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.: **92125** with submission date 28.09.2020 will be considered as complete and valid automatically on **28.10.2020** unless otherwise disposed!

HellermannTyton

HellermannTyton GmbH internal remarks: PB-No.: **92125**

Part Describtion: Strain relief straight GPN 140934

Part Submission Warrant

Part Name **Strain relief straight** Cust. Part Number **EU5T-14E042-MA**

Shown on Drawing No. **EU5T-14E042-MA** Org. Part Number **13303557**

Engineering Change Level **AELE-E-11789584-835** Dated **06.04.2017**

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

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. **13303557** Weight (kg) **0,0024**

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: **673936508**

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 28-Sep-20

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.: **92125**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E042-MA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**Strain relief straight**
INSPECTION FACILITY:	**QS-Laboratory**	DESIGN RECORD CHANGE LEVEL:	11789584-835 06.04.2017
		ENGINEERING CHANGE DOCUMENTS:	
		NAME of LABORATORY:	

ITEM	DIMENSION / SPECIFCATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)			OK	NOT OK
					mean	min	max		
1	10,85	± 0,5			10,80	10,79	10,81	☑	☐
2	7,2	± 0,5			7,0	7,0	7,0	☑	☐
3	1,5	± 0,25			1,5	1,5	1,5	☑	☐
4	14,2	± 0,5			14,39	14,39	14,39	☑	☐
5	14,4	± 0,5			14,5	14,5	14,5	☑	☐
								☐	☐
								☐	☐
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								☐	☐

Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	**TITLE**	**DATE**
i.A. N. Lohse	Quality Assistant	28-Sep-20

Production Part Approval, Performance Test Results

HellermannTyton

Internal PB-No.: **92125**

Production Part Approval
Performance Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E042-MA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**Strain relief straight**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	11789584-835 06.04.2017
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.			

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA) / TEST CONDITIONS	OK	NOT OK
						☐	☐
6	**Marking area:**					☑	☐
	Ford oval trademark				**Does exist on the part**	☐	☐
	Ford part number				**Executed as "EU5T14E042MA"**	☐	☐
	Cavity number				**Does exist on the part**	☐	☐
	Supplier code: ECLNT				**Executed as "ECLNT"**	☐	☐
	Material code				**Executed as ">PA66<"**	☐	☐
						☐	☐
7	**Cable insulation stop feature**				**No sharp edges exist in this area**	☑	☐
	no sharp edges allowed in this					☐	☐
	area					☐	☐
						☐	☐
8	**Part must be free of burrs, flash**				**Part is free of burrs, flash and sharp**	☑	☐
	and sharp edges that may				**edges, that could affect the function,**	☐	☐
	affect the function, safe handling,				**safe handling, installation or removal**	☐	☐
	installation or removal of the part				**of the part**	☐	☐
						☐	☐
9	**Sources for materials defined**				**See pos. 6 and 10.**	☑	☐
	by Ford material specifications				**Has been respected when the item was**	☐	☐
	shall be selected from the Ford				**constructed.**	☐	☐
	motor company engineering					☐	☐
	material approved source list.					☐	☐
	Part has met the polymetric					☐	☐
	material code parts marking					☐	☐
	exemption for weight.					☐	☐
						☐	☐
						☐	☐
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						☐	☐
						☐	☐
						☐	☐
						☐	☐

Blanket statements of conformance are unacceptable for any test results.

This letter is done automatically and is valid without signature.

CREATOR	TITLE	DATE
i.A. N. Lohse	Quality Assistant	28-Sep-20

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **92125**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E042-MA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**Strain relief straight**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	11789584-835 06.04.2017
*CUSTOMER SPECIFIED SUPPLIER/VENDOR		ENGINEERING CHANGE DOCUMENTS:	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.		NAME of LABORATORY:	

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA)	OK	NOT OK
						☐	☐
10	**Material Spec. PA6/6**				**Material is PA 66 in compliance to**	☑	☐
	WSS-M4D706-B1				**spec. WSS-M4D076-B1**	☐	☐
						☐	☐
11	**Color black**				**Color is black**	☑	☐
						☐	☐
12	**Max. allowable regrind content**				**No regrind used, closed loop**	☑	☐
	25% by weight					☐	☐

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	28-Sep-20

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

HellermannTyton

P-FMEA	A-00	Project- No GPN / NT Nr.	variable	Revision date Überarbeitungsdatum	18.05.2020
Group Assignment Produkt Gruppe	fastening elements (Befestigungselement)	Installation location Verbauort des Bauteils		Revision by Überarbeitet durch:	M. Michel
Part No Artikel Nr.	variable	Drawing number Zeichnung Nr.	variable	Review Date Überprüfungsdatum	18.05.2021
Part Description Artikel Bezeichnung	variable	Ind. Of Drwg. /date Zg. Index / Datum	variable	Reviewed by Überprüft durch	M. Michel
Core Team FMEA Team	M.Michel Prod., O.Pracht QS, H.Spieß PE, S.Behrend NT-PM				
Process Responsibility Prozessverantwortung bei	HT-Tornesch	Version of FMEA Version der FMEA	12	FMEA is electronic generatet and administradet. No Signature required. Diese FMEA ist elektronisch erstellt und verwaltet. Gültig ohne Unterschrift.	
Prepared by Erstellt von	Marco Michel	Original Issue Date Erstausgabe Datum	19.05.2010		

						Current status Derzeitiger Zustand							improved stage Verbesserter Zustand				
Feature / System / Process Merkmal / System / Prozess	location	Potential failure Potentieller Fehler	Potential consequences of failure Potentielle Folgen des Fehlers	D	Potential cause Potentielle Fehlerursache	Preventive and test measures Verhütungs- und Prüfmaßnahmen	A	B	E	RPZ	Recommended rectifying measures Empfohlene Abstellmaßnahmen	Responsible Verantwortlich Date / Datum	Implemented measures Getroffene Maßnahmen	A	B	E	RPZ
Resin	H T	no stocks	unable to start manufacture	N	poor stock control	P: bag stock on consignment	2	8	1	16							0
Goods Inwards	H T	incorrect goods	use wrong material	N	Supplier error	T: Goods in check	2	8	3	48							0
	H T	incorrect moisture content	cant't process	N	Supplier error	P: Cerificate of analysis	3	5	4	60							0
	H T	incorrect quantity	half production	N		P: Advised in advance	2	6	1	12							0
Resin Stores	H T	incorrect material issued	delayed production	N	Stores error	P: Production verify delivery	5	3	3	45							0
Injection moulding	H T	part not fully moulded or flash on part	functional degradation	N	improper moulding parameters	P: visual check FSK-pos.1,2,3 Individual testing according FSK	3	3	7	63							0

						Current status Derzeitiger Zustand							improved stage Verbesserter Zustand				
Feature / System / Process Merkmal / System / Prozess	**location**	**Potential failure** Potentieller Fehler	**Potential consequences of failure** Potentielle Folgen des Fehlers	**D**	**Potential cause** Potentielle Fehlerursache	**Preventive and test measures** Verhütungs- und Prüfmaßnahmen	A	B	E	RPZ	**Recommended rectifying measures** Empfohlene Abstellmaßnahmen	**Responsible** Verantwortlich **Date /** Datum	**Implemented measures** Getroffene Maßnahmen	A	B	E	RPZ
	H T	mould misalignment	heavy handling/ processing	N	improper sliding bolt	Visual check FSK-pos.4 Individual testing according FSK	2	3	7	42							0
	H T	flowing lines	optical degradation	N	improper mould parameters improper mould temperature	P: Visual inspection FSK-pos.5	3	1	7	21							0
	H T	burnings	optical degradation	N	improper mould venting	P: visual check FSK-pos.6	4	5	7	140	24 hours test, to put ejectors, ventilation improved	Technical Center , Mr.Bösel , 01.04.2015	Expansion check list =continuous	2	5	7	70
	H T		optical degradation	N	improper moulding parameters	P: Rules I manufacturing instructions T: visual check by manufacturing control	4	5	7	140	To re-use saved last injection parameter	Production Mr.Rust 15.04.2015	continuous	2	5	7	70
	H T	mould misalignment	functional degradation	N	wear of mould	P: maintance of mould T: functional check by manufacturing control	2	7	7	98							0
	H T		optical degradation	N	wear of mould	P: maintance of mould T: visualll check by manufacturing control	2	4	7	56							0
	H T	contamination	optical degradation	N	machine and accessories not clean enough	P: visual check FSK-pos.7	4	2	7	56							0

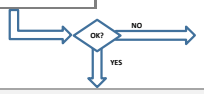
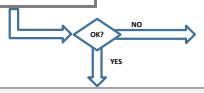
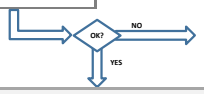
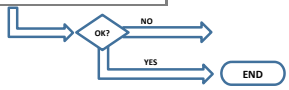
						Current status Derzeitiger Zustand								improved stage Verbesserter Zustand				
Feature / System / Process Merkmal / System / Prozess	**location**	**Potential failure** Potentieller Fehler	**Potential consequences of failure** Potentielle Folgen des Fehlers	**D**	**Potential cause** Potentielle Fehlerursache	**Preventive and test measures** Verhütungs- und Prüfmaßnahmen	A	B	E	RPZ	**Recommended rectifying measures** Empfohlene Abstellmaßnahmen	**Responsible** Verantwortlich **Date /** Datum	**Implemented measures** Getroffene Maßnahmen	A	B	E	RPZ
	HT	contamination	increased sensitiveness to break	N	material contamination	P: visual check FSK-pos.7 Individual testing according FSK	3	6	5	90							0
	HT			N	optical degradation	P: Visual inspection FSK-pos.5	4	2	7	56							0
	HT			N	thermical damage	P: visual check FSK-pos.7 Individual testing according FSK	3	7	7	147	Working instruction after start/stop, to observe parameter on the machine.	Production Mr.Rust 30.03.2015	training for employees	2	7	7	98
							2	7	7	98	In arrangement with mould management about avoidance of "bleak corners" in the hot channel system. 02.05.2018	Mould Management Mr. Florian Peters 02.05.2018	Admission to the tool specification 02.05.2018	2	7	7	98
	HT			N	Insufficient running reserve at material change	P: visual check FSK-pos.7 Individual testing according FSK	3	6	5	90							0
	HT	deformation	optical and functional degradation	N	defective production equipment	P: visual check FSK-pos.9	3	3	6	54							0
	HT	mixed parts caused by various tool insert	missing/ wrong parts at customer side	N	malfunction of handling or robot	P: visual check	2	6	6	72							0
allocation	HT	improper quantity of water	insufficient mechanical features	N	improper dosing equipment	P: measuring test of the dosing quantity FSK-pos.14,15	2	3	8	48							0
	HT	improper welding seam	open bags, improper moisture content	N	incorrect adjustment of the equipment, heating device defective	P: visual and mechanical check FSK-pos.16	3	3	6	54							0
	HT	improper printing/ bag stamp	goods wrongly identified	N	defective or incorrectly adjusted stamps, wrong bags or labels	T: visual check FSK-pos.17	3	5	4	60							0

						Current status Derzeitiger Zustand								improved stage Verbesserter Zustand				
Feature / System / Process Merkmal / System / Prozess	**location**	**Potential failure** Potentieller Fehler	**Potential consequences of failure** Potentielle Folgen des Fehlers	**D**	**Potential cause** Potentielle Fehlerursache	**Preventive and test measures** Verhütungs- und Prüfmaßnahmen	A	B	E	RPZ	**Recommended rectifying measures** Empfohlene Abstellmaßnahmen	**Responsible** Verantwortlich **Date /** Datum	**Implemented measures** Getroffene Maßnahmen	A	B	E	RPZ
	H T	incorrect number of pcs.	delivery of short or excess quantities	N	improper counting device	T: quantity check FSK-pos.18	3	3	4	36							0
	H T	mixed parts	missing /wrong parts at customer side	N	human error	T : visual checks, training,rotating articles,production card, FSK-pos.45	2	5	8	80							0
Storing goods	H T	no storage	no delivery to customer	N	incorrect master-data	T : crosscheck data	6	8	2	96							0
commissioning	H T	incorrect charge carrier	wrong parts to customer	N	insufficient charge carrier	L : Logistic verify charge carrier	3	2	1	6							0
	H T	ncorrect charge carrier	wrong parts to customer	N	human error	L : Logistic verify charge carrier	3	2	1	6							0
	H T	no storage	no delivery	N	damaged packing	L : visual check / repacking	2	4	1	8							0
Shipping goods	H T	wrong VDA label	missing /wrong parts at customer side	N	human error	L : crosscheck shipment / daily shipping audits	2	6	8	96							0

Process Flow Chart

PART NUMBER:	133-03557	GPN:	14-0934
PART NAME:	Strain relief straight-PA66HIRHS-BK		
DRAWING :	EU5T-14E042-MA		
PRODUCT GROUP:	A-00	PRODUCTION PLANT:	HT Tornesch

CORE TEAM:	PE, NTPM, QM, PR
KEY CONTACT PHONE:	+49 4122 701 330
DATE REVIEWED:	19.06.2020
CUSTOMER APPROVAL:	

Process / test procedure			document
100	goods in		
	20	incoming inspection	
		011-50005 PA66 HIR HS UV BK	
			VA13.1
200	injection moulding		
	50	process inspection first / final shot + 1 per shift visual attributes 1-9 by production / for process parameter see EDP-System	
		133-03557 Strain relief straight-PA66HIRHS-BK	
			VA13.1
500	packaging		
	55	packaging inspection	
		133-03557 Strain relief straight-PA66HIRHS-BK	
			VA13.1
1000	ARTICLE-AUDIT		
	100	annual layout	
		133-03557 Strain relief straight-PA66HIRHS-BK	
			VA13.1

Control Plan

rev: 29.09.2017

○ Prototyp
○ Pre-Launch
◉ Production

PART NUMBER: 133-03557 GPN: 14-0934
PART NAME: Strain relief straight-PA66HIRHS-BK
DRAWING : EU5T-14E042-MA
PRODUCT GROUP: A-00 PRODUCTION PLANT: HT Tornesch

CORE TEAM: PE, NTPM, QM, PR
KEY CONTACT PHONE: +49 4122 701 330
DATE REVIEWED: 19.06.2020
CUSTOMER APPROVAL:

Part / Prozess No / Characteristic	SC	Part / Prozess Specification / Tolerance	Sample Size	Frequenz	Evaluation / Measurement Technique Control Method	Reaction Plan
20 incoming inspection						VA13.1
011-50005 PA66 HIR HS UV BK						
302 COC residual moisture			1 bag	1 / delivery	410000 manual / visual	
50 process inspection						VA13.1
133-03557 Strain relief straight-PA66HIRHS-BK						
1 sink marks			1 shot	1 / day	504337 Master Samples, visual	
2 shortage			1 shot	1 / day	504337 Master Samples, visual	
3 Flashes			1 shot	1 / day	504337 Master Samples, visual	
4 mould mis alignment			1 shot	1 / day	504337 Master Samples, visual	
5 moulding lines			1 shot	1 / day	504337 Master Samples, visual	
6 burnings			1 shot	1 / day	504337 Master Samples, visual	
7 dirt			1 shot	1 / day	504337 Master Samples, visual	
8 deformation			1 shot	1 / day	504337 Master Samples, visual	
9 inclusions			1 shot	1 / day	504337 Master Samples, visual	
65 shot weight		see test procedure	1 shot	1 / day	20000 balance	
131 functinal check			1 shot	1 / day	410000 manual / visual	
55 packaging inspection						VA13.1
133-03557 Strain relief straight-PA66HIRHS-BK						
16 bag sealing			1 bag	1 / start off	410000 manual / visual	
17 label			1 bag	1 / start off	420000 sample / visual	
18 quantity			1 bag	1 / start off	430000 scale counter / manual	

Control Plan

rev: 29.09.2017

○ Prototyp
○ Pre-Launch
◉ Production

PART NUMBER:	133-03557	GPN:	14-0934
PART NAME:	Strain relief straight-PA66HIRHS-BK		
DRAWING :	EU5T-14E042-MA		
PRODUCT GROUP:	A-00	PRODUCTION PLANT:	HT Tornesch

CORE TEAM:	PE, NTPM, QM, PR
KEY CONTACT PHONE:	+49 4122 701 330
DATE REVIEWED:	19.06.2020
CUSTOMER APPROVAL:	

Part / Prozess No / Characteristic	SC	Part / Prozess Specification / Tolerance	Sample Size	Frequenz	Evaluation / Measurement Technique Control Method	Reaction Plan
55 packaging inspection						VA13.1
133-03557 Strain relief straight-PA66HIRHS-BK						
45 mixed parts in pack unit			1 bag	1 / start off	410000 manual / visual	
100 annual layout						VA13.1
133-03557 Strain relief straight-PA66HIRHS-BK						
1200 requalification / product audit acc. DRW-spec incl. packageing (1 part-No for mentioned part group)			1 shot	acc. AUDITPLAN		

HellermannTyton

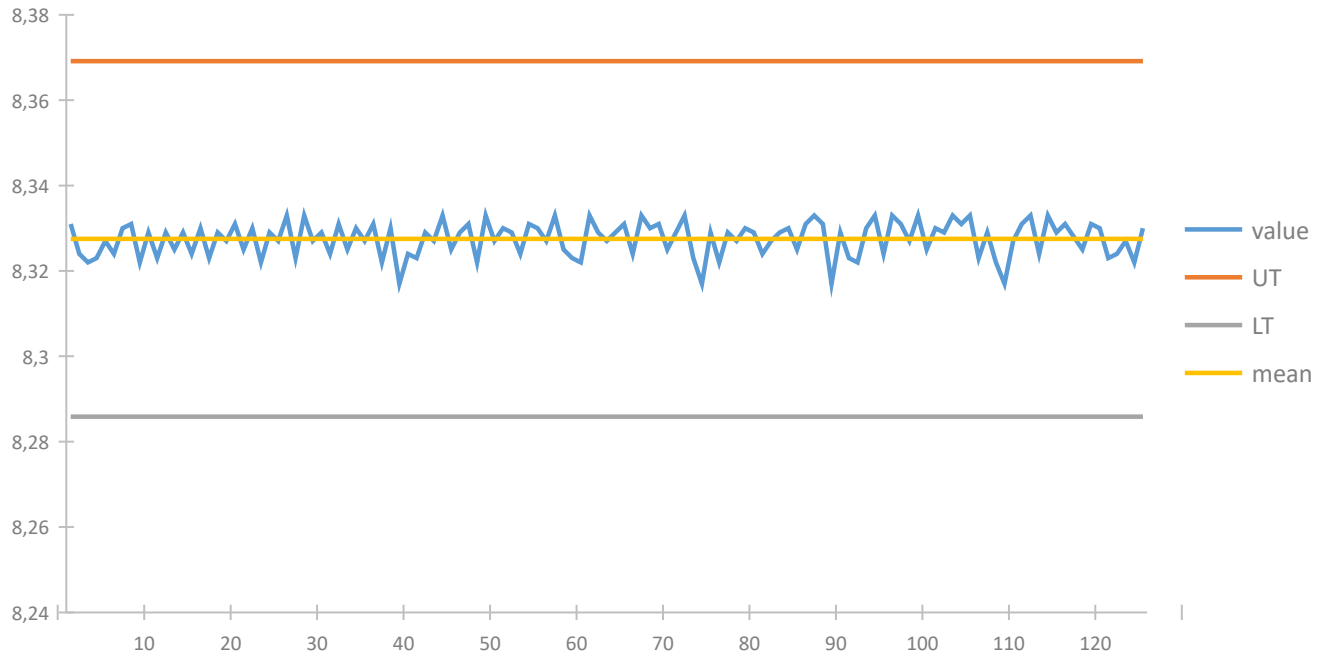
RPT: PPK_14-0934_002853

CAPABILITY STUDY

-shot weight-

06.08.2020

gpn:	14-0934				
part name:	Strain relief straight-PA66HIRHS-BK			ppk:	3,50
spec (+/- [%])	0,500				
tolerance (+/- [g])	0,042			ppk spec (min):	1,67
min:	8,317	mean:	8,327		
max:	8,333	stddiv:	0,004		



data tab:

no	value														
1	8,331	17	8,323	33	8,325	49	8,333	65	8,331	81	8,324	97	8,331	113	8,324
2	8,324	18	8,329	34	8,330	50	8,327	66	8,324	82	8,327	98	8,327	114	8,333
3	8,322	19	8,327	35	8,327	51	8,330	67	8,333	83	8,329	99	8,333	115	8,329
4	8,323	20	8,331	36	8,331	52	8,329	68	8,330	84	8,330	100	8,325	116	8,331
5	8,327	21	8,325	37	8,322	53	8,324	69	8,331	85	8,325	101	8,330	117	8,328
6	8,324	22	8,330	38	8,330	54	8,331	70	8,325	86	8,331	102	8,329	118	8,325
7	8,330	23	8,322	39	8,317	55	8,330	71	8,329	87	8,333	103	8,333	119	8,331
8	8,331	24	8,329	40	8,324	56	8,327	72	8,333	88	8,331	104	8,331	120	8,330
9	8,322	25	8,327	41	8,323	57	8,333	73	8,323	89	8,317	105	8,333	121	8,323
10	8,329	26	8,333	42	8,329	58	8,325	74	8,317	90	8,329	106	8,323	122	8,324
11	8,323	27	8,323	43	8,327	59	8,323	75	8,329	91	8,323	107	8,329	123	8,327
12	8,329	28	8,333	44	8,333	60	8,322	76	8,322	92	8,322	108	8,322	124	8,322
13	8,325	29	8,327	45	8,325	61	8,333	77	8,329	93	8,330	109	8,317	125	8,330
14	8,329	30	8,329	46	8,329	62	8,329	78	8,327	94	8,333	110	8,327		
15	8,324	31	8,324	47	8,331	63	8,327	79	8,330	95	8,324	111	8,331		
16	8,330	32	8,331	48	8,322	64	8,329	80	8,329	96	8,333	112	8,333		

HellermannTyton

REPEATABILITY AND REPRODUCIBILITY ANALYSIS REPORT

acc. to MSA 4th Edition

NON DESTRUCTIVE TEST

Specimen :	Cable guide EPS ri (GPN 19--0884	Gage type :	Weight scale	Plant :	Tornesch
Part. No. :	133-07186	Gage number :	PMN 02-0140	Date :	09.02.2021
Characteristic :	Shot weight (±5‰)	performed by:		approved by:	
Tolerance :	0,899 Units gramm	Name:	Jens Feil		Jens Feil
		Signature:			

# of operators:	3	# of trials:	3	# of parts:	10

OPERATOR	A:	S. Specker	B:	Buck	C:	Kirste

		P		A		R		T				RESULTS	
	TRIAL #	1	2	3	4	5	6	7	8	9	10		AVG
A	1	89,940	89,970	89,920	89,950	89,940	89,920	89,940	89,940	89,920	89,920	A_1	
	2	89,940	89,960	89,920	89,950	89,940	89,920	89,940	89,940	89,920	89,920	A_2	
	3	89,940	89,970	89,920	89,950	89,930	89,930	89,940	89,940	89,920	89,920	A_3	
Average		89,940	89,967	89,920	89,950	89,937	89,923	89,940	89,940	89,920	89,920	X_A	**89,9357**
Range		0,000	0,010	0,000	0,000	0,010	0,010	0,000	0,000	0,000	0,000	R_A	**0,0030**
B	1	89,940	89,970	89,920	89,950	89,940	89,920	89,940	89,940	89,920	89,920	B_1	
	2	89,940	89,960	89,920	89,950	89,930	89,920	89,940	89,950	89,930	89,930	B_2	
	3	89,940	89,970	89,930	89,950	89,930	89,930	89,940	89,940	89,920	89,920	B_3	
Average		89,940	89,967	89,923	89,950	89,933	89,923	89,940	89,943	89,923	89,923	X_B	**89,9367**
Range		0,000	0,010	0,010	0,000	0,010	0,010	0,000	0,010	0,010	0,010	R_B	**0,0070**
C	1	89,950	89,970	89,920	89,950	89,940	89,920	89,940	89,930	89,930	89,920	C_1	
	2	89,960	89,980	89,920	89,960	89,950	89,920	89,930	89,930	89,930	89,930	C_2	
	3	89,940	89,980	89,920	89,960	89,930	89,920	89,940	89,940	89,930	89,930	C_3	
Average		89,950	89,977	89,920	89,957	89,940	89,920	89,937	89,933	89,930	89,927	X_C	**89,9390**
Range		0,020	0,010	0,000	0,010	0,020	0,000	0,010	0,010	0,000	0,010	R_C	**0,0090**
PART		89,9433	89,9700	89,9211	89,9522	89,9367	89,9222	89,9389	89,9389	89,9244	89,9233	R_{PART} =	0,0489

$R = R_A + R_B + R_C$ / No of operators	0,0030	+	0,0070	+	0,0090	/	3	R =	0,0063
X_{DIFF} = [Max $(X)_{ABC}$] - [Min $(X)_{ABC}$]	= 89,9390	-	89,9357					X_{DIFF} =	0,0033
UCL_R = R * D_4 =	0,0063	*	2,58					UCL_R =	0,0163
D_4 = 3,27 for 2 trials		2,58 for 3 trials							

Measurement Unit Analysis

Repeatability : Equipment Variation (EV)

EV = $R * K_1$

EV = 0,0037

Trials	K_1
3	0,5908

Total Variation Method: % EV = 100[EV/TV]; **% EV =** **23,52**

Tolerance Method: % EV = 100[EV/(tol/6)]; **% EV =** **2,50**

Reproducibility : Appraiser Variation (AV)

AV = $[(X_{DIFF} * K_2)^2 - (EV^2 / nr)]^{1/2}$

AV = 0,0016

(n parts, r trials)

Oper	K_2
3	0,5231

Total Variation Method: % AV = 100[AV/TV]; **% AV =** **10,08**

Tolerance Method: % AV = 100[AV/(tol/6)]; **% AV =** **1,07**

Repeatability & Reproducibility (GRR)

GRR = $(EV^2 + AV^2)^{1/2}$

GRR = 0,0041

Total Variation Method: %GRR=100[GRR/TV]; **%GRR =** **25,59**

Tolerance Method: %GRR=100[GRR/(tol/6)]; **%GRR=** **2,72**

Part Variation (PV)

PV = $R_{PART} * K_3$

PV = 0,0154

Parts	K_3
10	0,3146

Total Variation Method: % PV = 100[PV/TV]; **% PV =** **96,67**

Total Variation (TV)

TV = $(GRR^2 + PV^2)^{1/2}$

TV = 0,0159

Number of Distinct Categories (ndc)

ndc = 1.41(PV / GRR)

ndc = 5,32686

CONCLUSION:

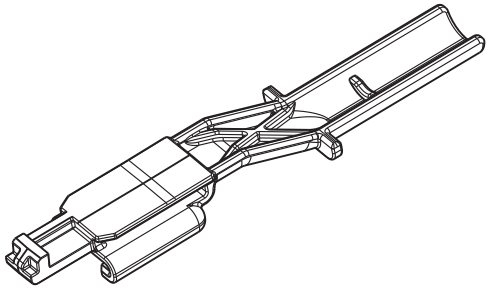
Gage system is satisfactory.

- Under 10% error	Gage system is satisfactory.
- 10% to 30% error	May be acceptable based upon importance of application, cost of gage, cost of repairs, etc.
- Over 30% error	Gage system is not satisfactory. Identify the causes and take corrective action.

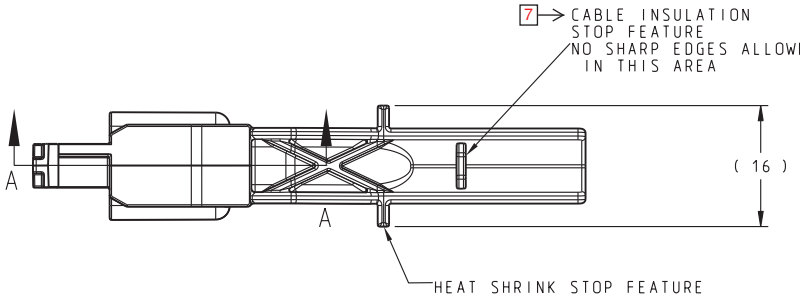
Remarks:

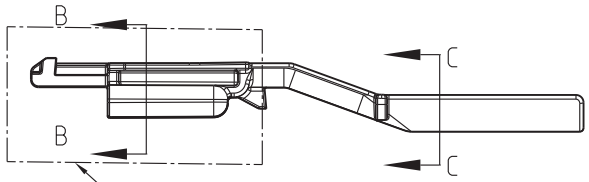
RET WIR CONN				
FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	MATERIAL SPEC.	COLOR	ESTIMATED PART WEIGHT
EU5T-14E042-M	CONNECTOR CLIP STRAIN RELIEF STRAIGHT	PA 6/6 WSS-M4D706-B1	BLACK	2.2 GRAMS

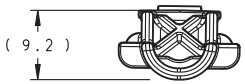
10 11

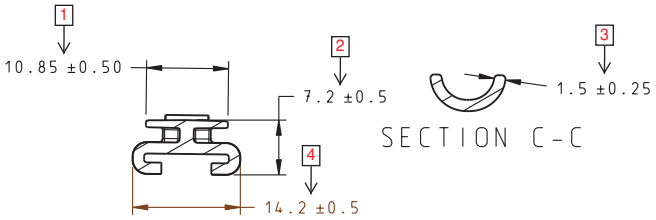


ISOMETRIC VIEW



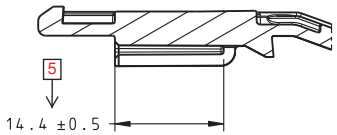






SECTION B-B

SECTION C-C



SECTION A-A

UNLESS OTHERWISE SPECIFIED:

1. N/A
2. FOR CURRENT RELEASE STATUS, SEE THE WERS ENGINEERING NOTICE
3. CHANGES TO DESIGN, COMPOSITION OR PROCESSING OF THE PART PREVIOUSLY APPROVED FOR PRODUCTION REQUIRE PRIOR APPROVAL FROM FORD MOTOR COMPANY PRODUCT ENGINEERING. REFER TO ISO/TS 16949
8. 4. PART MUST BE FREE OF BURRS, FLASH AND SHARP EDGES THAT MAY AFFECT THE FUNCTION, SAFE HANDLING, INSTALLATION OR REMOVAL OF THE PART.
5. N/A
6. N/A
9. 7. SOURCES FOR MATERIALS DEFINED BY FORD MATERIAL SPECIFICATIONS SHALL BE SELECTED FROM THE FORD MOTOR COMPANY ENGINEERING MATERIAL APPROVED SOURCE LIST.
PART HAS MET THE POLYMERIC MATERIAL CODE PARTS MARKING EXEMPTION FOR WEIGHT.
12. 8. MAXIMUM ALLOWABLE REGRIND CONTENT 25% BY WEIGHT.
9. N/A

LTRS	REVISIONS			
ORIGINATOR	CHECKER	ENGR APP	MATL APP	
RELEASED				
AELE-E-11789584-835		20170406		
TPUSILO	D.ZIMMERM	RVITALI		

HellermannTyton

HELLERMANNTYTON
GROSSER MOORWEG 45
25436 TORNESCH, GERMANY
Tel:+49(0)4122-701-0

GSDB CODE: CF90A | APP DATE: 20170406

REFERENCE	CONNECTOR CLIP STRAIN RELIEF STRAIGHT		
PART MUST COMPLY WITH RESTRICTED SUBSTANCE MANAGEMENT STANDARD WSS-M99P9999-A1 TO SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT			
DRAFTED IN ACCORDANCE WITH FORD MOTOR COMPANY ENGINEERING CAD AND DRAFTING STANDARDS VERSION 29		3RD ANGLE PROJ DIMENSIONS ARE IN MILLIMETERS	
CAD TYPE K-CATIA5	CAD LOC. TCe	CAD FILE EU5T-14E042-M-DWG-01 /01	DTMC IS MASTER
OPER. NO. N/A	UNIT N/A	DRAWING EU5T-14E042-MA	
DESIGN M.KROHN	DETAIL TPUSILO	TITLE RET WIR CONN	SHT 1 OF 1
CHECKED D.ZIMMERM	SAFETY MFG USE		N/A
SCALE 2:1	DATE 20170406	DIVISION N/A PLANT N/A	

FORD MOTOR COMPANY