in	± 0.0005 in
CT Scanner	Dimensional	Unlimited Pending Voxels	±.0001 in
Blue Light Scanner	Dimensional	Unlimited	±.0001 in

A Gage R&R is done by instrument type and is only done on those types used for part inspection.

Process Flow Diagram

☑ New Method	☐ Method proposed	Control number	PF-CAL-00.0-13	Rev. Date	9/11/2020	Rev.	4

Product/ Family ID:

Assembly parts

Process descripcion:

Receiving, molding, assembly, packaging and shipping

(Door to door)

Summary:

Activity	Current Qty	Proposed Qty	Difference Qty
● Process / Operation	7		
➡ Transportation	-		
■ Inspection / Quality	5		
▼ Storage	2		
Total =	14		

Created by: Manufacturing Engineer (mjaramillo@hellermanntyton.mx)

Approved by: Quality Eng; Quality Mgr; Maint Mgr; Materials Mgr; Production Mgr; Industrial Eng. (mjaramillo@hellermanntyton.mx)

No.	Description	● Process	➡ Transportation	■ Inspection/Q	▼ Storage	Comments
1	**Receiving** Receive the raw materials					
2	**Incoming inspection** Inspect the raw materials					
3	**Material storage** Store the raw materials					
4	**Materials set up** Supply materials to production					
5	**Assembly Machine Set up** Prepare the work stations to start the production					
6	**Line clearance and preparation for start up** Prepare the work stations to start the production					
7	**First piece approval** Approve the first piece of a new lot					
8	**Assembly** Assembly the parts at machine					
9	**Operator inspections** Inspect the finish good before packaging					
10	**Packaging** Pack the finished good					
11	**Final inspection** Inspect the finished good					
12	**Finished Goods Storage** Store the finished goods					
13	**Shipping** Ship the finished good to the Customer					
14	**Annual Validation** Perform full dimensional study of part number					

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan

Control Plan Number:	Key Contact/Phone:	Date (Orig.)	Date (Rev.)
CP-CAL-00.0-13	**Quality Assurance / (81) 2353 5642**	**23-Apr-18**	**See footer**
Part Number/Latest Change Level:	Core Team:	Customer Engineering Approval/Date (If Req'd)	

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan

Control Plan Number:	Key Contact/Phone:	Date (Orig.)	Date (Rev.)
CP-CAL-00.0-13	**Quality Manager / (81) 2353 5642**	**23-Apr-18**	**See footer**
Part Number/Latest Change Level: **Plastic-Metal Assembly Clips (Family of products)**	Core Team: **Quality Eng; Quality Mgr; Maint Mgr; Materials Mgr; Production Mgr; Process Sup; Industrial Eng.**	Customer Engineering Approval/Date (If Req'd) **NA**	
Part Name/Description **Plastic-Metal Assembly Clips (Family of products)**	Supplier/Plant Approval/Date **NA**	Customer Quality Approval/Date (If Req'd) **NA**	
Supplier/Plant: **HellermannTyton MTY** / Supplier Code: **NA**	Other Approval/Date (If Req'd) **NA**	Other Approval/Date (If Req'd) **NA**	

Quality Assurance	Team Supervisor	Material Handler	Process Technician	Operator	QA and/or Team Supervisor	Shipping and/or Receiving

Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for	CHARACTERISTICS NO.	CHARACTERISTICS PRODUCT	CHARACTERISTICS PROCESS	Special Char. Class	METHODS Product/Process Specification/	METHODS Evaluation/ Measurement	METHODS SIZE Size	METHODS SIZE Freq	METHODS Control Method	Reaction Plan
1	Receiving		1	batch number	Receiving		According to packing list.	Visual	Each lot	Each receipt	PR-MAT-01 Material Procedure. MRP System	Notify to Purchasing and QA Isolate according tol PR-CAL-01.
			2	Packaging Conditions		Free of damage	Free of damage on external packaging.	Visual	Each lot	Each receipt	PR-MAT-01 Material Procedure. MRP System	Notify to Purchasing and QA Isolate according tol PR-CAL-01.
			3	Quantity		Cantidad correcta	According to packing list.	Visual	Each lot	Each receipt	PR-MAT-01 Material Procedure. MRP System	Notify to Purchasing and QA Isolate according tol PR-CAL-01.
2	Incoming inspection		1	Material Characteristics			Per Certificate of Analysis	Visual Material Cert	Each Lot	Each Lot	WI-CAL-00.2 Quality Inspections. Per each item Control Plan	Notify QA and Purchasing; Isolate lot per PR-CAL-01
			2	Packaging conditions			No damages on the external packaging	Visual	Each lot	Each lot	WI-CAL-00.2 Quality Inspections. Per each item Control Plan	Notify QA and Purchasing; Isolate lot per PR-CAL-01
			3	Assembly components (If required)			Per Certificate of Compliance	Visual to Cert. Per print	Each Lot	Each Lot	WI-CAL-00.2 Quality Inspections. Per each item Control Plan	Notify QA and Purchasing; Isolate lot per PR-CAL-01
3	Material Storage		5	Lot Number			Per Packing List	Visual	Each Lot	Each Lot	PR-MAT-01 Materials management. MRP System	Notify Purchasing and QA; Isolate lot per PR-CAL-01
			6	Packaging Requirements			Packaging meets requirements	Visual	Each lot	Each lot	WI-CAL-00.2 Quality Inspections. Per each item Control Plan	Notify Purchasing and QA; Isolate lot PR-CAL-01
		Forklift	1		Material is moved to storage until use		All containers are identified and the in correct bin location.	Visual	Each container	Each container	PR-MAT-01 Materials management. MRP System	Adjust process; Isolate lot PR-CAL-01 (when applcable)
4	Materials Set Up	Forklift, Boxes, skids	1		Move components to the assembly stations		Correct Material is send to the assembly area per Work Order	Visual	Eack work order	Eack work order	Work Order (BOM) Material Process Log	Isolation per PR-CAL-01
			2		Move Packaging materials to the press		Correct boxes, bags, and labels brought to the press per work order	Visual to WO	Eack work order	Eack work order	Work Order (BOM) Material Process Log	Adjust process; Isolation PR-CAL-01
5	Assembly machine set-up	Assembly machine, fixtures.	1		Prepare assembly machine for assembly		Prepare machine according to Work Instructions ans visual aids	Visual	Each work order change	Each work order change	Work Order sign off, Start of Work Order record	Isolation per PR-CAL-01

Quality Assurance		Team Supervisor	Material Handler		Process Technician	Operator			QA and/or Team Supervisor	Shipping and/or Receiving
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for	CHARACTERISTICS NO.	PRODUCT	PROCESS	Special Char. Class	METHODS Product/Process Specification/	Evaluation/ Measurement	SIZE Size	SIZE Freq	Control Method	Reaction Plan
6	Line clearance and preparation for start up	Documents, forms, labels	1		Line free of previous job materials / documents.		Line must be clear and clean according to AV-PRD-06 and F-CAL-00.0-5	Visual to check list F-CAL-00.0-5	Each work order change	Each work order change	AV-PRD-06 Visual Aid for line cleanliness. F-CAL-00.0-5 Work Order start up checklist	Isolation per PR-CAL-01
			2		Prepare documents for Work Order		Documents should be: Mold book, Work Instructions, Visual Aids, Work Order, Validation record, Work Order start up, Labels.	Visual	Each work order change	Each work order change	F-CAL-00.0-5 Work Order start up checklist	Isolation per PR-CAL-01
7	First Piece Approval Visual	Injection Molding Machine	1	Part Quality			Check for visual defects (No Burns, Shorts, Flash, Warp or Part Damage Allowed), Verify correct assembly of the components.	Visual Inspection	1 Shot	Each Set Up	WI-CAL-00.2 Quality Inspections F-CAL-00.2-7 & F-CAL-00.2-9 First Piece Release. Operator Work Instructions.	Adjust Process; Re-inspect per WI-CAL-00.2 Retest; Isolation per PR-CAL-01
			2	Capability Study			Perform Dimensional on Designated characteristic	Calibrated Gages	1 Shot	Each Set Up	WI-CAL-00.2 Quality Inspections F-CAL-00.2-7 & F-CAL-00.2-9 First Piece Release. SQC Pack Drawing, Capability dimensions file.	Adjust Process; Re-inspect per WI-CAL-00.2 Retest; Isolation per PR-CAL-01
8	Clip Automatic assembly	Assembly Station	1	Assembly of Components			Verify plastic and metal components are properly assembled	Visual	each part	each part	Vision System validation.	Adjust Process/ Notify Supervisor and QA Recheck; Isolation PR-CAL-01
	Clip Manual assembly	Assembly Station, Fixture, handtool)	2				>bushing are properly assembled >Clip-components incorrect position >Plastic-Plastic bad assembly >lack of components >Mounting ribs	>Visual >Inspection equipment	each part	each part	Operator Work Instructions Visual Aids Sensors validation on weekly preventive maintanance	Adjust Process/ Notify Supervisor and QA Recheck; Isolation PR-CAL-01
	Bushing semi-automatic assembly	>Assemby fixture	3									
9	Operator Inspections	Assembly Machine	1	Part Quality			Verify part is assembled correctly and verify correct components	Visual to WO (BOM)	Check 1 per nest	Per hour	Work Order Sign Off F-PRD-00.21-1 Validation Record	Notify Process Tech, QA, and Production Lead/Supervisor Recheck; Isolation PR-CAL-01
			2				Verify part is assembled correctly and verify correct components	Inspection equipment	each part	each part	Work Order Sign Off F-PRD-00.21-1 Validation Record	Notify Process Tech, QA, and Production Lead/Supervisor Recheck; Isolation PR-CAL-01
		Packaging Materials	2	Correct bag / Box / Tote and Labels			Verify packaging materials and label match the work order (WO number, part number, quantity, etc)	Visual to WO (BOM)	2 checks	Per shift	Work Order Sign Off F-PRD-00.21-1 Validation Record	Notify Process Tech, Production Lead/Supervisor, and QA (if applicable) Recheck; Isolation PR-CAL-01
		Scale	3	Box Quanity			Verify bag / box / tote quanity is correct per the Label	Scale Verification and / or Hand Count	2 checks	Per shift	AV-PRD-01 F-PRD-00.21-1 Validation Record	Adjust Process and notify QA and Production Lead/Supervisor Recheck; Isolation PR-CAL-01
10	Packaging	Scale	1		Scale set up		Set the scale count for packaging.	Scale Verification	Each set up / 2 times per shift	Each set up / 2 times per shift	AV-PRD-01, AV-PRD-07 F-PRD-00.21-1 Validation Record	Notify QA and Production Lead/Supervisor Recheck; Isolation per PR-CAL-01
		Scale / Skid	2		Package and skid product.		Package product to quantities per the work order. Load skid correctly.	Scale to match standard pack. Skid must have heat treatment stamp.	Each container / Skid	Each container / Skid	Per each product Work Instruction.	Notify QA and Production Lead/Supervisor Recheck; Isolation per PR-CAL-01

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Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for	CHARACTERISTICS			Special Char. Class	METHODS				Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/	Evaluation/ Measurement	SIZE		Control Method	
									Size	Freq		
11	Final Inspection	Assembly machine	1	Assembled part quality			Check for visual defects (flash, shorts, mismatch, color, etc.). Check assembled part correctly.	Visual to print / work instructions / visual aids	1 box (according to sample size table)	per skid	WI-CAL-00.2 Quality Inspections Final Inspection F-CAL.00.2-1	Recheck; Isolation per PR-CAL-01
		Packaging Materials	2	Correct Box or Tote			Correct packaging materials per the work order	Visual to WO	1 check	Per shift	WI-CAL-00.2 Quality Inspections Final Inspection F-CAL.00.2-1	Recheck; Isolation PR-CAL-01
		Scale / count	3	Box Quanity			Bag / Box / Tote quanity is correct per the Label.	Scale Verification and / or Hand Count (Use different scale)	1 check	per skid	WI-CAL-00.2 Quality Inspections Final Inspection F-CAL.00.2-1	Recheck; Isolation PR-CAL-01
		Labeles	4	Box or tote Label			Per Work Order Check for Correct Label & Placement; if Required	Visual match against WO	All boxes	per skid	WI-CAL-00.2 Quality Inspections Final Inspection F-CAL.00.2-1 AV-PRD-03	Recheck; Isolation PR-CAL-01
12	Finished Goods Storage		1		FG are moved to storage until shipment.		All skids are identified and at least one box per skid has the green Acceptance label	Visual	Each skid	Each skid	MRP System	Adjust process; Isolation PR-CAL-01 (when applicable)
13	Shipping		1		Move Parts to Shipping Dock, Ship Product to Warehouse		Per ERP System, Per Shipping Requirements	Visual	Each Skid	Each Shipment	MRP System; Shipping Manifest	Notify Supervisor
			2		Ship product to customer		Per Customer Requirements	Visual	Each skid	Each shipment	MRP System; Shipping Manifest	Notify Supervisor
14	Annual Validation (If Required)		1		Validation of Product		Re-Validation of Product to Customer Requirements	PPAP	Full dimensional plus capability	At Annual Validation	Gauge Pack; SQC Pack	Control of Non-Conforming Product PR-CAL-01
			2	Dimensional			Perform dimensional inspection per the print.	Calibrated gages/Per the dimensional study	1 shot	At Annual Validation	Gauge Pack and Dimensional Study	Notify Production, Engineering, Tooling (as required); Isolation PR-CAL.01
			3	Dimensional Capability (If required)			Verify dimension meets Cpk requirements	Calibrated gages/Per SPC Software	1 shot or 100pcs minimum	At Annual Validation	Gauge Pack; SQC Pack	Notify Production, Engineering, Tooling (as required); Isolation PR-CAL.01

HellermannTyton

Potential Failure Mode and Effects Analysis (Process FMEA)

FMEA Number: **FMEA-CAL-00.0-13**	Responsible Organization/Plant: **HellermannTyton MTY**	Organization Code: **NA**	Date (Orig.): **23-Apr-17**	Date & Revision: **See footer**
Part Number/Latest Change Level: **Assemblies (Family of Products)**	Core Team: **Quality Eng; Quality Mgr; Maint Mgr; Materials Mgr; Production Mgr; Industrial Eng.**		Customer Part Number/Model Year(s)/Program(s): **NA**	
Part Name/Description: **Assemblies (Family of Products)**	Organization/Plant Approval/Date: **NA**		Customer Engineering Approval/Date (If Required): **NA**	
Key Contact/Phone: **Quality Assurance / (81) 2353-5642**	Other Approval/Date (If Required): **NA**		Customer Quality Approval/Date (If Required): **NA**	

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Current Process: Severity	Class	Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection	SOD	Recommended Action	Responsibility & Target Completion Date	Action Results: Actions Taken Completion Date	Severity	Occurrence	Detection	SOD
1 Receiving	Receipt raw materials	Incorrect quantities received	Delay in manufacturing	2		Supplier shipped wrong quantities	2	D - Incoming receiving.	8	32	None						
						Wrong quantities entered to MRP	2	P - Work instruction; D - MRP system; Cycle counts	8	32	None						
		Damaged materials received (resin, bags, boxes, etc)	Delay/ Stop in manufacturing.	5		Supplier issue / Shipping/ Carrier damage	2	D - Incoming Receiving, Incoming Inspection	8	80	None						
		Material is incorrectly labeled	Delay in manufacturing	7		Supplier shipped with incorrect or missing label	2	D - Incoming receiving, Incoming inspection	7	98	None						
						Material is labeled with wrong date code	2	P - Date code calendar; work instruction	7	98	None						
2 Incoming Inspection	Stock of usable materials	Material characteristics and/or colorant does not meet specifications (if required)	Cannot manufacture good product	7		Supplier issues	2	P - Material certifications prior to arrival; Supplier PPAP D - Incoming Inspection	7	98	None						
		Incorrect Material Certification	Delay in Manufacturing	5		Supplier issue	2	D - Incoming Inspection P - Certs send by e-mail prior to Arrival	8	80	None						
3 Material Storage	Move and store usable materials	MRP and rack location for material do not match	Delay in shipment.	4		Typing error during the information capture.	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
						Material placed on wrong side when is storage.	1	P - Work instruction; D - MRP system; Cycle counts	8	32	None						
		Materials not properly stored	Damage to finished goods/ Delay in shipment	4		Poor packaging conditions	3	P - Work instruction; D - MRP system; Cycle counts	8	96	None						
						Packing damage during the material handling	1	P - Work instruction; D - MRP system; Cycle counts	8	32	None						
4 Materials set up		Incorrect packaging materials (bags, boxes, totes, labels, etc)	Delay in manufacturing.	4		Material handler chooses wrong packaging materials for the work order	2	P - Work instruction; work order; material ID and labels D - Work order sign off, Start up check list, Certification process sheet.	8	64	None						
		Incorrect component	Delay in manufacturing	4		Material handler chooses wrong packaging materials for the work order	2	P - Work instruction; work order; material ID and labels D - Work order sign off, Start up check list, Certification process sheet.	8	64	None						

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Current Process				SOD	Recommended Action	Responsibility & Target Completion Date	Action Results				
						Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection				Actions Taken Completion Date	Severity	Occurrence	Detection	SOD
5 Assembly Machine Set up	The assembly machine is prepared to perform the assembly	Incorrect assembly materials (pins, bushings, etc.) or packaging materials (bags, boxes, totes, labels, etc).	Customer dissatisfaction	4		Material handler chooses wrong packaging materials for the work order	2	P - Work instruction; work order; material ID and labels D - Work order sign off	8	64	None						
6 Line clearance and preparation for start up	Assure no mixing of materials and prepare for start of production	Components or parts mixing	Delay on the production run, build incorrect products.	5		Material from previous run not were returned prior to start the new production run.	2	P - Start up work instruction, WO start up record D - Start up check list, Certification process sheet.	7	70	None						
		Wrong materials vs the WO.	Delay on the production run, build incorrect products.	5		Material pulled from wrong location on the warehouse.	2	P - Start up work instruction, WO start up record D - Start up check list, Certification process sheet.	7	70	None						
		Start up scrap is packaged	Customer complaints, Supplier Scorecard affected.	4		Product packaged from reject parts.	4	P - Visual aids D - Process inspections; final inspections, certification process sheet Non conforming product procedue.	5	80	None						
7 First Piece Approval	Manufacturing a conforming part per specifications	Assembly issues with the matting part.	Delay in manufacturing, Produced parts scrapped.	5		Delay/ Release 1st pc not performed according to specifications.	2	P -Inspections work instruction, quality visual aid. D - Certification process sheet, final inspections.	8	80	None						
				5		First piece release lables not properly filled.	2	P -Inspections work instruction, quality visual aid. D - Certification process sheet, final inspections.	8	80	None						
				5		Testing/inspection performed incorrectly/Discrepancy not reported	2	P -Inspections work instruction, quality visual aid. D - Certification process sheet, final inspections.	8	80	None						
8 Perform Assembly of the Component to the part	Components are assembled (pins, bushings, clips, etc.)	Manual assembly Incorrect assembly component in part	Customer dissatisfaction, unable to assembly	6		Components in work bench from last run	2	P - Work Instruction, Work order D - Process and final inspections; Work Instruction.	8	96	None						
		Manual assembly Incorrect/ incomplet assembly	Unable to use by customer	6		Assembled in wrong side/ position	2	P - Work Instruction D - Process and final inspections; Work Instruction.	8	96	None						
						Material componentes in bad conditions	2	P - Incoming inspection D - Process and final inspections	8	96	None						
		Semi-automatic assembly Incorrect assembly component in part	Customer dissatisfaction, unable to assembly	6		Wrong components feed to the fixture	3	P - Work Instruction, Work order D - Process and final inspections; Work Instruction.	8	144	- Visual aids for metal-plastic assemblies	- F. Martinez 19/07/21	30/07/2021	6	3	5	90
						Materials - component missing	2	P - Operator inspections, Work Instruction.Incoming Control plan updated with pictures. D - Process and final inspections; Work Instruction.	8	96	None						
		Semi-automatic assemby Assembly defective component	Unable to use by customer	6		Clip-component is damaged or defective	2	P - Incoming control/ Operator inspections, Work Instruction. D - Process and final inspections; Work Instruction and assembly machine alerts (if apply)	7	84	None						
						Wrong assembly fixture used in process	2	P - Operator inspections, Work Instruction. D - Process and final inspections; Work Instruction.	8	96	- Add fixture verification in start up check list	- F. Martinez 22/07/21 '- P. Vera 22/07/21	30/07/2021	6	2	5	60

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Current Process				SOD	Recommended Action	Responsibility & Target Completion Date	Action Results				
						Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection				Actions Taken Completion Date	Severity	Occurrence	Detection	SOD
						Material componentes in bad conditions	2	P - Incoming inspection D - Process and final inspections	8	96	None						

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Current Process				SOD	Recommended Action	Responsibility & Target Completion Date	Action Results					
						Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection				Actions Taken Completion Date	Severity	Occurrence	Detection	SOD	
		Semi-Manual Assembly Components	Incorrect Assembly	7		Clip-components incorrect position Plastic-Plastic bad assembly lack of components Mounting ribs	4	P - Operator inspections to 100%, Work Instruction. D - Process and final inspections; Work Instruction. D- Inspection equipment upgrade.	2	56	None							
		Automatic assembly Incorrect assembly component in part	Customer dissatisfaction, unable to assembly	6		Wrong components feed to the line	3	P - Work Instruction, Work order D - Process and final inspections; Work Instruction.	3	54	None							
						Materials - component missing	2	P - Operator inspections, Work Instruction.Incoming Control plan updated with pictures. Check fixtures in assembly station. D - Process and final inspections; Work Instruction and Vision Systems.	3	36	None							
		Automatic assembly Assembly defective component	Unable to use by customer	6		Clip-component is damaged or defective	2	P - Incoming control/ Operator inspections, Work Instruction. D - Checking fixtures in assembly line/ Process and final inspections; Work Instruction.	3	36	None							
						Wrong assembly fixture used in process	3	P - Operator inspections, Work Instruction. D - Process and final inspections; Work Instruction.	3	54	None							
		Incorrect assembly		6		Bad segregation of reject parts	4	P. Preventive machine D. Validation format of vision cam	3	72	None							
9 Operator Inspections	Perform checks to ensure product and process quality	Pass non-conforming product	Customer dissatisfaction	6		Delay/failure to conduct inspections	2	P - Work instruction; Validation Record D - Process inspections; final inspections.	8	96	None							
				6		Inspection performed incorrectly / Discrepancy not reported	3	P - Work instruction; Validation Record D - Process inspections; final inspections	5	90	None							
				6		Non-conformances not found in random sampling	2	P - Inspection frequency D - Process inspections; final inspections	7	84	None							
				6		Lack of components Bad assembly	2	P - Inspection frequency D -Detection equipment with presence sensors.	8	96	None							
10 Packaging	Conforming product is packaged according to work order requirements	Start up scrap is packaged	Customer complaints, Supplier Scorecard affected.	3		Product packaged from wrong bin.	2	P - Color bin ID and description added on WI; work instruction D - Color bin ID	7	42	None							
		Mixed parts packaged	Customer complaints, Supplier Scorecard affected.	4		Product from previous work order packaged	3	P - Line clean up before start up D - Process inspections; start up check list, certification proces sheet, final inspections	8	96	None							
		Incorrect quantities are packaged	Customer complaints, Supplier Scorecard affected, Delay/ Stop the customer manufacturing.	3		Improper scale set up	3	P - Operator Work instruction, validation record. D - Work order sign off; certification process sheet; final inspections	8	72	None							

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Current Process				SOD	Recommended Action	Responsibility & Target Completion Date	Action Results				
						Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection				Actions Taken Completion Date	Severity	Occurrence	Detection	SOD
				3		Scale out of calibration	2	P - Operator Work instruction, validation record. D - Certification process sheet; final inspections	8	48	None						
				3		Improper scale used.	3	P - Operator Work instruction, validation record. D - Certification process sheet; final inspections	8	72	None						
		Wrong labels/Missing labels/Bad placement	Customer complaints, Supplier Scorecard affected, Delay/ Stop the customer manufacturing.	3		Inccorrect work order set up in label print system	2	P - Work order sign off, Start up check list. D - Work order sign off; certification process sheet; final inspections	8	48	None						
				3		Labels from previous work order continue active on the work station.	3	P - Work order sign off, Start up check list. D - Work order sign off; certification process sheet; final inspections	8	72	None						
				3		Operator forgets to apply label/puts it in the wrong location	3	P - Work instruction D - Process inspections; final inspections	8	72	None						
		Wrong packaging material used	Customer complaints, Supplier Scorecard affected, Delay/ Stop the customer manufacturing.	3		Operator does not use materials provided by material handler	3	P - Work order sign off : Work instruction D - Process inspections; final inspections	8	72	None						
11 Final Inspection	Perform checks to ensure product and process quality	Inspections not performed according to Inspection instruction.	Pass non-conforming product	5		Delay/failure to conduct inspections	3	P - Work instruction; Final inspection record D - Process inspections; final inspections;	6	90	None						
				5		Delay on the material shipments	3	P - Work instruction; Final inspection record D - Process inspections; final inspections, JDE System.	6	90	None						
				5		Inspection performed incorrectly/Discrepancy not reported	3	P - Work instruction; Validation Record D - Process inspections; final inspections	5	75	None						
				5		Non-conformances not found in random sampling	3	P - Inspection frequency D - Process inspections; final inspections	6	90	None						
12 Finished Goods Storage	Move and store conforming finished goods until shipment	MRP and rack location for material do not match	Delay in shipment.	4		Error during the information capture.	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
						Material placed on wrong side when is storage.	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
		MRP and rack location quantity for material do not match	Delay in shipment.	4		Error during the information capture.	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
		Materials not properly stored	Damage to finished goods/ Delay in shipment	4		Poor packaging conditions	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
						Packing damage during the material handling	2	P - Work instruction; D - MRP system; Cycle counts	8	64	None						
13 Shipping	Ship per customer requirements	Product is not shipped per requirements	Delay/ Stop the customer manufacture			Incorrect product is picked	3	P/D - SO, shipping paperwork	6	54	None						

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Current Process				SOD	Recommended Action	Responsibility & Target Completion Date	Action Results				
						Potential Cause(s) of Failure	Occurrence	Current Process Controls P- Prevention D- Detection	Detection				Actions Taken Completion Date	Severity	Occurrence	Detection	SOD
				3		Wrong quantities are picked	3	P/D - SO; MRP system; ; work instruction; shipping paperwork	6	54	None						
						Wrong or missing identification/paperwork	3	P/D - SO; MRP system; ; work instruction; shipping paperwork	6	54	None						
		Product is shipped late	Delay/ Stop the customer manufacture	3		Stock issues	3	P - Planning; forecast D - MRP system	6	54	None						
						Delay in picking and shipping	3	P - Planning; forecast D - SO; MRP system	6	54	None						
		Damaged product is shipped	Delay/ Stop the customer manufacture	3		Packing damage during the material handling	2	P - Work instruction; D - Cycle counts	8	48	None						
14 Annual dimensional	Perform testing and inspection to ensure product and process quality	Pass non-conforming product	Customer dissatisfaction	6		Inspection performed incorrectly/Discrepancy not reported	2	P - Work instruction; Gage pack D - Gage pack	8	96	None						