HellermannTyton

From: **Quality Assurance HellermannTyton GmbH**

Subject: PPAP Approval signature deadline

Dear customer:

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

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

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

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

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

Your cooperation is greatly appreciated!

Respecting the procedure as described above, the documentation with HellermannTyton PB-No.: **99629** with submission date 23.09.2022 will be considered as complete and valid automatically on **23.10.2022** unless otherwise disposed!

HellermannTyton GmbH internal remarks: PB-No.: **99629**

Part Describtion: T50ROSFTOVALU GPN 110345

Part Submission Warrant

Part Name **T50ROSFTOVALU** Cust. Part Number **EU5T-14E047-VA**

Shown on Drawing No. **11-0345-011-CSU** Org. Part Number **15700153**

Engineering Change Level **08.1** Dated **17.11.2017**

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

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. **15700153** Weight (kg) **0,0022**

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: **925091254**

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 23-Sep-22

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

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

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature Date

Print Name Customer Tracking Number (optional)

Production Part Approval, Dimensional Results

HellermannTyton

Internal PB-No.: **99629**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E047-VA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50ROSFTOVALU**
INSPECTION FACILITY:	**QS-Laboratory**	DESIGN RECORD CHANGE LEVEL:	08.1 17.11.2017
		ENGINEERING CHANGE DOCUMENTS:	
		NAME of LABORATORY:	

ITEM	DIMENSION / SPECIFCATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)			OK	NOT OK
					mean	**min**	**max**		
1	**219**	**± 6**			**220**	**220**	**221**	☑	☐
2	**17,6**	**± 1,0**			**17,61**	**17,62**	**17,77**	☑	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐

Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	**TITLE**	**DATE**
i.A. N. Lohse	Quality Assistant	23-Sep-22

Production Part Approval, Performance Test Results

HellermannTyton

Internal PB-No.: **99629**

Production Part Approval
Performance Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E047-VA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50ROSFTOVALU**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	08.1 17.11.2017
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.			

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA) / TEST CONDITIONS	OK	NOT OK
						☐	☐
3	**Serrated side**				**Is serrated side**	☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	TITLE	DATE
i.A. N. Lohse	Quality Assistant	23-Sep-22

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **99629**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E047-VA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50ROSFTOVALU**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	08.1 17.11.2017
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.		NAME of LABORATORY:	

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)	OK	NOT OK
						☐	☐
4	**Material: PA66HIRHS**				**Material is PA66HIRHS**	☑	☐
	Colour: grey				**Colour is grey**	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	**TITLE**	**DATE**
i.A. N. Lohse	Quality Assistant	23-Sep-22

HellermannTyton

Current Material Certificate

ASCEND PERFORMANCE MATERIALS

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

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

Certificate Date : 22-Sep-21
Delivery No : 382583901
Shipped Qty : 46,520.000 Lbs
21,101.472 Kgs
Customer P.O. No: 146597-46
Container : SLAY 5330

Certificate of Analysis

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

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

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

This product meets the requirements of the following specifications: SAE J1639, SAE J1639 PA0171, ASTM D6779-PA0161-Z1Z2, ASTM 4066 PA0161, FMVSS 302, MS-DB-41 CPN 2056, ESB-M4D178-A2, WSS-M99P23-C1/C2, WSS-M99P9999-A1, WSS-M4D706B1, WSS-M99P1111-A, WSK-M4D706-A, GMW16447P-PA66-T2, GMW16558P-PA66-T1, GMP.PA66.015, Ford WQ 100B.

Material: VYDYNE 47H NT Q527 **Material No:** 10404322 **Batch No:** JI20FY05 **Date of Mfg:** 20-Sep-2021

Ascend Performance Materials Operations LLC Specification

Lot Data Property	Test Method	Min	Max	Result	Units
Density	ISO 1183	1.09	1.11	1.11	g/cm^3
DTUL, 1.82 MPA	ISO 75 1-2	53.0		66.0	C
Flex Modulus	ISO 178	1900		2517	MPa
Moisture	ASTM D6869	0.05	0.20	0.11	%
Notched Izod	ISO 180 / 1A	12.0		14.5	kJ/m^2
Strength @ Yld	ISO 527 1-2	60		67	MPa

1/1

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PFMEA)

PFMEA Number: **MFMEA-1**

Part Number / Name: Cable Ties - Various Materials
Process Responsibility: HellermannTyton
Prepared by: Quality Assurance
Model Year(s) / Vehicle(s): NA
Key Date: 3/11/1994
PFMEA Date Org: 3/11/1994
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
1-2 Material Ratio Central Material Handling System Operation	Acceptable material for production	Unacceptable Moisture Levels	Part Non-Compliance	5		Dryer malfunction	2	D - Dryer Alarms D - Moisture Testing P - Filter Cleaning P - Moisture Testing	2	20	None						0
		Contamination	Part Non-Compliance	5		Foreign Matter in Material	2	D - Visual Inspections P - Material Handling Work Instruction w/ color-coded containers	6	60	None						0
			Part Non-Compliance	5		Unlike Materials Mixed Together	2	D - Visual Inspections P - Material Handling Work Instruction	5	50	None						0
		Incorrect Material	Part Non-Compliance	6		Wrong material hook-up at press	2	D/P - Visual to Work Order	5	60	None						0
3 Molding Machine/ Automation Set-up	Instructions for production	Work Order Set Up Incorrectly	Delay in Manufacturing	4		Work Order read incorrectly	2	D/P - Work Order D - Set-up Verification P-Computers at workstations	5	40	None						0
		Incorrect Blending	Part Non-Compliance / Breakage and Color Match Failures	5		Material blender set incorrectly	2	D/P - Visual to Work Order D- Quality Tree	7	70	None						0
		Excess Plastic on Ties	Part Non-Compliance	5		Hot Excess Runner	2	D - Visual Inspections, Quality Tree P - Process Inspections	7	70	None						0
				5		Improper start-up	1	D - Visual Inspection, Quality Tree D - LPA at startup P - Final Inspections	5	25	None						0
		Soft Insertions	Part Non-Compliance	5		Thermolator Malfunction	1	D - Visual Inspections D-Audible alarms added to all Thermolator to detect temp. dev. D - Process Inspections P - First Piece Approvals	3	15	None						0
				5		Incorrect Tonnage	2	D- Visual Inspections D- Hand Insertions P - First Piece Approvals P - In Process PM's	5	50	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Start-up/Cycle Interruptions	4	D- Visual Inspections D - Process Inspections D- Hand Insertions	4	80	None						0
				5		Fast Cycle Time	2	D - Visual Inspection, Quality Tree D - Process Inspections D - Hand Insertions P - First Piece Approvals	5	50	None						0
				6		Leader Pin/Sidelock Wear	2	D - Visual Inspections, Quality Tree D - Process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	5	60	None						0
		Plugged Sprue Tips / Gates (Hot Manifold/Valve-Gated Molds)	Part Non-Compliance / Unbalanced Fill	3		Material Contamination	2	D- Visual Inspections, Quality Tree D - Process Inspections P - Magnets in Hopper and Melt Filters on Nozzle	5	30	None						0
		Start up scrap packaged	Customer Dissatisfaction	3		Automation equipment started too early after start up of process re-start.	4	P - Visual Inspection P - Work Instructions P - Automation disable switch during changeover D - Final Inspection D - Process Inspection	5	60	None						0
4 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	3		Insufficient Hold Pressure	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	36	None						0
				3		Cycle Time Too Fast	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	36	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	6	60	None						0
		Burnt tips	Part Non-Compliance / Cosmetic Issues / Short	3		Plugged/Worn Vents	3	D- Visual Inspections, Quality Tree P - First Piece Approvals P - In process PM's using Ice Blasting	6	54	None						0
		Sticking in mold	Part Non-Compliance / Mold Damage	5		Excessive Mold Temperatures	2	D- Visual Inspections P - First Piece Approvals D - Audible alarms added to all Thermolator to detect temp. dev.	5	50	None						0
				5		Excessive Hold Pressure	2	D- Visual Inspections, Quality Tree P - First Piece Approvals	6	60	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Residue Build-Up	2	D- Visual Inspections, Quality Tree P - First Piece Approvals D - Audible alarms added to all Thermolator to detect temp. dev.	5	50	None						0
				5		Water hooked up incorrectly	2	D-Visual Inspection	6	60	None						0
				3		Packaging interruptions Degator Jams	3	D- Visual Inspections P - First Piece Approvals	8	72	None						0
				5		Heater band malfunctions	2	D- Visual Inspection D - Process Inspection P - PM	5	50	None						0
		Excess Plastic on Ties	Part Non-Compliance	5		Hot Excess Runner	2	D - Visual Inspections, Quality Tree P - Process Inspections	7	70	None						0
		Blocked / Misformed Head	Part Non-Compliance	5		Broken Insert/Ejector Blade	2	D - Visual Inspection, Quality Tree P - Final Inspection	7	70	None						0
		Cut Head	Part Non-Compliance	5		Automation Malfunction	2	D - Visual Inspection P - Final Inspection D - Alarms allowing Operators to scrap parts after cups are emptied	7	80	None						0
		Missing or Extended Pawl	Part Non-Compliance	5		Thermolator Malfunction	1	D - Visual Inspections D - Process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolator to detect temp. dev.	3	15	None						0
				5		Restart(Mold Cleaning)	1	D/P- Visual Inspections D/P - Hand Insertion	5	25	None						0
				5		Improper start-up	1	D - Visual Inspection, Quality Tree D - LPA at startup P - Final Inspections	5	25	None						0
				5		Cycle Time Too Fast	1	D - Visual Inspections, Quality Tree P - Final Inspections	6	30	None						0
				5		Worn inserts	1	D - Visual Inspections P - Final Inspections P - PM Schedule	6	30	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
		Soft Insertions	Part Non-Compliance	5		Thermolator Malfunction	1	D - Visual Inspections D - Process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolator to detect temp. dev.	3	15	None						0
				5		Cycle Time Too Fast	1	D - First Piece D - Visual Inspection, Quality Tree P - Process Inspections	6	30	None						0
		Shorts	Part Non-Compliance / Cosmetic	3		Insufficient Injection Pressure compatibility of Press / mold	3	D- Visual Inspections, GO/NOGO Gages P - First Piece Approvals P - In process PM's	5	45	None						0
				3		Plugged/Worn Vents	3	D- Visual Inspections, GO/NOGO Gages P - First Piece Approvals P - In process PM's	5	45	None						0
				3		Residue Build-Up	2	D- Visual Inspections, GO/NOGO Gages P - First Piece Approvals P - In process PM's using Ice Blasting for mold cleaning	5	30	None						0
				3		Lot / Moisture Variations	2	D- Visual Inspections D - First Piece Approvals P - Material Certs P - Moisture Analysis	5	30	None						0
				3		Process Interruption	2	D- Visual Inspections, GO/NOGO Gages D - First Piece Approvals P - Material Certs P - Moisture Analysis	5	30	None						0
		Flash	Part Non-Compliance / Insertion Failures / Cosmetic	5		Excessive Injection Pressure	3	D- Visual Inspections, Quality Tree, GO/NOGO Gages 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	4	D- Visual Inspections D - Process Inspections D- Hand Insertions	4	80	None						0
				5		Start-up/Cycle Interruptions	3	D- Visual Inspections D - Process Inspections D- Hand Insertions	4	60	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				5		Clamp pressure on press	3	D- Visual Inspections D - Process Inspections D- Hand Insertions	4	60	None						0
				5		Worn inserts	4	D- Visual Inspections D - Tool Tests D - Process Inspections D- Hand Insertions	3	60	None						0
				5		Broken Insert/Ejector Blade	3	D- Visual Inspections, Quality Tree D - Process Inspections D- Hand Insertions	5	75	None						0
		Breakage	Part Non-Compliance	5		Thermolator Malfunction	1	D - Visual Inspections D - Process Inspections P - First Piece Approvals D - Hand Insertion D - Audible alarms added to all Thermolator to detect temp. dev.	3	15	None						0
				6		Barrel Heat Malfunction	4	D - Visual Inspections D - Process Inspections D - Parameter/Heat Checks D - Hand Insertions P - First Piece Approvals P - SPC Setup to Trigger Faults	3	72	None						0
		Slippage	Part Non-Compliance / Strap Engagement Failure	5		Worn inserts	1	D - Visual Inspection, Quality Tree D - Process Inspections D - Hand Insertions	6	30	None						0
				5		Fast Cycle Time	1	D - Visual Inspection, Quality Tree D - Process Inspections D - Hand Insertions P - First Piece Approvals	6	30	None						0
				5		Dirty Inserts	1	D - Visual Inspections, Quality Tree D - Process Inspections D - Hand Insertions D - Parameter/Heat Checks P - First Piece Approvals P - In Process PM	6	30	None						0
				5		High oil temperature on press due to insufficient water to cool	3	D - Visual Inspections, Quality Tree D - Process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	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
		Mold Mismatch	Part Non-Compliance/High Insertion Force	6		Poor Mold Alignment	2	D - Visual Inspections, Quality Tree D - Process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	5	60	None						0
				6		Leader Pin/Sidelock Wear	1	D - Visual Inspections, Quality Tree D - Process Inspections, Tech now conduct inspections, doing cleaning schedule D - Hand Insertions P - First Piece Approvals P - In Process PM	6	36	None						0
		Deep ejector pins	Part Non-Compliance/High Insertion Force	3		Excessive Hold Pressure	3	D - Visual Inspections D - Process Inspections	6	54	None						0
				3		Thermolator Malfunction	2	D - Visual Inspections D - Process Inspections D - Hand Insertions P - First Piece Approvals P - In Process PM	3	18	None						0
				3		Fast Cycle Time	2	D - Visual Inspections, Quality Tree D - 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 - Process Inspections P - Magnets in Hopper and Melt Filters on Nozzle	8	48	None						0
				3		Mold Heater Malfunction	2	D- Visual Inspections D - Process Inspections	8	48	None						0
				3		Valve Gate Malfunction	2	D- Visual Inspections D - Process Inspections	8	48	None						0
		Elongated Sprues	Part Non-Compliance / Cut Heads and Missing Pawls	6		Inadequate Cooling	2	D- Visual Inspections D - Process Inspections	7	84	None						0
		Start up scrap packaged	Customer Dissatisfaction	3		Automation equipment started too early after start up of process re-start.	3	P - Visual Inspection, Quality Tree P - Work Instructions, Training Manual P - Automation disable switch during changeover D - Final Inspection D - Process Inspection	5	45	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
5 First Piece Approval	Product Conforms per specifications before production	First Piece Not Hung	Delay in Manufacturing	6		Failure to hang First Piece	1	D/P - Tool Evaluation Sheet	8	48	None						0
6 Validation Testing	Validation and Documentation of New Tooling	Validation is Not Completed	Part Non-Compliance	6		Validation Testing Forgotten	1	D/P - New Tool Evaluation Sheet	8	48	None						0
7 Work order setup	Work order	Work order not sign off	Word order has in corrective BOM	8		Incorrect setup BOM in (JDE)	6	D-Cell lead checklist P- IE Setup BOM (IMLS)	2	96	None						0
			Incorrect BOM used	8		Wrong label on material	2	P-Work instruction D-Flag system	2	32	None						0
				8		Operator Error	3	P-Work instruction D-Flag system	2	48	None						0
8 In Process Checks	Control Plan	Checks not completed	Nonconformance products ship to customer	3		Process issues/Operator error	3	D-Operator hourly check D-Quality check 2 times in 24 hours D-Process Tech check every other hour. P-SharePoint/Shift Log P-Work instruction /Process sheet	2	18	None						0
9-10 Packaging - Automation and Inspection	Package product per customers specifications	Incorrect or Missing Date Code on the Bag	Traceability Loss	3		Printer Malfunction	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar	5	45	None						0
				3		Wrong/no date code on packaging - Operator Error	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar P - Work Instructions	7	63	None						0
		Degator Jams	Part Non-Compliance	5		Parts Not Aligned/cut heads	4	D - Visual Inspection p - Degator Guides P - Machine Alarms	4	80	None						0
			Loss Production	5		Dull Cutter Blades	2	D - Visual Inspection D - Process Inspection P - PM P - Warped Sprue Detection	6	60	None						0
				5		Cylinder Failure	2	D - Visual Inspection D - Process Inspection P - PM	3	30	None						0
		Incorrect Degator alignment	Cut Heads	5		Improper Set-up	2	D- Visual Inspection D - Process Inspection P - Degator Guides	5	50	None						0
						Manual Degator Jams	4	D- Visual Inspection D - Process Inspection P - PM	4	80	None						0
						Automated Degator Jams	3	D- Visual Inspection D - Process Inspection P - PM P- Degater Alarm	4	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
						Improper part feed	2	D- Visual Inspection D - Process Inspection P - PM P- Degater Guides w/ Alarms	3	30	None						0
						Part missing from lead in edge of runner	2	D- Visual Inspection D - Process Inspection P - PM P- Degater Alarm	5	50	None						0
		Greasy Parts Packaged	Part Non-Compliance	4		Robot Drags the Parts Across the Leader Pins	1	D - Visual Inspection D - Process Inspection P - PM	7	28	None						0
		Incorrect Moisture in Bags	Part Non-Compliance / Parts Conditioned Incorrectly	3		Water Dosing system failure	2	D - Monitoring Water D - Final Inspection P - Preventative Maintenance P - dosing system monitors flow	5	30	None						0
				3		Water Supply Not On	2	D - Monitoring Water D - Final Inspection	2	12	None						0
				3		Dirty or Clogged Filter	2	D - Monitoring Water D - Final Inspection P - Preventative Maintenance P - dosing system monitors flow	2	12	None						0
				3		Improper Timer Setting	3	D - Monitoring Water P-dosing system monitors flow	5	45	None						0
				3		Bad Bag Seals leak water	2	D - Visual Inspection D - Monitoring Water D - Final Inspection P - Preventative Maintenance	6	36	None						0
		Mis-labeling	Customer Dissatisfaction	3		Printer Ribbon not Inserted Properly	2	D - Visual Inspections D - Final Inspections P-Work order sign-off	7	42	None						0
				3		Wrong Labels Placed on Product	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0
				3		Wrong Pre-labeled Bag for Product	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0
				3		Excess Labels not Removed From Production Area	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
				3		Wrong label provided	3	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	63	None						0
		Insufficient Bag Seals	Part Non-Compliance	3		Sealer Tape Worn	4	D - Visual Inspection D - Final Inspection P - Electronic Shift Log	6	72	None						0
				3		Bag Wrinkled/Bag Mil Thickness Inconsistencies	4	D - Visual Inspection D - Final Inspection	7	84	None						0
				3		Sealer Malfunctions	2	D - Visual Inspection D - Final Inspection	7	42	None						0
				3		Material stuck on sealer	4	D - Visual Inspection D - Final Inspection 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 D - Final Inspection	7	63	None						0
				3		Insufficient Packaging Supplies	4	D - Visual Inspection D - Final Inspection	7	84	None						0
		Incorrect Quantity in Bag	Customer Dissatisfaction	4		Robot grippers failed to place parts	3	D - Visual Inspection P - Final Inspection	7	84	None						0
				4		Pick and Place Grippers Drop Parts	3	D - Visual Inspection P - Final Inspection	7	84	None						0
				4		Degator Jams	3	D - Visual Inspection P - Final Inspection	5	60	None						0
				4		Inconsistent Bag Width	3	P/D - Visual Inspection	7	84	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	8	64	None						0
		Parts mixed	Customer Dissatisfaction	4		Operator mixed product from previous work order	2	D - Visual Inspection D - Final Inspection	6	48	None						0

Item & Function	Requirement	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occurrence	Current Design Controls -Prevention -Detection	Detection	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	RPN
9A-10 Packaging - Manual and Inspection	Package product per customers specifications	Incorrect or Missing work order number on Bag	Traceability Loss	3		Printer Malfunction	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar	5	45	None						0
				3		Operator error	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar	5	45							
		Incorrect or Missing Date Code on the Box	Traceability Loss	3		Operator error	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar P - Work Instructions P-SharePoint/Shift Log	3	27	None						0
		Incorrect Moisture in Bags	Part Non-Compliance / Parts Conditioned Incorrectly	3		Operator error	2	D - Monitoring Water D - Final Inspection P - Preventative Maintenance P - dosing system monitors flow	3	18	None						0
				3		Water Dosing system failure	2	D - Monitoring Water D - Final Inspection P - Preventative Maintenance P - dosing system monitors flow	5	30	None						0
				3		Water Supply Not On	2	D - Monitoring Water D - Final Inspection	2	12	None						0
				3		Dirty or Clogged Filter	2	D - Monitoring Water D - Final Inspection P - Preventative Maintenance P - dosing system monitors flow	2	12	None						0
				3		Improper Timer Setting	3	D - Monitoring Water P-dosing system monitors flow	5	45	None						0
				3		Bad Bag Seals leak water	2	D - Visual Inspection D - Monitoring Water D - Final Inspection P - Preventative Maintenance	6	36	None						

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
		Mis-labeling	Customer Dissatisfaction	3		Wrong Labels Placed on Product	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0
				3		Wrong Pre-labeled Bag for Product	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0
				3		Excess Labels not Removed From Production Area	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	84	None						0
				3		Wrong label provided	3	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	7	63	None						0
		Insufficient Bag Seals	Part Non-Compliance	3		Sealer Tape Worn	4	D - Visual Inspection D - Final Inspection P - Electronic Shift Log	6	72	None						0
				3		Bag Wrinkled/Bag Mil Thickness Inconsistencies	4	D - Visual Inspection D - Final Inspection	7	84	None						0
				3		Sealer Malfunctions	2	D - Visual Inspection D - Final Inspection	7	42	None						0
				3		Material stuck on sealer	4	D - Visual Inspection D - Final Inspection P - Incoming Inspection	7	84	None						0
				3		Improperly Adjusted Timer	4	P - Work Instruction D - Visual Inspection	7	84	None						0
		Incorrect Quantity in Bag	Customer Dissatisfaction	4		Scale issue	3	P - Work Instruction D - Visual verification D-SharePoint/Shift Log P-Calibration	2	24	None						0
				4		Operator error	3	P - Work Instruction D - Visual verification D-SharePoint/Shift Log	5	60	None						0
		Incorrect Quantity in Box	Customer Dissatisfaction	4		Improper Scale Set Up	3	D - Visual Inspection D - Final Inspection P - Bag Counter (T18R-C)	5	60	None						0
				4		Scale Out of Calibration	1	D - Visual Inspection D - Final Inspection P - Calibration Schedule	5	20	None						0
		Parts mixed	Customer Dissatisfaction	4		Operator mixed product	2	D - Visual Inspection D - Final Inspection	6	48	None						0
11 Final and Live Inspection	Product conforms per specifications after production run.	Bad Product Shipped	Customer Dissatisfaction	8		Inspection Not Performed by QA	1	D/P - Final and Live Inspection	1	8	None						0
				7		Bad Product not Found in Random Sampling	2	D /P- Final and Live Inspection	7	98	None						0
		Water Verification Incomplete	Part Non-Compliance	6		Water not Verified During Process Inspection	1	D/P - Shift Log or Share Point. P- Final and Live Inspection	1	42	None						

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
12-13 QA Testing	Validation and documentation of product per specifications	Daily Testing Incomplete	Part Non-Compliance	6		Testing Not Performed by QA	1	D/P - Weekly Matrix, First Piece Acceptance. P- Daily Production Meeting	3	18	None						0
		Weekly Testing Incomplete	Part Non-Compliance	6		Testing Not Performed by QA	1	D/P - Weekly Matrix P- Daily Production Meeting	3	18	None						0
				5		Damaged Shipment	2	D - Visual Inspection D - Final Inspection	8	80	None						0
				5		Customer Specific Requirements Not Met	2	D - Visual Inspection P - Final Inspection	8	80	None						0
14 Material Movement	Move products from Injection Molding work station to FG	Good product put in Hold	Delay shipment to customer	5		Incorrect cone put on product at Molding Work Station	2	D - Visual Inspection P -Hold ticket attached P-Work instruction	3	30	None						0
		Bad Product Shipped	Customer Dissatisfaction	8	PTC	Incorrect cone put on product at Molding Work Station	1	D - Visual Inspection P -Hold ticket attached P-Work instruction	9	72							0
15 Annual Validation (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	2	20	None						0

PTC = Pass Through Characteristic

FORD PN
BU5T-14E047-DA - Cable Tie Portion (156-00303)
DU5T-14G317-MA - Wide Strap (111-12300)
W703646-S2300 - Cable Tie (T50R0HSM4)

PROCESS FLOW DIAGRAM

Part Description: Cable Tie
HT Dwg.# and Rev: Various
Customer P/N and Rev: Various
Customer Name: Various

Program Name: Cable Ties
Created By: Gwendolyn Benz
Creation Date: 03/11/94

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Process Name/ Operation Description	Product/Process Characteristics	Control Methods
1		◆			Material Movement	Move Materials to material handling system and Verify Correct Material Moisture Check on Silo Materials	Material Process Log F-PRD-8.1-4 and Moisture Log F-QA-10.3-9
2	■				Material Ratio	Verify Correct Material	Material Process Log F-PRD-8.1-4
3	■				Molding Machine/Automation Set Up	Verify Mold Machine is Set Up	Per Set-Up Instructions F-PRD-9.6-1
4				☒	First Piece Approval QA Completes (Injection Molding)	Short Shots, Any Flash, Color, and Hand Insertions	First Piece Acceptance F-QA-10.3-5
5	■				First Piece Approval	Hang First Piece	Visual At Press
6				☒	Validation Testing	Validate Parts	Measurements - Refer to Control Plan
7	■				Work order set-up LPA	Validate work order to materials, labels, etc. LPA-Random Audit	Visual, Signed Set-up Stamp on Work Order F-PRD-9
8				☒	In Process Checks (Injection Molding)	Short Shots, Any Flash, Color, and Hand Insertions	Per Control Plan
9	■				Packaging - Automation and Inspection	Verify Seals, Water, Date Code, Labels, Hole Punch, Box Quantity	Inspection Stamp/Label (Initialed and Dated) on Box / Share Point / Shift Log F-PRD-1.1 / Placard
9A	■				Packaging - Manual and Inspection	Verify Seals, Water, Date Code, Labels, Hole Punch, Box Quantity	
10				☒	Visual Appearance	Check Ties for Visual Defects	Per Control Plan
11				☒	Final and Live Inspection	Quality Approval of Final Product	F-QA-10.4-21/ Share Point
12				☒	QA Testing	Verify Daily Testing Has Been Completed	Per Control Plan
13				☒	QA Testing	Verify Weekly Testing Has Been Completed	Per Control Plan
14		◆			Material Movement	Move Skid To Shipping Dock	ERP System
15				☒	Annual Validation (If Required)	PPAP Parts on Yearly Basis if Required	PPAP Matrix

HellermannTyton

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan

Control Plan Number: **MCP-1**	Key Contact/Phone: **414.355.1130**	Date (Orig.) **03/11/94**	Date & Revision **See Footer**
Part Number/Latest Change Level: **Cable Ties - Various Materials**	Core Team: **Quality Assurance, Manufacturing, Automation, Receiving-Shipping**	Customer Engineering Approval/Date (If Req'd) **NA**	
Part Name/Description **Cable Ties - Various Materials**	Supplier/Plant Approval/Date **07/28/05**	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	Process Tech / Auto Technician	Operator	QA and/or Team Supervisor	Shipping and/or Receiving

Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS			Special Char. Class	METHODS					Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
									Size	Freq		
1	Material Movement	Material Handling System	1		Move Material to Material Handling System		Correct Material is set up in the Material Handling System per Work Order	Visual	Each Material Change	Each Material Change	Material Process Log F-PRD-8.1-4	Notify Team Supervisor and QA, Isolate Lot per WI-PRD-13.1-3 & PR-QA-13.1-2
			2		Check moistures in Silo Materials		Perform Moistures per TS-WI-MAX400XL	Computrac Max 4000XL	1 Sample/ Material	One /Shift	Raw Material Moisture Content Test Log F-QA-10.3-9	Notify Production Team Supervisor and QA, Adjust Dryers and Re-check. Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
2	Material Ratio	Material Handling System	1		Material Ratio		Set up Per Work Order	Visual machine setting	Each material Change	Each Material 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
			2		Colorant (When Needed)		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
3	Molding Machine / Automation Set-up	Injection Molding Machine	1		Machine Set-Up		Per Mattec, Part specific Process Sheet, and Acceptable Visual Part and Hand Insertion	Review of Set-Up Specs	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
		Thermal Transfer Machine (If Needed)	2		Machine Set-Up		Set up Foil Applicator for Stripes (If Necessary)	Review of Set-Up Specs	Each Set Up	Each Set Up	Work Order	Adjust Process/Recheck, Isolate Product per WI-PRD-13.1-3 & PR-QA-13.1-2
4-5	First Piece Approval Visual	Injection Molding Machine	1	Part Quality			Check For Flash, Shorts, Blocked/cut Heads, Mismatch, Color(If Needed)	Visual	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5 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 Hand Insertion	Injection Molding Machine	2	Insertion Properties of Cable Tie			No Hard Insertions, Slippage or Cracked Inserts Allowed. Breakage Testing According to WI -QA-10.3-2	Hand Insertion Process Inspection Check Per WI-QA-10.3-2	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5 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 Check Diaphragm (dimension to print at first pc if applicable)	Injection Molding Machine	3	Part Quality			Per Drawing	Caliper	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5 and Hung at Press	Retest / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2

Quality Assurance		Material Handler	Process Tech / Auto Technician				Operator			Shipping and/or Receiving
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS		Special Char. Class	METHODS				Reaction Plan
			NO.	PRODUCT	PROCESS	Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
								Size	Freq		
6	Validation Testing	Injection Molding Machine	1	Push In / Push On Force (If Needed)		Per Drawing / SQC Pack	Force Tester or Tensometer	1 Shot	At Initial Validation Testing	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	2	Pull Out/Pull Off Force (If Needed)		Per Drawing / SQC Pack	Force Tester or Tensometer	1 Shot	At Initial Validation Testing	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	3	Dimensional		Perform Dimensional on the Part per Print	Calibrated Gages per Dimensional Study	1 shot	At Initial Validation Testing	Dimensional Study F-QA-10.4-2	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	4	Test for Minimum Wire Bundle		Minimum Wire Bundle Requirements Per Print	Wire Bundle Test	1 Shot	At Initial Validation Testing	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
		Injection Molding Machine	5	Tensile Strength		Tensile Strength of Tie Must Meet Minimum Requirements Per Print	Tensile Tester WI-QA-10.3-14	1 Shot or 100pcs Minimum	At Initial Validation Testing	SPC Software	Control of Non-Conforming Product/PR-QA-13.1-2
7	Work Order Set-Up Team Supervisor or Cell Leader	Packaging Equipment	1	Packaging Requirements		Validate Material and Packaging Requirements per Work Order	Visual	1	Each Work Order	Signed Set-Up Stamp on Work Order	Adjust Process, Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
	Layered Process Audit	Production Process	2		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)
8	In Process Checks Completed Hand Insertion/Visual Process Inspection	Injection Molding Machine	1	Hand Insertions		No Hard Insertions, Slippage or Cracked Inserts Allowed. Breakage Testing According to WI -QA-10.3-2	Hand Insertion Process Inspection Check Per WI-QA-10.3-2	1 Shot	Twice per Shift	Share Point or Shift Log F-PRD-1.1	WI-PRD-13.1-3 Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine	2	Process Set-Up		Work Order Matches MIU / Cavity Count Matches Actual / Cycle Time is to Standard or Adjusted Notes	Visual	Once	Per Shift	Share Point or Shift Log F-PRD-1.1	WI-PRD-13.1-3 Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine	3	Part Quality		Check For Flash, Shorts, Blocked/cut Heads, Mismatch, Color(If Needed)	Visual	1 Shot	4x per Shift and 1 x per each start-up	Share Point or Shift Log F-PRD-1.1	WI-PRD-13.1-3 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	Process Tech / Auto Technician				Operator		QA and/or Team Supervisor		Shipping and/or Receiving
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS			Special Char. Class	METHODS				Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
									Size	Freq		
9-10	Packaging Auto Packaging Operator Process Inspections	Injection Molding Machine	1	Visual Appearance			Check Ties for Visual Defects	Visual	1 Shot	Per Hour	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	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
		Injection Molding Machine	2	Hand Insertions			No Hard Insertions, Slippage or Cracked Inserts Allowed.	Hand Insertion Process Inspection Check per WI-QA-10.3-2	1 Shot	Per Hour for molds under 38 cavities, Every Other Hour for molds over 38 cavities.	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Notify Supervisor, Processing Tech and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Sealer	3	Proper Bag Seal			Bag Must Have a Complete and Un-Wrinkled Seal	Visual and Pull at Seams	1 bag	Twice per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Adjust Process/ Notify Supervisor or QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Waters in Bag	4	Amount of Water Added Per Bag			Per Work Order	Actual value on PLC or manually measure.	1 measurement	2 Times Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Notify Supervisor and Quality Assurance / Adjust Process Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Date Code	5	Date Code Stamp			Bag Must Have Correct Data Code Date Code Calendar S-PRD-8.1-6	Visual	Once	One Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels	6	Bag and Box Labels			Bag and Box Labels Must Match Work Order	Visual	One box One bag	Twice Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	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	7	Hole Punch (Where Applicable)			Hole Punch Must Be Within Header Boundaries and Complete	Visual	Once bag	One Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	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	Process Tech / Auto Technician				Operator		QA and/or Team Supervisor		Shipping and/or Receiving
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS			Special Char. Class	METHODS				Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
									Size	Freq		
9A-10	Packaging Manual Packaging Operator Process Inspections	Injection Molding Machine	1	Visual Appearance			Check Ties for Visual Defects	Visual	1 Shot	Per Hour	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Notify Supervisor, Processing Tech and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Injection Molding Machine	2	Hand Insertions			No Hard Insertions, Slippage or Cracked Inserts Allowed.	Hand Insertion Process Inspection Check per WI-QA-10.3-2	1 Shot	Per Hour for molds under 38 cavities, Every Other Hour for molds over 38 cavities.	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Notify Supervisor, Processing Tech and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Sealer	3	Proper Bag Seal			Bag Must Have a Complete and Un-Wrinkled Seal	Visual and Pull at Seams	1 bag	Twice per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Adjust Process/ Notify Supervisor or QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Water in Bag	4	Amount of Water Added Per Bag			Per Work Order	Manually measure.	1 measurement	2 Times Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Notify Supervisor and Quality Assurance / Adjust Process Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Date Code	5	Date Code Stamp			Operator inspection Sticker Must Have Correct Date Code S-PRD-8.1-6	Visual	Once	Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels	6	Bag and Box Labels			Bag and Box Labels Must Match Work Order	Visual	One box One bag	Twice Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	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	7	Hole Punch (Where Applicable)			Hole Punch Must Be Within Header Boundaries and Complete	Visual	Once	Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	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	8	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	Once	Twice Per Shift	Inspection Label (Initialed and Dated) / Share Point or F-PRD-1.1	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
	Final Inspection at the	Injection Molding					Check For Flash, Shorts, Blocked/cut Heads			Twice per 24	Share Point or Final Inspection	Notify Team Supervisor/Process Tech Adjust Process

HellermannTyton

Quality Assurance		Material Handler	Process Tech / Auto Technician				Operator			Shipping and/or Receiving
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS NO.	CHARACTERISTICS PRODUCT	CHARACTERISTICS PROCESS	Special Char. Class	METHODS Product/Process Specification/ Tolerance	METHODS Evaluation/ Measurement Technique	METHODS SIZE Size	METHODS SIZE Freq	METHODS Control Method	Reaction Plan
11	Final Inspection at the Cell	Injection Molding Machine	1	Part Quality			Blocked/cut Heads, Mismatch, Color(If Needed)	Visual	1 Shot	Twice per 24 hours	Inspection F-QA-10.4-21	Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels	2	Box Label			Per Work Order Check for Correct Label Placement; if Required	Visual match	1 label	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Labels	3	Bag Label			Per Work Order Check for Correct Label Placement; if Required	Visual match	1 label	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Waters in Bag	4	Water Verification			Verify Water is in Bag where required	Visual	1 Bag	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Sealer	5	Proper Bag Seal			Bag Must Have a Complete Seal	Visual and Pull at Seams	1 bag	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Correct Amount of Parts in Box	6	Quantity in Box			Boxes Must Have Specified Amount of Bags per Box	Hand Count	1 Sample	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Packaging	7	Packaging Requirements			Verify per Work Order correct Box	Visual	1 check	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
		Stamp	8	Date Code Stamp / Printer			Date Code Calendar S-PRD-8.1-6	Visual match	1 check	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Notify Team Supervisor/Process Tech Adjust Process Control of Non-Conforming Product per WI-PRD-13.1-3 & PR-QA-13.1-2
12	QA Daily Testing	Injection Molding Machine	1	QA Lab Tech Hand Insertion			No Hard Insertions, Slippage or Cracked Inserts Allowed. Breakage Testing According to WI -QA-10.3-2	Hand Insertion Process Inspection Check Per WI-QA-10.3-2	1 Shot	Daily	Weekly Matrix F-QA-10.3-8	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	2	Part Quality			Check For Flash, Shorts, Blocked/cut Heads, Mismatch, Color(If Needed)	Visual	1 Shot	Daily	Weekly Matrix F-QA-10.3-8	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	3	Part Quality			T18RA and T30RA ran through a tool	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

Quality Assurance		Material Handler	Process Tech / Auto Technician				Operator			Shipping and/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
13	Weekly Testing	Injection Molding Machine	1	Test for Minimum Wire Bundle			Minimum Wire Bundle Requirements Per Print	Wire Bundle Test	1 Shot	Weekly	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	2	Test for Tensile Strength			Tensile Strength of Tie Must Meet Minimum Requirements Per Print	Tensile Tester	1 Shot	Weekly	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	3	Force Testing Push On, Push In, Pull Off, Pull Out (If Required)			Per Print	Tensile Tester / Force Gauge	1pc	Weekly	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
14	Material Movement		1		Move Parts to Shipping Dock		Per ERP System	Visual	Each Skid	Each Skid	ERP System	Notify Supervisor
15	Annual Validation (If Required)		1		Validation of Product		Re-Validation of Product to Customer Requirements	PPAP	Per Customer Requirements	Per Customer Requirements	PPAP Matrix	Control of Non-Conforming Product per PR-QA-13.1-2

Parts Include:

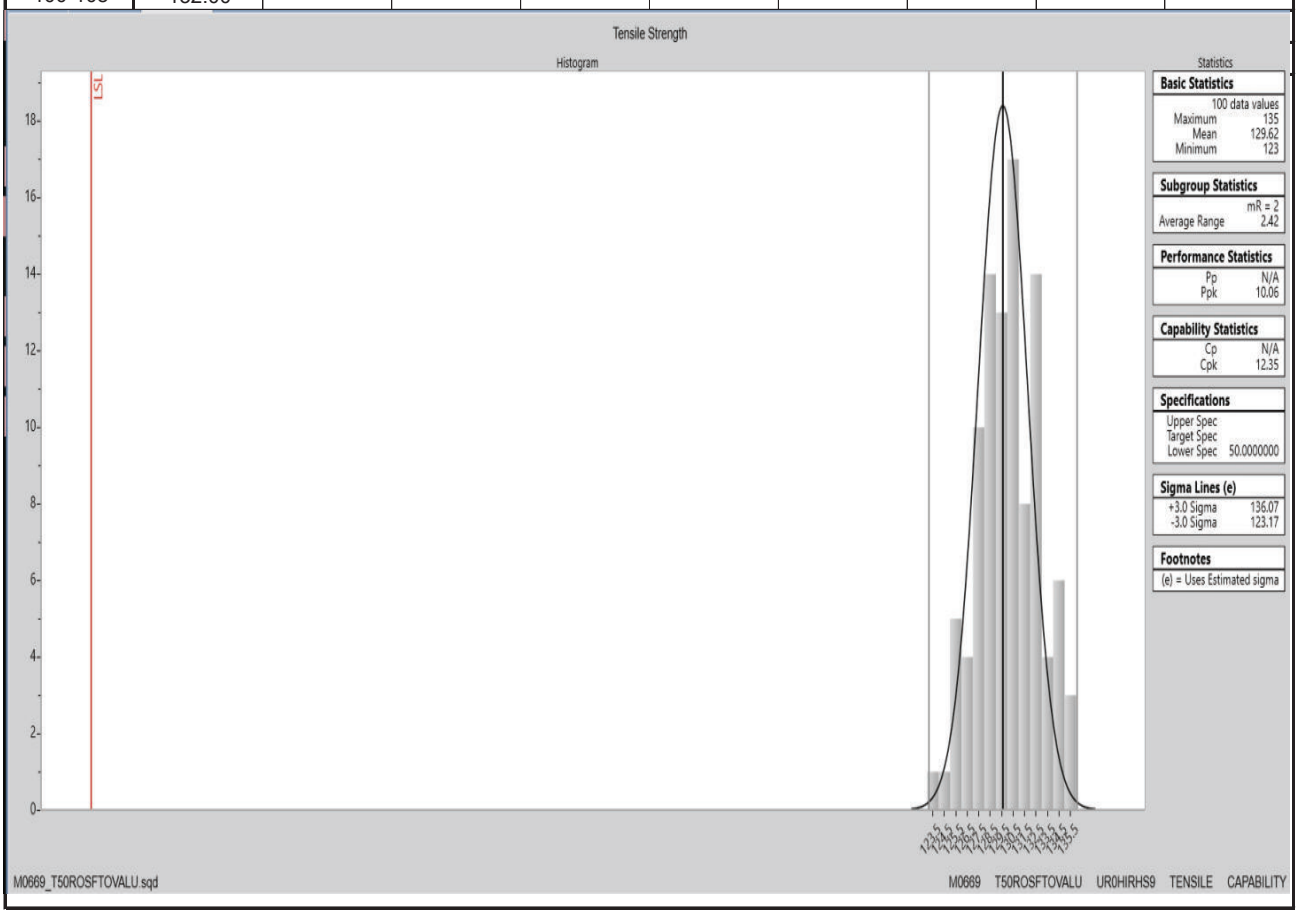
T18 Series	IT Ties
T30 Series	All Wide Straps
T40 Series	All releasable
T50 Series	SR255
T120 Series	Double Headed
T150 Series	DCT 9 & 11
T250 Series	SDCT
T255 Series	Screw Mount
CTT Series	All Outside Serrated Ties
PAT100 Series	Stud Mounts

NOTE * All Series Include: PE, PER, TAS, SM, OSSFT, WPM'S, SF, RTM, DP,OSFT

Initial Process Study

Part No.	Part Description	Supplier	
157-00153	OVAL HOLE FIR TREE WITH 8	HellermannTyton	
Drawing No.	**Drawing Date**	**Drawing Revision**	**Inspection Facility**
11-0345-011-CSU	11/17/2017	08.1	HT-Milwaukee
Production Date	**Material**	**Tool No.**	**Inspector**
12/6/2018	UR0HIRHS9	M0669	JD

DATA	TENSILE lbs								
1-9	132.00	135.00	134.00	132.00	127.00	134.00	130.00	131.00	129.00
10-18	126.00	128.00	131.00	123.00	130.00	125.00	129.00	128.00	127.00
19-27	126.00	129.00	124.00	127.00	125.00	128.00	126.00	125.00	130.00
28-36	130.00	130.00	125.00	129.00	127.00	133.00	134.00	134.00	132.00
37-45	128.00	132.00	132.00	127.00	128.00	128.00	130.00	132.00	127.00
46-54	127.00	125.00	132.00	127.00	126.00	129.00	130.00	128.00	129.00
55-63	130.00	131.00	129.00	128.00	129.00	132.00	133.00	130.00	133.00
64-72	132.00	135.00	132.00	133.00	134.00	129.00	134.00	132.00	130.00
73-81	130.00	130.00	132.00	130.00	130.00	131.00	127.00	128.00	129.00
82-90	128.00	130.00	127.00	131.00	130.00	129.00	128.00	132.00	129.00
91-99	131.00	130.00	128.00	129.00	131.00	128.00	128.00	131.00	135.00
100-108	132.00								



Gage R&R

R&R Study Results
Using Specifications

Gage number:	TGM-914	Done by:	Danielle Oldham.
Gage description:	Digital Scale	Part name:	T120R
Gage type:	Scale	Characteristics:	Weight
Study name:	Anova Gage RR	Specifications:	LSL=5.45 Nominal=5.5 USL=5.8
Study date:	01/25/2019	Number of Distinct Categories:	53.25961

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 = 0.001457034	%EV = 2.49777
Reproducibility - Appraiser Variation (AV) AV = 0.0005102141	%AV = 0.8746518
Repeatability & Reproducibility (R&R) R&R = 0.001543783	%R&R = 2.646482
Part Variation (PV) PV = 0.05831296	%PV = 99.96497

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.0583334

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Danielle	1	5.522	5.516	5.543	5.802	5.572	5.508	5.58	5.584	5.398	5.523
Danielle	2	5.521	5.518	5.541	5.801	5.575	5.509	5.58	5.586	5.4	5.524
Danielle	3	5.523	5.519	5.542	5.803	5.574	5.511	5.579	5.587	5.397	5.522
Zanetta	1	5.524	5.52	5.542	5.803	5.577	5.51	5.578	5.586	5.398	5.522
Zanetta	2	5.526	5.521	5.545	5.804	5.575	5.509	5.579	5.59	5.399	5.521
Zanetta	3	5.523	5.518	5.543	5.8	5.576	5.51	5.578	5.589	5.4	5.525
Marreall	1	5.522	5.517	5.542	5.805	5.575	5.509	5.577	5.584	5.399	5.52
Marreall	2	5.524	5.517	5.544	5.804	5.573	5.511	5.578	5.584	5.397	5.522
Marreall	3	5.524	5.516	5.545	5.803	5.572	5.512	5.577	5.586	5.396	5.523

HellermannTyton

Gage R&R

R&R Study Results Using Specifications

1/10/2019

Gage number:	TGM-983	Done by:	Danielle Oldham.
Gage description:	Indicator	Part name:	T120R
Gage type:	Indicator	Characteristics:	Height
Study name:	Annual Gage R & R	Specifications:	LSL=0.067 Nominal=0.075 USL=0.083
Study date:	01/10/2019	Number of Distinct Cate	20.99557

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 = 7.993686E-05

%EV = 2.997633

Reproducibility - Appraiser Variation (AV)
AV = 0.0001598051

%AV = 5.992693

Repeatability & Reproducibility (R&R)
R&R = 0.0001786829

%R&R = 6.70061

Part Variation (PV)
PV = 0.002660673

%PV = 99.77526

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.002666666

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
App 1	1	0.0716	0.0714	0.07075	0.07235	0.0712	0.07125	0.07155	0.07175	0.06705	0.07055
App 1	2	0.0719	0.0711	0.0706	0.0721	0.07125	0.07122	0.07155	0.07155	0.06705	0.0705
App 1	3	0.0717	0.07105	0.0707	0.0721	0.0712	0.07125	0.0716	0.0718	0.06705	0.07055
App 2	1	0.0715	0.0713	0.0707	0.0722	0.07055	0.07122	0.0715	0.07145	0.06705	0.06955
App 2	2	0.07157	0.0712	0.0707	0.0722	0.07045	0.07125	0.0712	0.0714	0.06695	0.0694
App 2	3	0.07155	0.0711	0.0705	0.0723	0.07055	0.07122	0.07135	0.07145	0.06705	0.0697
App 3	1	0.0715	0.0713	0.07075	0.0723	0.0697	0.07125	0.0715	0.07155	0.067	0.06945
App 3	2	0.07155	0.0713	0.0706	0.0721	0.0698	0.07122	0.07155	0.0714	0.06705	0.06945
App 3	3	0.0715	0.0712	0.0706	0.07215	0.06975	0.07125	0.0714	0.0714	0.06695	0.06955

HellermannTyton

Gage R&R

R&R Study Results Using Specifications

1/25/2019

Gage number:	TGM-760	Done by:	Danielle Oldham.
Gage description:	Micro-Vu	Part name:	133-02158
Gage type:	Micro-Vu	Characteristics:	Length-Vision System
Study name:	Annual Gage R & R	Specifications:	LSL=318 Nominal=318.7 USL=319.4
Study date:	01/25/2019	Number of Distinct Cate	30.21336

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 = 0.007599652

%EV = 3.257008

Reproducibility - Appraiser Variation (AV)
AV = 0.007782144

%AV = 3.335219

Repeatability & Reproducibility (R&R)
R&R = 0.01087734

%R&R = 4.661736

Part Variation (PV)
PV = 0.2330786

%PV = 99.89128

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.2333323

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Tom	1	319.312	318.681	318.764	318.736	318.71	318.581	318.461	318.368	318.328	318.626
Tom	2	319.291	318.708	318.767	318.732	318.699	318.578	318.445	318.396	318.349	318.624
Tom	3	319.293	318.71	318.78	318.749	318.712	318.6	318.464	318.372	318.348	318.622
Rob	1	319.29	318.708	318.768	318.737	318.715	318.601	318.469	318.386	318.334	318.634
Rob	2	319.289	318.722	318.757	318.727	318.716	318.609	318.452	318.398	318.342	318.61
Rob	3	319.302	318.711	318.787	318.753	318.718	318.598	318.45	318.406	318.35	318.63
Danielle	1	319.316	318.723	318.789	318.757	318.732	318.607	318.459	318.389	318.357	318.62
Danielle	2	319.316	318.724	318.79	318.759	318.732	318.607	318.464	318.389	318.359	318.614
Danielle	3	319.316	318.723	318.79	318.759	318.731	318.607	318.466	318.389	318.359	318.616

HellermannTyton

Gage R&R

R&R Study Results Using Specifications

1/30/2019

Gage number:	TGM-966	Done by:	Danielle Oldham.
Gage description:	Global Performance 7-10-7	Part name:	133-03809
Gage type:	Coordinate Measuring Machine	Characteristics:	Coordinates
Study name:	Annual Gage R & R	Specifications:	LSL=39.5 Nominal=40 USL=40.5
Study date:	01/30/2019	Number of Distinct Cate	46.77556

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 = 0.004973302 — %EV = 2.983981

Reproducibility - Appraiser Variation (AV)
AV = 0.0006955892 — %AV = 0.4173535

Repeatability & Reproducibility (R&R)
R&R = 0.00502171 — %R&R = 3.013026

Part Variation (PV)
PV = 0.166591 — %PV = 99.9546

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.1666667

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Tom	1	39.5967	39.4882	39.5801	39.6089	39.6386	39.6597	39.5273	39.6145	39.6405	39.5991
Tom	2	39.5989	39.4808	39.5815	39.6061	39.6342	39.6524	39.5298	39.6121	39.6373	39.5975
Tom	3	39.5972	39.4856	39.5866	39.6069	39.6436	39.6608	39.5312	39.6157	39.6379	39.6062
Rob	1	39.5992	39.4876	39.5825	39.6045	39.6399	39.6582	39.525	39.6079	39.64	39.6011
Rob	2	39.598	39.4743	39.5854	39.5997	39.6457	39.6643	39.53	39.5922	39.6341	39.5938
Rob	3	39.5924	39.4801	39.5832	39.6	39.6327	39.6678	39.5236	39.599	39.6454	39.6029
Danielle	1	39.5773	39.4794	39.5788	39.6003	39.6498	39.6679	39.5266	39.6071	39.6429	39.613
Danielle	2	39.5966	39.4795	39.5866	39.6057	39.6394	39.6577	39.5259	39.6168	39.6411	39.6008
Danielle	3	39.582	39.4956	39.5806	39.604	39.6422	39.6596	39.5223	39.6119	39.6364	39.6146

HellermannTyton

Gage R&R

R&R Study Results Using Specifications

10/18/2018

Gage number:	TGM-850	Done by:	Danielle Oldham
Gage description:	Tensile Tester	Part name:	T120R
Gage type:	Tensile Tester	Characteristics:	Tensile Strength
Study name:	Annual Gage R & R	Specifications:	LSL=120 Nominal=158 USL=196
Study date:	10/12/2018	Number of Distinct Cate	44.97344

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 = 0.2463085

%EV = 1.944541

Reproducibility - Appraiser Variation (AV)
AV = 0.3112622

%AV = 2.457333

Repeatability & Reproducibility (R&R)
R&R = 0.3969283

%R&R = 3.133644

Part Variation (PV)
PV = 12.66045

%PV = 99.95089

Specification Spread (USL-LSL)/
(USL - LSL)/ = 12.66667

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Danielle	1	150.2	145.32	157.82	157.02	151.69	159.67	153.49	162.61	158.38	150.2
Danielle	2	150.48	145.41	157.47	156.7	152.26	160.25	153.02	162.53	158.28	149.73
Danielle	3	150.45	145.48	158.04	157.07	151.28	159.25	153.43	162.81	158.62	150.36
Zanetta	1	150.9	146.26	157.42	154.45	151.45	159.34	152.81	161.61	158.15	149.28
Zanetta	2	150.86	146.51	157.19	154.13	152.36	159.36	152.36	161.49	158.04	149.04
Zanetta	3	150.91	146.39	157.25	154.02	151.45	159.45	152.96	161.71	158.22	149.73
Mareali	1	151.15	147.82	157.09	154	152.07	159.25	152.24	161.05	158.13	148.69
Mareali	2	151.13	147.59	157.19	153.84	151.58	158.99	152.15	161.02	158.05	148.95
Mareali	3	151.22	147.99	157.02	153.52	152.05	158.8	151.99	160.53	158.04	148.15

HellermannTyton

Gage R&R

R&R Study Results
Using Specifications

Gage number:	TGM-888	Done by:	Danielle Oldham
Gage description:	Digital Caliper	Part name:	T120R
Gage type:	Caliper	Characteristics:	Width
Study name:	Anova Gage RR	Specifications:	LSL=7.4 Nominal=7.6 USL=7.8
Study date:	01/24/2019	Number of Distinct Cate	14.30642

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 = 0.006497341

%EV = 9.746009

Reproducibility - Appraiser Variation (AV)
AV = 0.0007351582

%AV = 1.102737

Repeatability & Reproducibility (R&R)
R&R = 0.006538799

%R&R = 9.808196

Part Variation (PV)
PV = 0.06634524

%PV = 99.51783

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.06666669

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Danielle	1	7.56	7.54	7.6	7.76	7.66	7.56	7.54	7.61	7.47	7.54
Danielle	2	7.55	7.54	7.61	7.77	7.65	7.56	7.55	7.6	7.47	7.55
Danielle	3	7.56	7.53	7.61	7.77	7.66	7.56	7.55	7.6	7.48	7.54
Marreall	1	7.56	7.55	7.62	7.78	7.66	7.56	7.54	7.61	7.47	7.55
Marreall	2	7.56	7.55	7.61	7.77	7.66	7.56	7.55	7.61	7.46	7.54
Marreall	3	7.55	7.54	7.61	7.76	7.65	7.55	7.54	7.6	7.48	7.55
Zanetta	1	7.55	7.53	7.6	7.78	7.65	7.55	7.56	7.61	7.46	7.56
Zanetta	2	7.55	7.54	7.6	7.77	7.66	7.56	7.55	7.6	7.45	7.55
Zanetta	3	7.54	7.54	7.61	7.77	7.66	7.56	7.54	7.6	7.47	7.55

HellermannTyton

CATIA V5

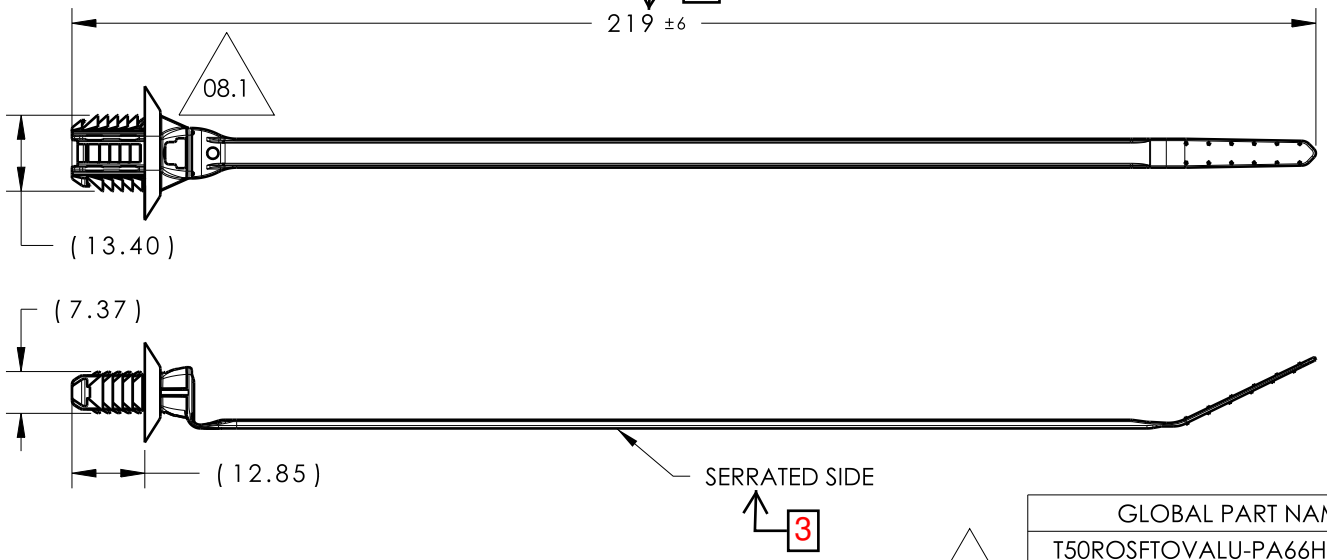
Revision Level			Revision Record	Changed	Date	Approved	Date
Drawing	State	Part					
08.1	Design Release	-	SEE ECN# 014187	KVH	11/17/17	EJF	11/17/17

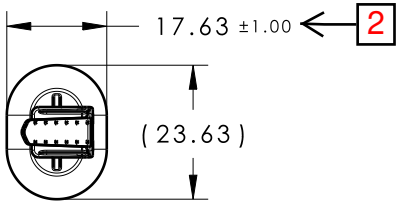
REFERENCE:

PERFORMANCE REQUIREMENTS:

1. FIR TREE PUSH IN FORCE: 45 NEWTONS (10 LBS) MAX IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm.
2. FIR TREE PULL OUT FORCE: 110 NEWTONS (25 LBS) MIN IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm.
3. SHEET METAL THICKNESS RANGE: 0.60mm - 6.75mm
4. APPLICABLE OVAL HOLE SIZES:
   - A. 6.2 X 12.2mm
   - B. 6.5 X 12.5mm
   - C. 6.5 X 13.0mm
   - D. 7.0 X 12.0mm
5. CABLE TIE MIN LOOP TENSILE STRENGTH: 225 NEWTONS (50 LBS)
6. BUNDLE RANGE: 2.0mm TO 50mm
7. MAXIMUM PERCENT REGRIND PERMISSIBLE: 25%

08.1

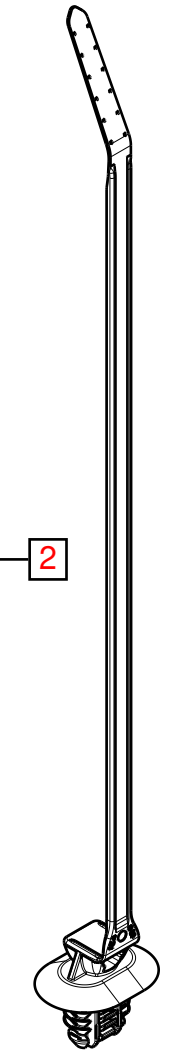




4

GLOBAL PART NAME	MATERIAL	COLOR
T50ROSFTOVALU-PA66HIRHS-GY	PA66HIRHS	GRAY
T50ROSFTOVALU-PA66HIRHS-BK	PA66HIRHS	BLACK
T50ROSFTOVALU-PA46-BN	PA46	BROWN

08.1



ISOMETRIC VIEW

Material: SEE CHART COLOR: SEE CHART	Units **millimeters** Tolerance defined on each dimension		Drawn: SJA 5/5/11 Approved: MHT 4/4/12 **HellermannTyton** **North America** **Email: corp@htamericas.com** **Web: www.hellermann.tyton.com**	Article/Type-No: T50ROSFTOVALU Title: OVAL HOLE FIR TREE WITH 8" 50LB LOW PROFILE CABLE TIE Drawing-No: **11-0345-011-CSU** PRODUCTION : Phase	Scale: 3:4 Project Number: 11-0345 Format: AH Sheet: 1/1