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.: **92373** with submission date 02.06.2021 will be considered as complete and valid automatically on **02.07.2021** unless otherwise disposed!

HellermannTyton

HellermannTyton GmbH internal remarks: PB-No.: **92373**

Part Describtion: BCFTOVAL GPN 110339

Part Submission Warrant

Part Name **BCFTOVAL** Cust. Part Number **FU5T-14E044-DA**

Shown on Drawing No. **11-0339-001-CSU** Org. Part Number **15101403**

Engineering Change Level **12.1** Dated **07.01.2016**

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

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. **15101403** Weight (kg) **0,0014**

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: **732796258**

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 2-Jun-21

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

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

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature Date

Print Name Customer Tracking Number (optional)

Production Part Approval, Dimensional Results

HellermannTyton

Internal PB-No.: **92373**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**FU5T-14E044-DA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**BCFTOVAL**
INSPECTION FACILITY:	**QS-Laboratory**	DESIGN RECORD CHANGE LEVEL:	12.1 07.01.2016
		ENGINEERING CHANGE DOCUMENTS:	
		NAME of LABORATORY:	

ITEM	DIMENSION / SPECIFCATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)			OK	NOT OK
					mean	**min**	**max**		
1	**1,5**	**± 0,5**			**1,6**	**1,5**	**1,6**	☑	☐
2	**58,0**	**± 2,0**			**57,9**	**57,9**	**58,0**	☑	☐
3	**15,45**	**± 1,0**			**15,4**	**15,4**	**15,4**	☑	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐
								☐	☐

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	2-Jun-21

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **92373**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**FU5T-14E044-DA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**BCFTOVAL**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	12.1 07.01.2016
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.		NAME of LABORATORY:	

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

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	2-Jun-21

ASCEND
PERFORMANCE MATERIALS

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

HELLERMANN TYTON GMBH
GROSSER MOORWEG 45
Tornesch, 25436
Attention: AXEL LANG

Container ID: 00000000000002010854

Certificate Date: 21-JAN-21
Delivery No: 0382549220
Shipped Qty: 12,075.000 Lbs
(5,477.220 Kgs)
Customer P.O. No: 4500129185 / 40

Certificate of Analysis

This certifies that the Nylon Resin shipped to you from Ascend Performance Materials Operations, LLC has been tested and found to meet the 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 D4066 PA0161, FMVSS 302, MS-DB-41 CPN 1826, ESB-M4D178-A2, WSS-M99P23-C1/C2, WSS-M99P9999-A1, WSSM4D706B1, WSS-M99P1111-A, WSS-M4D706-A4, WSK-M4D706-A, GMW16447P-PA66-T2, GMW16558P-PA66-T1 and GMP.PA66.015, Ford WQ 100C.

Material Type: VYDYNE 47H BK0644 **Material No:** 10397364 **Batch No** IK02FY03 **Date of Mfg** 02-NOV-2020

Ascend Performance Materials Operations LLC Specification

Lot Data **Property**	**Test Method**	**Min**	**Max**	**Result**	**Units**
Moisture	STM 00835	0.10	0.20	0.15	%
Copper	STM 00667	125	250	169	PPM
Strength @ Yld	STM 01253	50	70	59	MPa

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PFMEA)

PFMEA Number: **MFMEA-43**

Part Number / Name: Customary Mounts ess 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
1-4 Incoming Receiving	Cert matches material and P.O. request	Unacceptable Moisture Levels	Cannot Manufacture	5	PTC	Shipping Damage	2	D - Incoming Inspection P - Material Certs	8	80	None						0
				5	PTC	Material lot received with moisture to high/low	2	D - Incoming Inspection P - Material Certs	8	80	None						0
		Improperly labeled	Delay in Manufacturing	4		Material lot received does not match cert	2	D - Incoming Inspection P - Material Certs	8	64	None						0
5-8 Material Movement	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	5	50	Upgrade to Novatech system. Increase Moisture test freq.	Maintenance - 3/4/13 Mike Wendt -	New Dryer system New	5	2	2	20
		Contamination	Part Non-Compliance	5		Foreign Matter in Material	2	D - Visual Inspections P - Material Handling Work Instruction	8	80	Develop new material handling procedure	Mike Wendt - 8/30/13	Added color-coded container	5	2	6	60
			Part Non-Compliance	5		Unlike Materials Mixed Together	2	D - Visual Inspections P - Material Handling Work Instruction	8	80	New material ID system	John Gleason - 1/1/13	Material ID added to WO, New process for stickers on Material	5	2	5	50
		Incorrect Material	Part Non-Compliance	6		Wrong material hook-up at press	2	D/P - Visual to Work Order	8	96	Upgrade to Novatech system.	Maintenance - 3/4/13	ID proofing in new system upgrade	6	2	5	60
9 Molding Machine 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	8	64	Electronic Shift Log	John Gleason/Ross H. - 6/13	Computers added to work station. Sharepoint logs implemented	4	2	5	40

10-11 First Piece Acceptance	Product conforms per specifications before production	First Piece Not Hung	Delay in Manufacturing	8		First Piece Not Submitted	1	D- Visual/No First Piece at press. P-Training of Production Personnel	5	40	None						0
12 Validation Testing	Validation and documentation of new tooling	Validation is Not Completed	Part Non-Compliance	8		Validation Testing Forgotten	1	D/P-PPAP Matrix	2	16	None						0
13-14 Setup / In process checks Injection Molding Process	Manufacturing a conforming part per specifications	Sinks	Part Non-Compliance	3		Insufficient Hold Pressure	2	D- Visual Inspections P - First Piece Approvals	8	48	Increase Visual inspection	John Gleason/Dean Anderson -	Implemented Quality tree	3	2	7	42
				3		Cycle Time Too Fast	2	D- Visual Inspections P - First Piece Approvals	8	48	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	3	2	7	42
		Incorrect Blending	Part Non-Compliance / and Color Match Failures	5		Material blended incorrectly at press	2	D/P - Visual to Work Order	8	80	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	5	2	7	70
		Burning	Part Non-Compliance / Cosmetic Issues / Short	3		Plugged/Worn Vents	3	D- Visual Inspections P - First Piece Approvals P - In process PM's	8	72	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	3	3	7	63
		Sticking in mold	Part Non-Compliance / Mold Damage	5			2	D- Visual Inspections P - First Piece Approvals	8	80	Increase Visual inspection	John Gleason/Dean Anderson -	Implemented Quality tree	5	2	7	70
				5		Excessive Hold Pressure	2	D- Visual Inspections P - First Piece Approvals	8	80	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	5	2	7	70
				5		Water hooked up incorrectly	2	D-Visual Inspection	8	80	Implemented Water Maps - Ongoing implementation of pre plumbing molds	Rich Staszewski On going for water map and pre plumbing	T18L-completed 6/26/09 Ongoing for other molds	5	2	6	60
				5		Heater band malfunctions	3	D- Visual Inspection D - Process Inspection P - PM	5	75	None						0
		Excess Plastic	Part Non-Compliance	5		Hot Excess Runner	2	D - Visual Inspections P - Process Inspections	8	80	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	5	2	7	70
		Blocked thru holes/windows	Part Non-Compliance	5		Broken Insert/Ejector Blade	2	D - Visual Inspection P - Final Inspection	8	80	Increase Visual inspection	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	5	2	7	70
		Missing Retainer tab insert (If Present)	Part Non-Compliance	5		Thermolator Malfunction	1	D - Visual Inspections D - Process Inspections P - First Piece Approvals	6	30	Add audible warning	Manit. - 9/13	Audible alarms added to all Thermolator to detect temp. dev.	5	1	3	15

		5		Improper start-up	1	D - Visual Inspection D - LPA at startup P - Final Inspections	8	40	Increase frequency of functional testing (insertion).	John Gleason/Dean Anderson - 7/14	Implemented Quality tree	5	1	7	35
		5		Cycle Time Too Fast	1	D - Visual Inspections P - Final Inspections	8	40	None						0
		5		Worn inserts	2	D - Visual Inspections P - Final Inspections	8	80	None						0
		5		Washed out vents	2	D - Visual Inspections P - Final Inspections	8	80	None						0
Shorts	Part Non-Compliance / Cosmetic Low Extraction force	6		Insufficient Injection Pressure compatibility of Press / mold	3	D- Visual Inspections P - First Piece Approvals P - In process PM's	8	144	Gauges to Detect insertion force	Dean Anderson - 11/13	Developed and implemented Go/No Gauges	6	3	5	90
		6		Plugged/Worn Vents	3	D- Visual Inspections P - First Piece Approvals P - In process PM's	8	144	Gauges to Detect insertion force	Dean Anderson - 11/13	Developed and implemented Go/No Gauges	6	3	5	90
		6		Residue Build-Up	3	D- Visual Inspections P - First Piece Approvals P - In process PM's	8	144	- PM Schedule - Gauges	Mike Wendt - 9/12 Dean Anderson - 11/13	Ice Blasting to clean mold per shift Go/No Go Gauges	6	2	5	60
		6		Lot / Moisture Variations	3	D- Visual Inspections D - First Piece Approvals P - Material Certs P - Moisture Analysis	8	144	Develop moisture testing schedule	Mike Wendt - 8/13	Purchased Moisture Analyzers. Implemented testing procedure	6	2	5	60
		6		Process Interruption	2	D- Visual Inspections D - First Piece Approvals P - Material Certs P - Moisture Analysis	4	48	None						0
Flash	Part Non-Compliance / High Insertion Force Failures / Cosmetic	6		Excessive Injection Pressure	3	D- Visual Inspections P - First Piece Approvals P - In Process PM's	8	144	Increase frequency of functional testing (insertion).	John Gleason/Dean Anderson - 7/14	Implemented Quality tree - Go/No Go Gauge	6	3	5	90
		6		Incorrect Tonnage	3	D- Visual Inspections P - First Piece Approvals P - In Process PM's	8	144	- Upgrade Presses (Replace Van Dorn) - Capacity Plan/Controls on	Rick R - Ongoing - John Gleason	Replaced Toggle with hydraulic/electric clamp	6	2	5	60
Mold Mismatch	Parting Line Flash	6		Poor Mold Alignment	2	D - Visual Inspections D - Process Inspections P - First Piece Approvals P - In Process PM	8	96	- Increase Visual inspections - Gauge	-John Gleason/Dean Anderson - 7/14 - Dean Anderson - 11/13	- Quality tree - Go/No Go gauges	6	2	5	60

				6		Leader Pin/Sidelock Wear	2	D - Visual Inspections D - Process Inspections P - First Piece Approvals P - In Process PM	8	96	-PM - Increase Visual Inspection	Dan Sheeran - 11/12 - John Gleason/Dean Anderson - 7/14	- Tech now conduct inspections doing cleaning schedule - Quality Tree	6	1	7	42
		Deep ejector pins	Part Non-Compliance	6		Excessive Hold Pressure	3	D - Visual Inspections D - Process Inspections P - First Piece Approvals P - In Process PM	8	144	- Increase Visual inspections	- John Gleason/Dean Anderson - 7/14	- Quality Tree	4	3	7	84
				6		Thermolator Malfunction	2	D - Visual Inspections D - Process Inspections P - First Piece Approvals P - In Process PM	8	96	Add audible warning	Manit. - 9/13	Audible alarms added to all Thermolator to detect temp. dev.	4	2	3	24
				3		Fast Cycle Time	2	D - Visual Inspections D - Process Inspections P - First Piece Approvals P - In Process PM	8	48	None						0
		Plugged Sprue Tips / Gates (Hot Manifold)	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
		Start up scrap packaged	Customer Dissatisfaction	3		Operator packages parts too soon	4	P - Visual Inspection P - Work Instructions D - Final Inspection D - Process Inspection	8	96	- Scrap Handling Procedure -Automate Program	- John Gleason - 1/1/13 - Randy Olhoff - 6/18/10	- Scrap handling procedure - Reversing Conveyors	3	3	7	63
15-16 Packaging	Package product per customers specifications	Incorrect or Missing Date Code on the Box	Traceability Loss	3		Wrong/no date code on package	3	D - Visual Inspections D - Final Inspections P - Date Code Calendar P - Work Instructions	7	63	None						0
		Greasy Parts Packaged	Part Non-Compliance	4		Ejector Pin / Machine Grease	1	D - Visual Inspection D - Process Inspection P - PM	8	32	None						0
		Incorrect / Missing Labels	Customer Dissatisfaction	3		Printer Ribbon not Inserted Properly	2	D - Visual Inspections D - Final Inspections P-Work order sign-off	8	48	- Improved Procedure	- John Gleason - 7/14 - Mike Wendt/Gary Schultz - 5-14	- Electronic shift log - Supervisor Check List	3	3	5	45

				3		Wrong Labels Placed on Product	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	8	96	- Improved Procedure	- John Gleason - 7/14 - Mike Wendt/Gary Schultz - 5-14	- Electronic shift log - Supervisor Check List	3	3	5	45
				3		Excess Labels not Removed From Production Area	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	8	96	- Improved Procedure	- John Gleason - 7/14 - Mike Wendt/Gary Schultz - 5-14	- Electronic shift log - Supervisor Check List	3	3	5	45
				3		Wrong label provided	4	D - Visual Inspections D - Final Inspections P - LPA P-Work order sign-off	8	96	- Improved Procedure	- John Gleason - 7/14 - Mike Wendt/Gary Schultz - 5-14	- Electronic shift log - Supervisor Check List	3	3	5	45
		Insufficient Packaging	Customer Dissatisfaction	3		Insufficient Packaging Supplies	3	D - Visual Inspection D - Final Inspection	8	72	None						0
		Incorrect Quantity in Box	Customer Dissatisfaction	4		Improper Scale Set Up	3	D - Visual Inspection D - Final Inspection	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 from previous work order	2	D - Visual Inspection D - Final Inspection	6	48	None						0
17 Final and Live Inspection	Product conforms per specifications after production run.	Bad Product Shipped	Customer Dissatisfaction	7		Inspection Not Performed by QA	1	D/P - Final and Live Inspection	1	7	None						0
				7		Bad Product not Found in Random Sampling	2	D /P- Final and Live Inspection	7	98	None						0
18 QA Testing	Validation and documentation of product per specifications	QA Testing Incomplete	Part Non-Compliance	6		Testing Not Performed by QA	1	D/P - Weekly Matrix, First Piece Acceptance. P- Daily Production Meeting./Training Quality Personnel	3	18	None						0
19-20 Material	Ship product per specifications to	Shipped Incorrectly	Customer Dissatisfaction	5		Late Shipment	2	D - Visual Inspection D - Final Inspection	8	80	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
21 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

PROCESS FLOW DIAGRAM

Part Description:	Customary Mounts	Program Name:	NA
HT Dwg.# and Rev:	Various	Created By:	Gwendolyn Benz
Customer P/N and Rev:	Various	Creation Date:	10/22/07
Customer Name:	Various		

	Process ■ "n"	Move ◆ "u"	Store ● "l"	Inspect ☒ "x"	Operational Description:	Special Characteristics / Descriptions	Control Methods
1	■				Incoming Receiving QA Receives C of A from Raw Material Supplier	C of A	ERP System
2	■				Incoming Receiving Receive in Raw Materials From Suppliers	Quality Approval of Material	ERP System
3				☒	Incoming Receiving Shipping and Receiving Inspects Raw Material	Review Container, Packaging, Lot Numbers and Quantity of Material	ERP System
4				☒	Incoming Receiving QA Inspects Color of Material (If Needed)	Review Color of Material	ERP System
5		◆			Material Movement	Move Raw Materials into Storage	ERP System
6			●		Material Storage	Store Raw Materials Until Needed	FIFO By Lot
7		◆			Material Movement	Move Materials to material handling system and Verify Correct Material Moisture Check on Silo Materials perTS-WI-MAX4000XL.	Material Process Log F-PRD-8.1-4 and Moisture Log F-QA-10.3-9
8	■				Material Ratio	Verify Correct Material	Material Process Log F-PRD-8.1-4
9	■				Molding Machine Set Up	Verify Mold Machine is Set Up	Per Set-Up Instructions
10				☒	QA Completes First Piece Approval (Injection Molding)	Short Shots, Any Flash, Warpage, or Burning.	First Piece Acceptance F-QA-10.3-5
11	■				Quality Approval of First Piece	Hang First Piece	Visual At Press
12				☒	Validation Testing	Validate Parts	Measurements - Refer to Control Plan
13	■				Work Order Set up LPA	Validate materials, labels, etc. to Work Order LPA Random Audit	Visual, Signed Set-Up Stamp on Work Order F-PRD-9
14				☒	In Process Checks (Injection Molding)	Short Shots, Any Flash, Warpage, or Burning.	Per Control Plan
15				☒	Final Product and Packaging is Verified	Check Parts for Visual Defects Seals, Quantity, Bags, Boxes, Date Code Verified.	Label (Initialed and Dated) on Box / Share Point / F-PRD-1.1
16	■				Full Skid / Order Complete	Verify Product is Skidded Properly and Mark Ready for Inspection	Label Placed on Skid
17				☒	Final Inspection	Quality Approval of Final Product	F-QA-10.4-21/ Share Point
18				☒	QA Testing	Verify Part Testing Has Been Completed	Per Control Plan
19		◆			Material Movement	Move Skid To Shipping Dock	Ready for Movement cone / ERP System
20	■				Material Movement	Ship Product to Warehouse	Shipping Manifest/ ERP System
21				☒	Annual Validation (If Required)	PPAP Parts on Yearly Basis if Required	PPAP Matrix

☐ Prototype ☐ Pre-Launch ☑ Production

Control Plan

Control Plan Number: MCP 43	Key Contact/Phone: 414.355.1130	Date (Orig.) 08/21/07	Date (Rev.) See Footer
Part Number/Latest Change Level: Customary Mounts - Various	Core Team: Quality Assurance, Manufacturing, Automation, Receiving-Shipping	Customer Engineering Approval/Date (If Req'd) NA	
Part Name/Description: Customary Mounts - Various	Supplier/Plant Approval/Date NA	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	Team Supervisor	Material Handler	Processing 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 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
1-4	Incoming Receiving		1	Material Characteristics			Per Certificate of Analysis	Visual Material Cert	Each Lot	Each Lot	ERP System	Isolate lot PR-QA-13.1-2
			2	Quantity			Per Packing List	Gaylord Count	Each Lot	Each Lot	ERP System	Notify Purchasing
			3	Packaging Requirements			Packaging meets Requirements	Gaylord Visual	Each Lot	Each Lot	WI-SR-10.2-1	Notify Purchasing and QA
			4	Lot Number			Per Packing List	Gaylord Visual	Each Lot	Each Lot	ERP System	Notify QA
			5	Material Color			Per Color Chip	Material Visual	Each Lot	Each Lot	ERP System	Isolate lot PR-QA-13.1-2
5-7	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	Isolate Lot PR-QA-13.1-2
			2		Check moisture in Silo Materials		Perform Moistures per TS-WI-MAX4000XL	Computrac Max 4000XL Tester	1 Sample/ Material	Daily	Moisture Log F-QA-10.3-9	Check and Adjust Dryers / Control of Non-Conforming Product PR-QA-13.1-2
8	Material Ratio	Material Handling System	1		Material Ratio		Set Up Per Work Order	Visual	Each Material Change	Each Material Change	Material Process Log F-PRD-8.1-4	Isolation PR-QA-13.1-2 Adjust Ratio
			2		Colorant (When Needed)		Mix Ratio Setting / Set Up Per Work Order	Ratio Setting	Each Lot	Each Colorant	Material Process Log F-PRD-8.1-4	Isolation PR-QA-13.1-2 Adjust Ratio
9	Molding Machine Set up	Injection Molding Machine	1		Machine Set-Up		Per Mattec, Set-Up Sheet, and Acceptable Visual Part	Review of Set-Up Specs	Each Set Up	Each Set Up	Machine Set-Up Sheet F-PRD-9.6-1	Adjust Process/Recheck Isolation PR-QA-13.1-2
10-11	First Piece Approval Visual	Injection Molding Machine	1	Part Quality			Check for Burns, Shorts, Flash and Warp that will effect Fit, Form or Function of the Mount	Visual Inspection	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5	Adjust Process Retest / Control of Non-Conforming Product PR-QA-13.1-2
			2	Stud Verification (If Required)			Check M6 and M5 Studs on Fixture for size	WI-QA-10.4-8	1 Shot	Each Set Up	First Piece Acceptance F-QA-10.3-5	Notify Supervisor and Tool Room Retest / Control of Non-Conforming Product PR-QA-13.1-2
12	Initial Validation Testing	Injection Molding Machine	1	Dimensional			Perform Dimensional on the Part to Print	Calibrated Gages per Dimensional Study	1 Shot	At Initial Validation	Dimensional Study F-QA-10.4-2	Control of Non-Conforming Product PR-QA-13.1-2

Quality Assurance		Team Supervisor	Material Handler			Processing 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				
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	Reaction Plan
									Size	Freq		
			2	Push In / Push On Force (If Needed)			Per Drawing / SQC Pack	Force Tester or Tensometer	1 Shot	At Initial Validation	SPC Software	Control of Non-Conforming Product PR-QA-13.1-2
			3	Pull Out/Pull Off Force (If Needed)			Per Drawing / SQC Pack	Force Tester or Tensometer	1 Shot	At Initial Validation	SPC Software	Control of Non-Conforming Product PR-QA-13.1-2
			4	Dimensional Capability			Per Drawing / SQC Pack	Calibrated Gages	100pcs	At Initial Validation	SPC Software	Control of Non-Conforming Product PR-QA-13.1-2
			5	Connector Clip Push On/Pull Off Forces (If required)			Per Drawing / SQC Pack	Calibrated Gages	1 Shot	At Initial Validation	SPC Software	Control of Non-Conforming Product PR-QA-13.1-2
13	Work Order Set-Up TEAM SUPERVISOR or PROCESSING TECH	Packaging Equipment	1	Packaging Requirements			Set-Up Packaging Requirements per Work Order	Visual	1	Each Work Order	Signed Set-Up Stamp on Work Order	Adjust Process Control of Non-Conforming Product 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 PR-QA-13.1-2 (if applicable)
14	In process Checks Processing Tech Completed Visual Process Inspection	Injection Molding Machine	1	Part Quality			No Burns, Shorts, Flash, Warp or Part Damage Allowed.	Visual Inspection	1 Shot	4 x 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 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 PR-QA-13.1-2
15-16	Packaging Packaging Operator Process Inspections	Injection Molding Machine	1	Visual Appearance			Check Parts for Visual Defects	Visual	1 Shot	Per Hour	Inspection Label (Initialed and Dated)	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product PR-QA-13.1-2
		Waters in Bag (If Needed)	2	Amount of Water Added Per Bag			Per Work Order	Scale WI-PRD-10.3-1	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 PR-QA-13.1-2
		Sealer (If needed)	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 PR-QA-13.1-2
		Stamper	4	Date Code Stamp			Bag and Box Must Have Correct Date Code S-PRD-8.1-6	Visual	Once	Per Shift	Inspection Label (Initialed and Dated)	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product PR-QA-13.1-2

Quality Assurance		Team Supervisor	Material Handler			Processing 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		
		Labels	5	Bag and Box Labels			Bag and Box Labels Must Match Work Order	Visual	Twice	Per Shift	Inspection Label (Initialed and Dated)	Adjust Process/ Notify Supervisor and QA Recheck / Control of Non-Conforming Product PR-QA-13.1-2
		Scale/Conveyor Check	6	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	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 PR-QA-13.1-2
17	Final Inspection at Cell	Injection Molding Machine	1	Part Quality			Check for Burns, Shorts, Flash and Warp	Work Order	1 Shot	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product PR-QA-13.1-2
		Labels	2	Box Label			Per Work Order Check for Correct Label Placement; if Required	Visual match	1 label	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product 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 PR-QA-13.1-2
		Waters in Bag (If Needed)	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	Control of Non-Conforming Product PR-QA-13.1-2
		Sealer	5	Proper Bag Seal			Bag Must Have a Complete Seal Where Required	Visual and Pull at Seams	1 bag	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product PR-QA-13.1-2
		Correct Amount of Parts in Box	6	Quantity in Box			Boxes Must Have Specified Amount of Bags per Box	Hand Count	1 Sample	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product 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	Control of Non-Conforming Product PR-QA-13.1-2
		Stamp	8	Date Code Stamp / Printer			S-PRD-8.1-6	Visual match	1 check	Twice per 24 hours	Share Point or Final Inspection F-QA-10.4-21	Control of Non-Conforming Product PR-QA-13.1-2
18	QA Daily Testing	Injection Molding Machine	1	Part Quality			Check for Burns, Shorts, Flash and Warp that will effect Fit, Form or Function of the Mount	Visual Inspection	1 Shot	Daily	Weekly Matrix F-QA-10.3-8	Adjust Process Retest / Control of Non-Conforming Product PR-QA-13.1-2

Quality Assurance		Team Supervisor	Material Handler			Processing 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		
		Injection Molding Machine	2	Push In / Push On Force (If Needed)			Per Drawing / SQC Pack	Force Tester or Tensometer	1 part	Weekly	SPC Software	Adjust Process Retest / Control of Non-Conforming Product PR-QA-13.1-2
		Injection Molding Machine	3	Pull Out/Pull Off Force (If Needed)			Per Drawing / SQC Pack	Force Tester or Tensometer	1 part	Weekly	SPC Software	Adjust Process Retest / Control of Non-Conforming Product PR-QA-13.1-2
19-20	Shipping		1		Shipping		Per Shipping Requirements	Visual	Each Skid	Each Shipment	Shipping Manifest and ERP System	Notify Supervisor
21	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 PR-QA-13.1-2

HellermannTyton

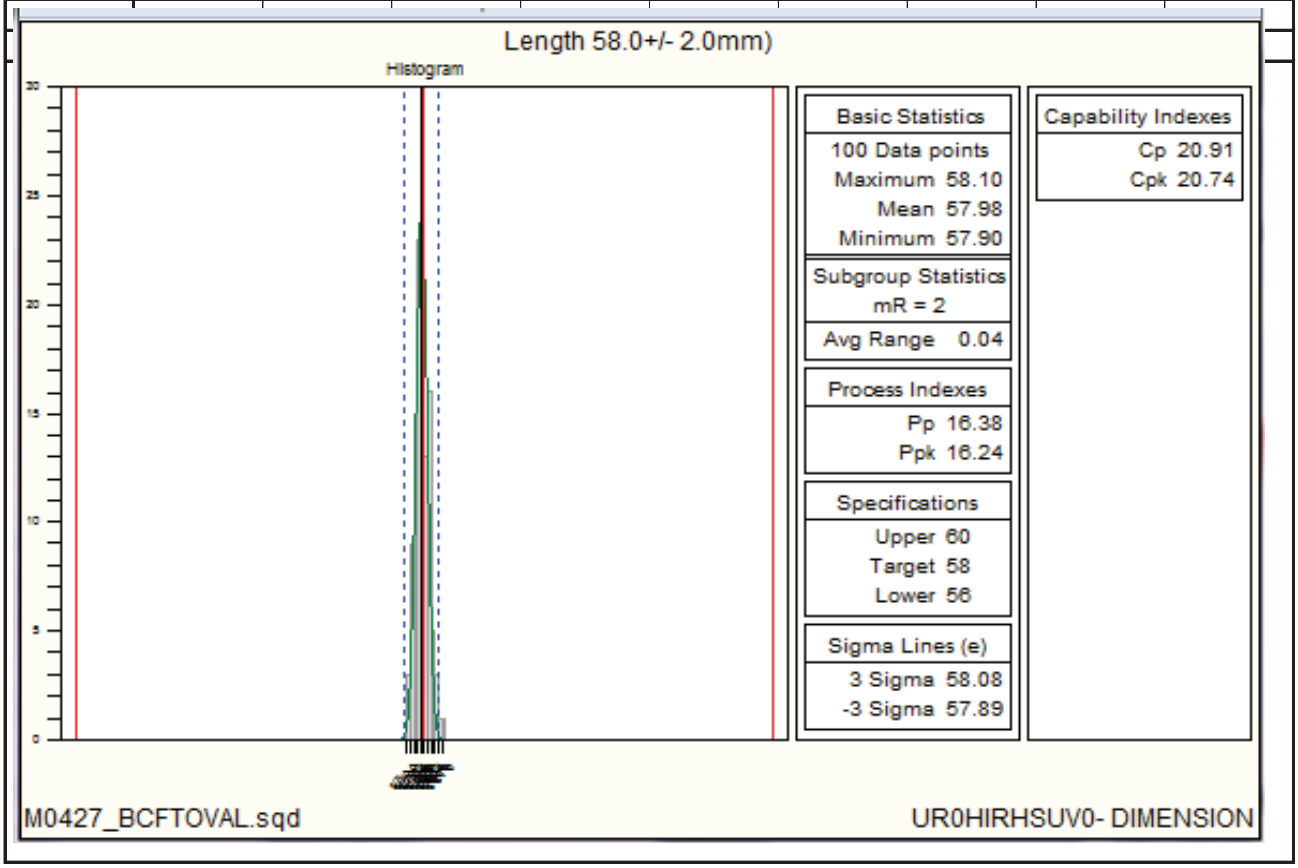
Initial Process Study

Part No.	Part Description	Supplier
151-01403	Tape Clip with Oval Fir Tree	HellermannTyton

Drawing No.	Drawing Date	Drawing Revision	Inspection Facility
11-0339-001-CSU	1/7/2016	12.1	HT-Milwaukee

Production Date	Material	Tool No.	Inspector
7/6/2016	UR0HIRHSUV0	M0427	DC.

DATA	Length 58.0 +/- 2.0) mm								
1-9	58.03	57.96	57.96	58.01	58.09	58.04	58.05	57.93	58.00
10-18	57.95	58.01	57.99	57.95	57.97	58.02	57.96	57.94	57.97
19-27	58.00	58.10	58.02	58.02	57.97	57.94	57.97	58.04	58.01
28-36	57.99	58.01	58.00	57.96	57.98	58.06	57.95	57.99	58.00
37-45	58.05	58.06	57.92	57.99	57.98	58.01	57.99	57.94	57.93
46-54	57.95	57.97	58.00	57.95	57.97	58.02	58.02	58.02	58.02
55-63	58.04	58.02	57.94	58.00	58.02	57.97	57.99	58.02	58.06
64-72	57.93	57.97	58.03	58.02	57.98	58.02	58.02	57.95	57.99
73-81	57.96	57.99	57.99	58.00	58.02	58.00	57.97	57.97	57.96
82-90	57.93	57.96	57.94	57.91	57.96	57.97	57.97	57.95	57.93
91-99	57.94	57.93	57.96	57.90	57.95	57.96	57.93	57.91	57.92
100-108	57.97								



R&R Study Results Using Specifications

2/1/2018

Gage number:	TGM-628	Done by:	Donna Szczepanski
Gage description:	Scale	Part name:	151-01314
Gage type:	Scale	Characteristics:	weight
Study name:	Anova Gage R & R	Specifications:	LSL=2.4 Nominal=2.5 USL=2.6
Study date:	01/26/2018	Number of Distinct Categories:	116.6139

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 = 0.0003189476

%EV = 0.9568438

Reproducibility - Appraiser Variation (AV)
AV = 0.0002463516

%AV = 0.7390556

Repeatability & Reproducibility (R&R)
R&R = 0.0004030096

%R&R = 1.20903

Part Variation (PV)
PV = 0.03333087

%PV = 99.99269

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.0333333

Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	2.5679	2.568	2.5509	2.5709	2.5694	2.5403	2.5431	2.5706	2.5696	2.5382
Donna	2	2.568	2.5682	2.5511	2.5709	2.5683	2.5409	2.5431	2.5703	2.5696	2.5384
Donna	3	2.5671	2.5688	2.5511	2.5708	2.5691	2.5406	2.5436	2.5705	2.5698	2.5388
Taleala	1	2.5671	2.5677	2.551	2.5708	2.569	2.5406	2.5434	2.5696	2.57	2.5385
Taleala	2	2.5678	2.5682	2.5512	2.5711	2.569	2.5409	2.543	2.5705	2.5698	2.5385
Taleala	3	2.5676	2.5685	2.5513	2.5712	2.5695	2.5403	2.5433	2.5707	2.57	2.5387
Rob	1	2.568	2.5687	2.5516	2.5703	2.5691	2.5408	2.5438	2.5709	2.5698	2.5387
Rob	2	2.5685	2.5689	2.5519	2.5716	2.5698	2.5416	2.5436	2.5708	2.5701	2.539
Rob	3	2.5681	2.5691	2.5514	2.5715	2.5698	2.5415	2.5439	2.5705	2.5703	2.539

HellermannTyton

R&R Study Results Using Specifications

2/6/2018

Gage number:	TGM-537	Done by:	QA_Admin
Gage description:	Digital Indicator	Part name:	T50R0
Gage type:	Indicator	Characteristics:	Head Height
Study name:	ANOVA Scale R&R	Specifications:	LSL=5.3 Nominal=5.9 USL=6.5
Study date:	01/15/2018	Number of Distinct Categories:	80.32957

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 = 0.003347164

%EV = 1.673582

Reproducibility - Appraiser Variation (AV)
AV = 0.001056678

%AV = 0.528339

Repeatability & Reproducibility (R&R)
R&R = 0.003509997

%R&R = 1.754999

Part Variation (PV)
PV = 0.1999692

%PV = 99.9846

Specification Spread (USL-LSL)/
(USL - LSL)/ = 0.2

Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Taleala	1	5.74	5.74	5.72	5.75	5.72	5.77	5.74	5.75	5.74	5.72
Taleala	2	5.73	5.74	5.73	5.75	5.72	5.78	5.75	5.75	5.74	5.72
Taleala	3	5.74	5.74	5.73	5.75	5.72	5.77	5.75	5.76	5.75	5.72
Felicia	1	5.73	5.74	5.72	5.74	5.72	5.77	5.74	5.75	5.74	5.72
Felicia	2	5.74	5.74	5.73	5.74	5.73	5.78	5.74	5.75	5.74	5.73
Felicia	3	5.73	5.74	5.72	5.74	5.72	5.77	5.74	5.75	5.74	5.72
Joyce	1	5.74	5.74	5.72	5.74	5.72	5.77	5.74	5.76	5.74	5.73
Joyce	2	5.73	5.74	5.73	5.74	5.72	5.78	5.74	5.75	5.74	5.72
Joyce	3	5.73	5.74	5.72	5.74	5.72	5.77	5.74	5.75	5.75	5.72

R&R Study Results
Using Specifications

2/6/2018

Gage number:	TGM-760	Done by:	QA_Admin
Gage description:	Micro-Vu	Part name:	T50R0
Gage type:	Micro-Vu	Characteristics:	Length
Study name:	Anova Gage RR	Specifications:	LSL=196 Nominal=202 USL=208
Study date:	01/12/2018	Number of Distinct Categories:	1633.901

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 = 0.0009959223 — %EV = 0.04979611

Reproducibility - Appraiser Variation (AV)
AV = 0.0014096 — %AV = 0.07048

Repeatability & Reproducibility (R&R)
R&R = 0.00172593 — %R&R = 0.08629649

Part Variation (PV)
PV = 1.999999 — %PV = 99.99996

Specification Spread (USL-LSL)/
(USL - LSL)/ = 2

Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Barry	1	197.9685	197.9134	197.8128	197.828	197.7084	197.8157	198.0724	197.6714	197.9272	198.0251
Barry	2	197.9657	197.911	197.8131	197.8262	197.7127	197.8153	198.0736	197.6719	197.9272	198.0263
Barry	3	197.9667	197.9111	197.813	197.8269	197.7125	197.8127	198.0763	197.6731	197.9272	198.0271
Donna	1	197.967	197.9108	197.814	197.8282	197.7128	197.812	198.0751	197.6749	197.9277	198.027
Donna	2	197.9677	197.9099	197.8139	197.8273	197.7106	197.812	198.075	197.6779	197.9287	198.0277
Donna	3	197.9681	197.9096	197.8153	197.8279	197.7139	197.8135	198.0746	197.6779	197.9293	198.0279
Taleala	1	197.968	197.9102	197.8166	197.8304	197.7147	197.815	198.0754	197.6788	197.9295	198.028
Taleala	2	197.9682	197.9109	197.8174	197.8319	197.7153	197.8154	198.0754	197.6809	197.9286	198.0289
Taleala	3	197.9692	197.9101	197.818	197.8307	197.7154	197.8145	198.076	197.6801	197.9315	198.0289

HellermannTyton

R&R Study Results
Using Specifications

1/31/2018

Gage number:	TGM-966	Done by:	Donna Szczepanski
Gage description:	Global Performance 7-10-7	Part name:	133-01339
Gage type:	Coordinate Measuring Machine	Characteristics:	
Study name:	Anova Gage R & R	Specifications:	LSL=193.77 Nominal=194.47 USL=195.17
Study date:	01/26/2018	Number of Distinct Categories:	15.66439

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 = 0.01851334

%EV = 7.934321

Reproducibility - Appraiser Variation (AV)
AV = 0.009738355

%AV = 4.173599

Repeatability & Reproducibility (R&R)
R&R = 0.02091839

%R&R = 8.965065

Part Variation (PV)
PV = 0.2323928

%PV = 99.59733

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

Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Tom	1	184.2818	184.3054	184.2134	184.3446	184.2817	184.4099	184.1092	184.3943	184.5566	184.5174
Tom	2	184.311	184.2812	184.2398	184.3407	184.2711	184.4173	184.092	184.3912	184.5438	184.5198
Tom	3	184.2663	184.2774	184.2218	184.3436	184.2964	184.4163	184.1053	184.4084	184.5551	184.5127
Dave	1	184.2344	184.305	184.1868	184.3155	184.2766	184.3772	184.0993	184.4225	184.5465	184.5188
Dave	2	184.2632	184.2456	184.2533	184.3096	184.2957	184.4001	184.0926	184.3564	184.5102	184.4883
Dave	3	184.2346	184.2579	184.2209	184.2919	184.2628	184.3929	184.1042	184.3468	184.5107	184.5146
Rob	1	184.2706	184.2944	184.2427	184.3427	184.2969	184.3777	184.1079	184.3828	184.5559	184.506
Rob	2	184.3106	184.3253	184.188	184.3414	184.2729	184.3944	184.0905	184.392	184.5135	184.5014
Rob	3	184.2378	184.3008	184.2495	184.3303	184.273	184.3649	184.0979	184.351	184.5271	184.4758

HellermannTyton

R&R Study Results
Using Specifications

2/1/2018

Gage number:	TGM-650	Done by:	Donna Szczepanski
Gage description:	Tensile Tester	Part name:	T120R
Gage type:	Tensile Tester	Characteristics:	Tensile Strength
Study name:	Anova Gage R & R	Specifications:	LSL=120 Nominal=158 USL=196
Study date:	10/17/2017	Number of Distinct Categories:	35.33951

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 = 0.1764119

%EV = 1.392726

Reproducibility - Appraiser Variation (AV)
AV = 0.4731652

%AV = 3.735514

Repeatability & Reproducibility (R&R)
R&R = 0.5049816

%R&R = 3.986697

Part Variation (PV)
PV = 12.6566

%PV = 99.9205

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

Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Joyce	1	150.45	156.85	154.74	153.07	157.58	158.25	162.5	159.98	159.26	162.5
Joyce	2	150.68	157	154.87	153.07	157.62	158.32	162.52	160.1	159.31	162.52
Joyce	3	151.2	157.07	155.11	153.28	157.59	158.33	162.53	160.31	159.38	162.53
Taleala	1	151.81	157.11	155.55	153.49	157.7	158.43	162.56	160.5	159.49	162.56
Taleala	2	151.86	157.13	155.96	153.8	157.76	158.65	162.84	160.65	159.77	162.84
Taleala	3	151.91	157.25	156.13	154.17	157.88	158.84	162.92	160.73	159.77	162.92
Robin	1	152.44	157.34	156.23	154.21	157.99	158.91	163.06	160.74	159.8	163.06
Robin	2	152.65	157.4	156.73	154.51	158.08	159.16	163.66	160.79	159.84	162.66
Robin	3	152.67	157.48	156.78	154.64	158.14	159.25	163.67	161.2	159.95	162.67

HellermannTyton

R&R Study Results
Using Specifications

2/6/2018

Gage number:	TGM-918	Done by:	Donna Szczepanski
Gage description:	Caliper	Part name:	151-01314
Gage type:	Caliper	Characteristics:	Width
Study name:	Anova Gage R & R	Specifications:	LSL=22.15 Nominal=23.15 USL=24.15
Study date:	01/26/2018	Number of Distinct Categories:	76.27592

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 = 0.006103516

%EV = 1.831055

Reproducibility - Appraiser Variation (AV)
AV = 0.0008380898

%AV = 0.2514269

Repeatability & Reproducibility (R&R)
R&R = 0.006160787

%R&R = 1.848236

Part Variation (PV)
PV = 0.3332764

%PV = 99.96293

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

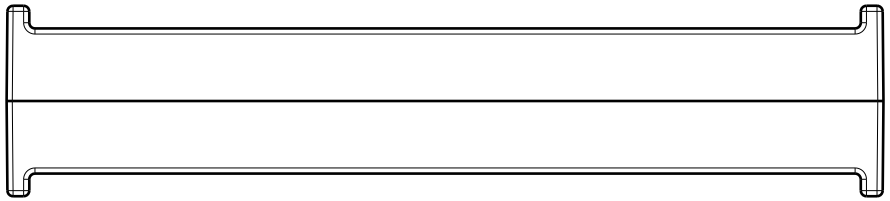
Appraiser	Replication	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	23.15	23.18	23.23	23.22	23.21	23.22	23.19	23.21	23.19	23.19
Donna	2	23.14	23.17	23.22	23.21	23.19	23.23	23.18	23.22	23.18	23.18
Donna	3	23.15	23.17	23.22	23.22	23.2	23.23	23.18	23.22	23.18	23.18
Taleala	1	23.15	23.17	23.21	23.21	23.21	23.22	23.17	23.22	23.18	23.18
Taleala	2	23.15	23.18	23.2	23.22	23.2	23.23	23.19	23.21	23.18	23.18
Taleala	3	23.14	23.17	23.21	23.21	23.2	23.22	23.19	23.21	23.19	23.18
Rob	1	23.15	23.17	23.22	23.22	23.21	23.23	23.19	23.21	23.19	23.18
Rob	2	23.16	23.18	23.21	23.22	23.2	23.23	23.19	23.2	23.18	23.18
Rob	3	23.16	23.17	23.22	23.22	23.2	23.21	23.17	23.21	23.19	23.18

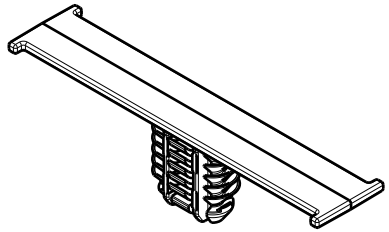
HellermannTyton

CATIA V5

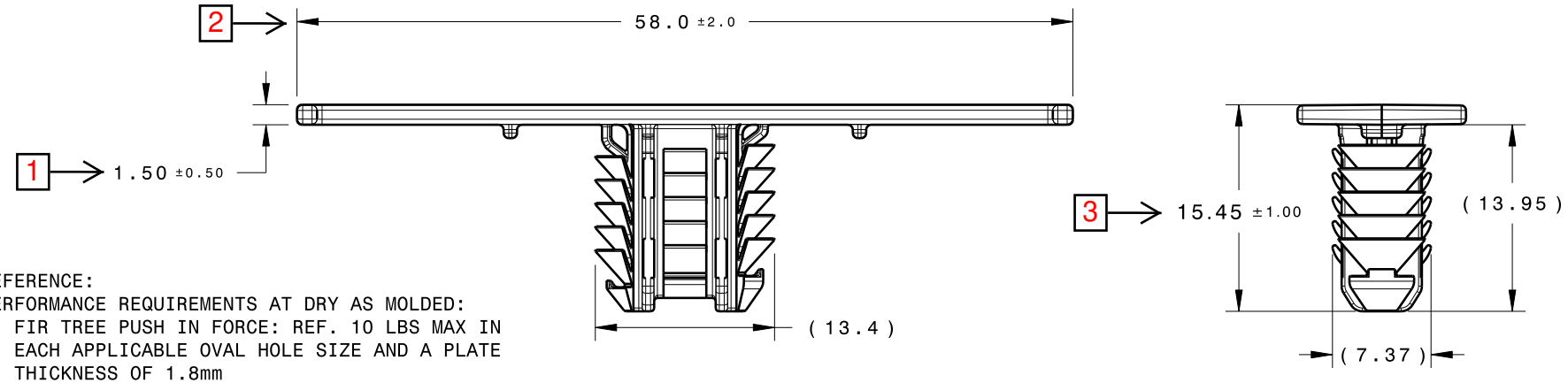
Revision Level			Revision Record	Changed	Date	Approved	Date
Drawing	State	Part					
12.1	Design Release	D	SEE ECN# 013334	CJR	1/7/16	KVH	1/7/16

012.1





ISOMETRIC VIEW (1/1)



REFERENCE:
PERFORMANCE REQUIREMENTS AT DRY AS MOLDED:
1. FIR TREE PUSH IN FORCE: REF. 10 LBS MAX IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm
2. FIR TREE PULL OUT FORCE: REF. 25 LBS MIN IN EACH APPLICABLE OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm
3. SHEET METAL THICKNESS RANGE: 0.60mm - 6.0mm
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 →

COLOR	TYPE NUMBER
NATURAL	BCFTOVAL
BLACK	BCFTOVAL

Material
PA66HIRHS ← 4
COLOR: SEE TABLE

Units **millimeters**

Tolerance defined on each dimension

Drawn	SJA	04/22/11
Approved	AAC	04/22/11

HellermannTyton
North America
Email: corp@htamericas.com
Web: www.hellermann.tyton.com

Article/Type-No: SEE TABLE

Title: TAPE CLIP WITH OVAL FIR TREE

Drawing-No: **11-0339-001-CSU**

PRODUCTION : Phase

Scale: 2:1

Project Number: 11-0339

Format: AH

Sheet: 1/1