

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.:			
99551	with submission date	22.09.2022	will be considered as complete and valid auto-
atically on	22.10.2022	unless otherwise disposed!	

Part Submission Warrant

Part Name CC16R Cust. Part Number HU5T-14E042-C
 Shown on Drawing No. 17-0833-001-CSU Org. Part Number 15102206
 Engineering Change Level 00.0 Dated 15.05.2017
 Additional Engineering Changes n/a Dated n/a
 Safety and/or Government Regulation ☐ Yes ☒ No Purchase Order No. 15102206 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

25436

Germany

City

Region

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:

676874221

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.

V. Lohse

Date 22-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)



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

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

Certificate Date : 04-Mar-22

Delivery No : 382607871

Shipped Qty : 11,022.928 Lbs
5,000.000 Kgs

Customer P.O. No: 4500171533 AIFREIGHT

Container : 0000000000002089636

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 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: VYDYNE 47H BK0644

Material No: 10397365

Batch No: KA18FY04

Date of Mfg: 18-Jan-2022

Ascend Performance Materials Operations LLC Specification

<u>Lot Data Property</u>	<u>Test Method</u>	<u>Min</u>	<u>Max</u>	<u>Result</u>	<u>Units</u>
Copper	STM 00667	125	250	202	PPM
Moisture	STM 00835	0.10	0.20	0.10	%
NOTCHED CHARPY	STM 01255	14.0		21.0	kJ/m^2
Strength @ Yld	STM 01253	50	70	58	MPa

Note: This certificate is generated and controlled by electronic means. No signature is required. This document may not be reproduced, except in full, without written consent of the Nylon Plastics and Polymers Department, Ascend Performance Materials Operations LLC.

All information contained in this letter is provided for informational purposes only and is not meant to alter or waive the appropriate contractual product specifications. Moisture values are representative of the product at the time it was sampled. If numerical flame spread ratings appear herein, they are not intended to reflect the hazards presented by this or any other material under actual fire conditions. Each end user should determine whether potential fire hazards are associated with the finished product, and whether this resin is suitable for the particular end use.

This Certificate of Analysis is provided by Ascend Performance Materials (or its authorized distributor) to its direct purchaser only and is intended for internal use. It is not valid if resold, conveyed or otherwise transferred to another party without Ascend's prior written consent. Ascend makes no warranties and assumes no liability for any product or certification obtained from an unauthorized source. Contact Ascend at +1 713-315-5700 to confirm the validity of any third party supplier. Ascend and Vydne are registered trademarks of Ascend Performance Materials Operations LLC.

**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	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Results				
													Actions Taken	Severity	Occurrence	Detection	R P N
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	New Dryer system	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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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 -	Implemen- ted 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	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)	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	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	3	Incorrect or Missing Date Code on the Box	3	Wrong/no date code on package	7	63	None						0
	Greasy Parts Packaged	4	Part Non-Compliance	1	Ejector Pin / Machine Grease	8	32	None						0
	Incorrect / Missing Labels	3	Customer Dissatisfaction	2	Printer Ribbon not Inserted Properly	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.	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
 HT Dwg.# and Rev: Various
 Customer P/N and Rev: Various
 Customer Name: Various

Program Name: NA
 Created By: Gwendolyn Benz
 Creation Date: 10/22/07

	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 per TS-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			Special Char. Class	METHODS				Reaction Plan	
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE			Control Method
									Size	Freq		
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
			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	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	Notify Supervisor and Tool Room
			2	Push In / Push On Force (If Needed)			Per Drawing / SQC Pack	Force Tester or Tensometer	1 Shot	At Initial Validation	SPC Software	Retest / 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

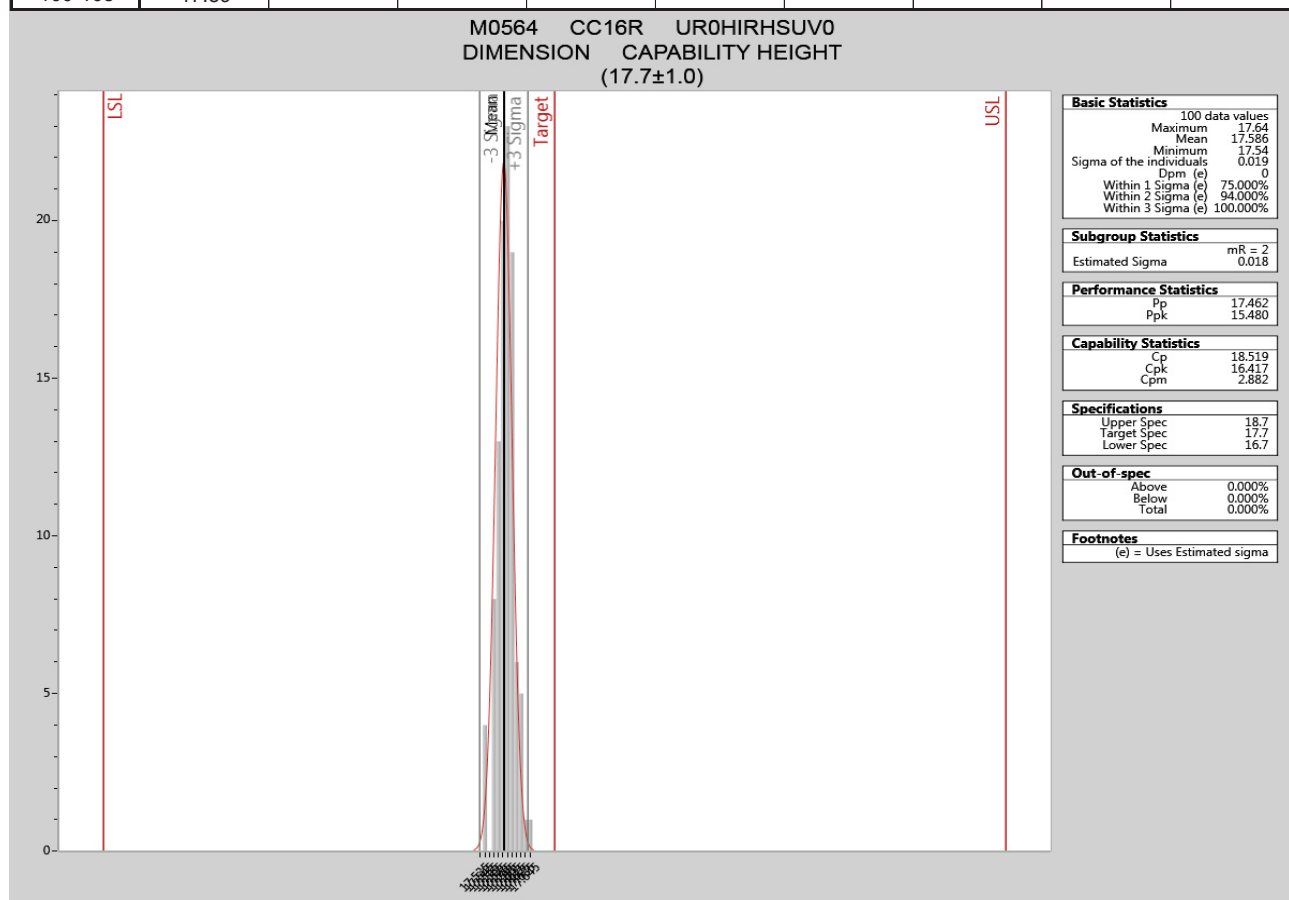
Quality Assurance		Team Supervisor	Material Handler		Processing Technician	Operator		QA and/or Team Supervisor			Shipping and/or Receiving	
Part / Process Number	Process Name / Operation Description	Machine, Device, Jig, Tools for MFG.	CHARACTERISTICS			Special Char. Class	METHODS					Reaction Plan
			NO.	PRODUCT	PROCESS		Product/Process Specification/ Tolerance	Evaluation/ Measurement Technique	SIZE		Control Method	
									Size	Freq		
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
		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

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		
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
		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

Initial Process Study

Part No. 151-02206	Part Description 8x14mm OVAL FIR TREE WITH CC FOR EWCAP-005-11 CLIP SLOT	Supplier HellermannTyton	
Drawing No. 17-0833-001-CSU	Drawing Date 5/15/2017	Drawing Revision 0	Inspection Facility HT-Milwaukee
Production Date 8/1/2017	Material UR0HIRHSUV0	Tool No. M0564	Inspector D.Copeland

DATA	DIM 17.7±1.0 mm								
1-9	17.54	17.60	17.61	17.57	17.59	17.59	17.54	17.58	17.54
10-18	17.56	17.57	17.62	17.56	17.57	17.59	17.59	17.60	17.58
19-27	17.61	17.60	17.58	17.57	17.57	17.57	17.59	17.59	17.59
28-36	17.59	17.61	17.57	17.57	17.60	17.57	17.58	17.59	17.57
37-45	17.60	17.57	17.59	17.62	17.59	17.59	17.58	17.58	17.58
46-54	17.59	17.62	17.58	17.59	17.58	17.60	17.60	17.57	17.60
55-63	17.60	17.58	17.60	17.56	17.58	17.58	17.58	17.58	17.58
64-72	17.60	17.62	17.58	17.64	17.57	17.60	17.62	17.56	17.59
73-81	17.63	17.60	17.60	17.56	17.61	17.54	17.61	17.59	17.59
82-90	17.59	17.59	17.56	17.59	17.56	17.56	17.60	17.60	17.58
91-99	17.58	17.58	17.58	17.61	17.60	17.60	17.60	17.59	17.59
100-108	17.59								



Gage R&R

R&R Study Results Using Specifications

Gage number:	TGM-628	Done by:	Donna Szczepanski
Gage description:	Scale	Part name:	HDM500BUSHING
Gage type:	Scale	Characteristics:	Weight
Study name:	Gage R&R	Specifications:	LSL=9.22 Nominal=9.32 USL=9.42
Study date:	01/27/2017	Number of Distinct Cate	298.5769

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 = 0.0001476421

%EV = 0.4429267

Reproducibility - Appraiser Variation (AV)

AV = 5.45911E-05

%AV = 0.1637734

Repeatability & Reproducibility (R&R)

R&R = 0.0001574115

%R&R = 0.4722349

Part Variation (PV)

PV = 0.03333293

%PV = 99.99889

Specification Spread (USL-LSL)/

(USL - LSL) = 0.0333333

Appraiser	Replicate	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	9.3792	9.275	9.3019	9.3126	9.3516	9.2857	9.2819	9.2732	9.3045	9.311
Donna	2	9.3794	9.2749	9.302	9.3127	9.3516	9.2859	9.2823	9.2735	9.3044	9.3109
Donna	3	9.3797	9.2745	9.3019	9.3124	9.3515	9.2862	9.282	9.2737	9.3042	9.3108
Robert	1	9.3795	9.2754	9.3021	9.3122	9.351	9.2862	9.2821	9.2738	9.3047	9.3104
Robert	2	9.3793	9.2751	9.302	9.3121	9.3509	9.286	9.2823	9.2737	9.3048	9.3103
Robert	3	9.3794	9.2752	9.302	9.3122	9.351	9.2859	9.2825	9.2737	9.3049	9.31
Taleala	1	9.3792	9.2753	9.3019	9.3122	9.351	9.2858	9.2823	9.2734	9.3045	9.3101
Taleala	2	9.3794	9.2751	9.3018	9.3123	9.351	9.2862	9.2825	9.2733	9.3047	9.31
Taleala	3	9.3792	9.2752	9.302	9.3121	9.3509	9.2861	9.2823	9.2733	9.3045	9.31

Gage R&R

R&R Study Results Using Specifications

Gage number:	TGM-760	Done by:	Donna Szczepanski
Gage description:	Micro-Vu	Part name:	T50R0HSM4
Gage type:	Micro-Vu	Characteristics:	LENGTH
Study name:	Annual Gage R & R	Specifications:	LSL=196 Nominal=202 USL=208
Study date:	01/27/2017	Number of Distinct Cate	

Objective:

Comment:

Interpretation guidelines

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

Results based on specifications

Measurement Unit Analysis

Specification Spread (USL-LSL)/%10

Repeatability - Equipment Variation (EV)

EV = %1

%EV = %2

Reproducibility - Appraiser Variation (AV)

AV = %3

%AV = %4

Repeatability & Reproducibility (R&R)

R&R = %5

%R&R = %6

Part Variation (PV)

PV = %7

%PV = %8

Specification Spread (USL-LSL)/%10

(USL - LSL)/%10 = %9

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Barry	1	198.3937	195.6462	196.7406	197.8381	197.8253	197.8198	197.9252	197.9103	197.9053	197.9078
Barry	2	198.3925	195.6467	196.7411	197.8373	197.8252	197.8208	197.9256	197.9098	197.9055	197.9067
Barry	3	198.3933	195.6457	196.74	197.8375	197.8244	197.8215	197.9256	197.9096	197.9061	197.9081
Robert	1	198.394	195.646	196.7402	197.8379	197.8244	197.8201	197.9262	197.9097	197.9053	197.9084
Robert	2	198.3937	195.6457	196.7405	197.8375	197.8237	197.8199	197.9261	197.91	197.9055	197.9072
Robert	3	198.3941	195.6454	196.7405	197.8376	197.8246	197.821	197.9266	197.9089	197.9059	197.908
Donna	1	198.3938	195.6457	196.7401	197.8373	197.8248	197.8195	197.9263	197.9091	197.9049	197.908
Donna	2	198.3943	195.6453	196.7405	197.8376	197.8249	197.8202	197.9263	197.909	197.9055	197.9088
Donna	3	198.394	195.6456	196.7403	197.8371	197.8243	197.8201	197.9258	197.9084	197.9056	197.9081

Gage R&R

R&R Study Results Using Specifications

Gage number:	TGM-918	Done by:	Donna Szczepanski
Gage description:	Caliper	Part name:	T50R
Gage type:	Caliper	Characteristics:	Width
Study name:	Annual Gage R & R	Specifications:	LSL=4.4 Nominal=4.6 USL=4.8
Study date:	01/27/2017	Number of Distinct Cate	16.8596

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 = 0.005512863

%EV = 8.269292

Reproducibility - Appraiser Variation (AV)

AV = 0.000691507

%AV = 1.03726

Repeatability & Reproducibility (R&R)

R&R = 0.005556063

%R&R = 8.334092

Part Variation (PV)

PV = 0.06643476

%PV = 99.65211

Specification Spread (USL-LSL)/

(USL - LSL) = 0.06666669

Appraiser	Replicate	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	4.65	4.7	4.7	4.7	4.88	4.69	4.69	4.81	4.69	4.49
Donna	2	4.64	4.69	4.69	4.7	4.88	4.68	4.69	4.8	4.7	4.5
Donna	3	4.65	4.7	4.69	4.69	4.89	4.69	4.69	4.81	4.7	4.5
Taleala	1	4.65	4.69	4.69	4.67	4.89	4.68	4.67	4.8	4.7	4.5
Taleala	2	4.65	4.69	4.69	4.69	4.89	4.69	4.69	4.81	4.7	4.49
Taleala	3	4.64	4.7	4.69	4.69	4.88	4.69	4.69	4.81	4.7	4.49
Marreall	1	4.64	4.7	4.7	4.69	4.89	4.68	4.7	4.8	4.69	4.49
Marreall	2	4.65	4.69	4.69	4.69	4.89	4.68	4.7	4.8	4.69	4.5
Marreall	3	4.65	4.69	4.69	4.7	4.88	4.69	4.69	4.8	4.7	4.5

Gage R&R

R&R Study Results Using Specifications

Gage number:	TGM-966	Done by:	Donna Szczepanski
Gage description:	Global Performance 7-10-7	Part name:	133-01889
Gage type:	Coordinate Measuring Machine	Characteristics:	
Study name:	Annual Gage R & R	Specifications:	LSL=82.44 Nominal=82.99 USL=83.54
Study date:	01/26/2017	Number of Distinct Cate	15.48943

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 = 0.01526946	%EV = 8.328806

Reproducibility - Appraiser Variation (AV)	
AV = 0.006562775	%AV = 3.5797

Repeatability & Reproducibility (R&R)	
R&R = 0.01662006	%R&R = 9.065498

Part Variation (PV)	
PV = 0.1825782	%PV = 99.58823

Specification Spread (USL-LSL)/
(USL - LSL) = 0.1833331

Appraiser	Replicate	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
RSC	1	83.3904	83.568	83.5971	83.5169	83.5981	83.3302	83.4234	82.9692	83.4501	83.5741
RSC	2	83.3938	83.5743	83.5822	83.5387	83.6147	83.3004	83.4494	82.9852	83.4355	83.6305
RSC	3	83.3998	83.5491	83.6211	83.5407	83.621	83.3449	83.4478	82.9887	83.4502	83.6083
DS	1	83.4048	83.5076	83.5413	83.556	83.6141	83.2832	83.4243	82.9823	83.4402	83.5572
DS	2	83.405	83.5077	83.5775	83.5314	83.6074	83.3178	83.4356	82.9836	83.4085	83.5454
DS	3	83.4089	83.543	83.5638	83.5383	83.6239	83.329	83.4568	82.9913	83.4448	83.5549
DC	1	83.42091	83.5285	83.5948	83.5475	83.5788	83.3378	83.458	83.0248	83.4174	83.6015
DC	2	83.4027	83.5385	83.5832	83.5223	83.5892	83.3355	83.443	82.9868	83.4141	83.5986
DC	3	83.4003	83.5339	83.5661	83.5146	83.5718	83.3173	83.4162	83.0146	83.4232	83.5785

Gage R&R

R&R Study Results Using Study Parameters

Gage number:	TGM-537	Done by:	Donna Szczepanski
Gage description:	Digital Indicator	Part name:	T50L0M4
Gage type:	Indicator	Characteristics:	HEIGHT
Study name:	Annual Gage R & R	Specifications:	LSL=5 Nominal=5.6 USL=6.2
Study date:	01/27/2017	Number of Distinct Cate	

Objective:

Comment:

Interpretation guidelines

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

Results based on study parameters

Measurement Unit Analysis Total Variation (TV)

Repeatability - Equipment Variation (EV)

EV = %1 %EV = %2

Reproducibility - Appraiser Variation (AV)

AV = %3 %AV = %4

Repeatability & Reproducibility (R&R)

R&R = %5 %R&R = %6

Part Variation (PV)

PV = %7 %PV = %8

Total Variation (TV)

TV = %9

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	5.47	6.25	5.67	5.57	5.61	5.54	5.5	5.53	5.39	5.69
Donna	2	5.46	6.25	5.66	5.59	5.61	5.54	5.51	5.52	5.39	5.69
Donna	3	5.46	6.25	5.67	5.59	5.61	5.53	5.49	5.53	5.39	5.69
Taleala	1	5.46	6.25	5.66	5.56	5.62	5.53	5.49	5.52	5.39	5.68
Taleala	2	5.47	6.25	5.67	5.57	5.61	5.53	5.49	5.53	5.38	5.68
Taleala	3	5.46	6.24	5.66	5.57	5.63	5.52	5.5	5.53	5.39	5.67
Marreall	1	5.47	6.25	5.66	5.58	5.63	5.52	5.5	5.52	5.38	5.67
Marreall	2	5.48	6.24	5.67	5.59	5.62	5.52	5.51	5.53	5.38	5.68
Marreall	3	5.48	6.25	5.67	5.59	5.63	5.53	5.5	5.53	5.39	5.67

Gage R&R

R&R Study Results Using Specifications

Gage number:	TGM-850	Done by:	Donna Szczepanski
Gage description:	Tensile Tester	Part name:	T150MOX2
Gage type:	Tensile Tester	Characteristics:	TENSILE
Study name:	Annual Gage R & R	Specifications:	LSL=350 Nominal=400 USL=450
Study date:	09/05/2016	Number of Distinct Cate	33.77499

Objective:

Comment:

Interpretation guidelines

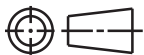
< 10%	generally considered to be an acceptable measurement system
10%-30%	may be acceptable based upon importance of application, cost of measurement device, cost of repair etc.
> 30%	considered to be not acceptable - every effort should be made to improve the measurement system

Results based on specifications

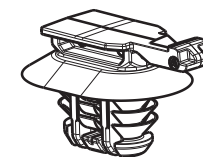
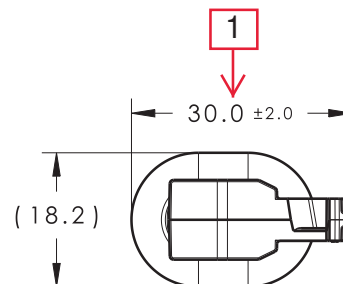
Measurement Unit Analysis	Specification Spread (USL-LSL)/
Repeatability - Equipment Variation (EV)	
EV = 0.5977558	%EV = 3.586535
Reproducibility - Appraiser Variation (AV)	
AV = 0.3549044	%AV = 2.129426
Repeatability & Reproducibility (R&R)	
R&R = 0.6951756	%R&R = 4.171054
Part Variation (PV)	
PV = 16.65216	%PV = 99.91298
Specification Spread (USL-LSL)/	
(USL - LSL) = 16.66667	

Appraiser	Replicati	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
Donna	1	412.72	397.78	404.6	408.78	396.05	402.22	405.73	410.82	389.22	407.63
Donna	2	412.57	399.11	403.87	409.73	396.68	402.27	405.44	410.15	390.27	408.1
Donna	3	414.47	397.85	403.65	408.79	396.13	403.21	406.39	410	390.24	407.69
Taleala	1	414.82	397.63	404.83	408.97	395.15	400.96	405.76	410.05	391.3	407.32
Taleala	2	414.04	398.32	404.53	408.52	395.75	399.79	405.35	411.83	390.51	407.42
Taleala	3	416.31	396.93	404.84	408.78	395.51	400.03	405.39	410.34	391.35	406.07
Marreall	1	412.83	397.2	403.15	408.01	393.95	399.72	405.5	410.07	392.4	406.62
Marreall	2	414.54	396.58	403.48	407.64	395.16	400.1	405.05	410.25	391.75	406.23
Marreall	3	413.5	397.36	403.25	408.07	395.29	401.18	405.65	408.24	391.7	406.4

CATIA V5



Revision Level			Revision Record	Changed	Date	Approved	Date
Drawing	State	Part					
00.0	Design Release		SEE ECN# 013847	HDC	05/15/17	EJH	05/15/17

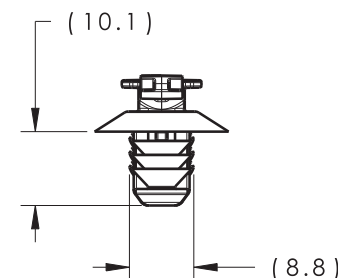
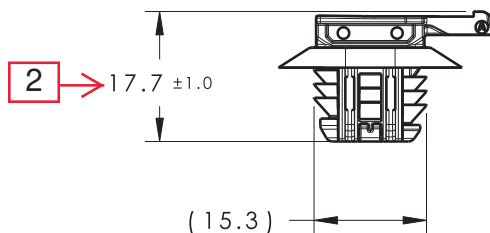


ISOMETRIC VIEW

REFERENCE:

PERFORMANCE REQUIREMENTS AT DRY AS MOLDED:

1. FIR TREE PUSH IN FORCE: 45 NEWTONS (10 LBS) MAX IN EACH APPLICABLE NOMINAL OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm.
2. FIR TREE PULL OUT FORCE: 110 NEWTONS (25 LBS) MIN IN EACH APPLICABLE NOMINAL OVAL HOLE SIZE AND A PLATE THICKNESS OF 1.8mm.
3. SHEET METAL THICKNESS RANGE: 0.60mm - 3.00mm
4. APPLICABLE OVAL HOLE SIZES:
 - A. 8.0 X 14.0mm +/- 0.2
 - B. 8.0 X 15.0mm +/- 0.2
5. DESIGNED TO MEET PUSH IN/PULL OUT FORCES OF SAE/USCAR-2
6. FITS INTO USCAR CLIP SLOT SPECIFICATION EWCAP-005-11 (NOT A TEST SPEC.)



<div>Material</div> <div>PA66HIRHS</div> <div>COLOR: BLACK</div> <div><div><div></div><div>3</div></div></div>	<div>Units<div>millimeters</div></div>	<div>The copyright of this drawing is reserved by HellermannTyton. It is issued on condition that it is not reproduced, copied or disclosed to a third party, either wholly or in part, without the consent of HellermannTyton.</div>	<div>Drawn</div> <div>HDC</div> <div>4/12/17</div>	<div>Article/Type-No</div> <div>CC16R</div>	<div>Scale</div> <div>1:1</div>
	<div>Tolerance defined on each dimension</div>		<div>Approved</div> <div>EJH</div> <div>5/15/17</div>	<div>Title</div> <div>8 X 14mm OVAL HOLE FIR TREE WITH CC FOR EWCAP-005-11 CLIP SLOT</div>	<div>Project Number</div> <div>17-0833</div>
			<div>HellermannTyton</div> <div>North America</div> <div>Email: corp@htamericas.com</div> <div>Web: www.hellermann.tyton.com</div>	<div>Drawing-No</div> <div>PRODUCTION : Phase</div> <div>17-0833-001-CSU</div>	<div>Format</div> <div>AH</div>
					<div>Sheet</div> <div>1/1</div>