HellermannTyton | HellermannTyton GmbH internal remarks: | PB-No.: **30366** | Part Describtion: T50SOSFT6-E3 GPN

Part Submission Warrant

Part Name **T50SOSFT6-E3** | Cust. Part Number **FU5T-14E047-LA** / **FU5T-14E047-LA**

Shown on Drawing No. **FU5T-14E047-LA** | Org. Part Number **157-00241**

Engineering Change Level **AELE-E-12982958-173** | Dated **15.04.20106**

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

Safety and/or Government Regulation ☐ Yes ☑ No | Purchase Order No. **157-00241** | Weight (kg) **0,0015**

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

Erdem Ula
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: **ID: 577689953**

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 230000 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.** **i.A.** Date 3-May-17

Print Name **i.A. O. Pracht** / **i.A. A. Kalkowski** Assistant Doc. QD +49 (0) 4122 701 330 Fax No. +49 4122 701 241

Title **PRQM** E-mail O.Pracht@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.: **30366**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**FU5T-14E047-LA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50SOSFT6-E3**
INSPECTION FACILITY:	**QS Laboratory**	DESIGN RECORD CHANGE LEVEL:	12982958-173 15.04.20106
		ENGINEERING CHANGE DOCUMENTS:	

ITEM	DIMENSION / SPECIFICATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)			OK	NOT OK
					mean	**min**	**max**		
1	**161,5**	**± 5**			**162,4**	**162,2**	**162,6**	☑	☐
2	**4,7**	**± 0,2**			**4,6**	**4,6**	**4,6**	☑	☐
3	**9,6**	**± 1**			**9,6**	**9,6**	**9,7**	☑	☐
4	**1,35**	**± 0,2**			**1,32**	**1,32**	**1,33**	☑	☐
5	**Ø16,0**	**± 1**			**16,0**	**16,0**	**16,1**	☑	☐
								☐	☐
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Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. A. Kalkowski	Assistant Doc. QD	
i.A. O. Pracht	PRQM	3-May-17

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **30366**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**FU5T-14E047-LA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50SOSFT6-E3**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	12982958-173 15.04.20106
*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
						☐	☐
	Material:					☐	☐
6	**PA66 HIRHS**				**is PA66 HIRHS**	☑	☐
	WSS-M4D706-B1				**acc. to WSS-M4D706-B1**	☐	☐
	color: black				**color is black**	☐	☐
						☐	☐
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Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. A. Kalkowski	Assistant Doc. QD	
i.A. O. Pracht	PRQM	3-May-17

Production Part Approval, Performance Test Results

HellermannTyton

Internal PB-No.: **30366**

Production Part Approval
Performance Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**FU5T-14E047-LA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50SOSFT6-E3**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	12982958-173 15.04.20106
*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
								☐	☐
7	**serrated side**				**is serrated side as shown on drawing**			☑	☐
								☐	☐
8	**Part must be free of burrs,**				**Part is free of burrs, flash and**			☑	☐
	flash and sharp edges that				**sharp edges that may affect the**			☐	☐
	may affect the function,				**function, safe handling, installation**			☐	☐
	safe handling, installation				**or removal of the part.**			☐	☐
	or removal of the part.							☐	☐
								☐	☐
					mean	**min.**	**max.**	☐	☐
9	**Fir tree push in force:**	**45N max.**			**21N**	**13N**	**30N**	☑	☐
								☐	☐
					mean	**min.**	**max.**	☐	☐
10	**Fir tree pull out force:**	**110N min.**			**402N**	**372N**	**432N**	☑	☐
								☐	☐
								☐	☐
11	**sheet metal thickness range**	**0,7- 3,5mm**			**suitable for thickness range 0,7- 3,5mm**			☑	☐
								☐	☐
12	**applicable hole size**	**6,5±0,4**			**suitable for hole size 6,1- 6,9mm**			☑	☐
								☐	☐
					mean	**min.**	**max.**	☐	☐
13	**cable tie loop tensile strength**	**min. 180N**			**290N**	**239N**	**317N**	☑	☐
								☐	☐
14	**bundle range**	**1- 20mm**			**suitable for bundle range 1- 20mm**			☑	☐
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								☐	☐

Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. A. Kalkowski	Assistant Doc. QD	
i.A. O. Pracht	PRQM	3-May-17

HellermannTyton GmbH internal remarks: PB-No.: **30366**

Part Describtion: T50SOSFT6-E3 GPN

Part Submission Warrant

Part Name **T50SOSFT6-E3** Cust. Part Number **FU5T-14E047-LA** / **FU5T-14E047-LA**

Shown on Drawing No. **FU5T-14E047-LA** Org. Part Number **157-00241**

Engineering Change Level **AELE-E-12982958-173** Dated **15.04.20106**

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

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. **157-00241** Weight (kg) **0,0015**

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

Erdem Ula
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: **ID: 577689953**

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
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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 230000 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.** **i.A.** Date 3-May-17

Print Name **i.A. O. Pracht** / **i.A. A. Kalkowski** Assistant Doc. QD +49 (0) 4122 701 330 Fax No. +49 4122 701 241

Title **PRQM** E-mail O.Pracht@HellermannTyton.de

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature Date

Print Name Customer Tracking Number (optional)

HellermannTyton

P-FMEA	**B-00**	**Project- No** GPN / NT Nr.	**variable**	**Revision date** Überarbeitungsdatum	**07.03.2017**
Group Assignment Produkt Gruppe	**cable ties (Kabelband)**	**Installation location** Verbauort des Bauteils		**Revision by** Überarbeitet durch:	**M. Michel**
Part No Artikel Nr.	**variable**	**Drawing number** Zeichnung Nr.	**variable**	**Review Date** Überprüfungsdatum	**07.03.2018**
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	**8**	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	**20.05.2010**		

						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 Goods Inwards	H T	no stocks	unable to start manufacture	N	poor stock control	P: bag stock on consignment	2	8	1	16							0
	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
	H T	incorrect coating	no funktion of the part	N	bad delivery resupply	P: certification report form supplier	2	6	7	84							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

FMEA No.: B-00						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	insufficient mould venting, improper moulding parameters	P: maintenance of mould, manufacturing instruction T: visual check by manufacturing control	2	2	2	8							0
	H T	contamination	optical degradation	N	machine and accessories not clean enough	P: visual check FSK-pos.7	4	2	7	56							0

FMEA No.: B-00						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	contamination	increased sensitiveness to break	N	material contamination	P: visual check FSK-pos.7 Individual testing according FSK	3	6	5	90							0
	H T			N	optical degradation	P: visual check FSK-pos.7	4	2	7	56							0
	H T			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				0
	H T			N	Insufficient running reserve at material change	P: visual check FSK-pos.7 Individual testing according FSK	3	6	5	90							0
	H T	deformation	optical and functional degradation	N	defective production equipment	P: visual check FSK-pos.9	3	3	6	54							0
allocation	H T	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
	H T	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
	H T	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
	H T	incorrect number of pcs.	delivery of short or excess quantities	N	improper counting device	T: quantity check FSK-pos.18	3	3	5	45							0

FMEA No.: B-00						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	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

☐ Prototyp ☐ Pre-launch ☑ Production

CONTROL PLAN

HellermannTyton

Control Plan No 15700241	Key Contact / Phone +49 4122 701 272	Date reviewed	Date rev. 29.06.2016
Part No / latest changelev 15700241 project:: 140904	Core Team PE / NTPM / QS / F	Customer Engineering Approval / date	
Part name/Description T50SOSFT6-E3 PGroup: 600	Supplier / Plant approval date	Customer Quality Approval / Date	
Supplier Plant Tornesch	other approval date / Drawing 14-0904-003-CSG	other Approval / Date	

Part / Prozess No	Prozess name / Operation description	Machine /	No / Product / Prozess Characteristics	SC	Part / Prozess Specification / Tolerance	Sample Size	Frequenz	Evaluation / Measurement Technique Control Method	Reaction Plan
20	incoming inspection								VA13.1
01150005	PA66 HIRHS		302-0 COC residual moisture			1 bag	1 delivery	410000 manual / visual	
50	process inspection +first / final shot + 1 per shift visuel attributes 1-9 by production								VA13.1
15700241	T50SOSFT6-E3		1-0 sink marks			1 shot	1 day	503967 Master Samples, visual	
			2-0 shortage			1 shot	1 day	503967 Master Samples, visual	
			3-0 Flashes			1 shot	1 day	503967 Master Samples, visual	
			4-0 mould mis alignment			1 shot	1 day	503967 Master Samples, visual	
			5-0 moulding lines			1 shot	1 day	503967 Master Samples, visual	
			6-0 burnings			1 shot	1 day	503967 Master Samples, visual	
			7-0 dirt			1 shot	1 day	503967 Master Samples, visual	
			8-0 deformation			1 shot	1 day	503967 Master Samples, visual	
			9-0 inclusions			1 shot	1 day	503967 Master Samples, visual	
			10-0 insertion			1 shot	1 day	410000 manual / visual	
			11-0 slip back			1 shot	1 day	410000 manual / visual	
			12-0 pawl			1 shot	1 day	420000 sample / visual	
			65-0 shot weight			1 shot	1 day	20000 balance	
55	packaging inspection								VA13.1
15700241	T50SOSFT6-E3		16-0 bag sealing			1 bag	1 start off	410000 manual / visual	
			17-0 label			1 bag	1 start off	420000 sample / visual	
			18-0 quantity			1 bag	1 start off	430000 scale counter / manual	
			45-0 mixed parts in pack unit			1 bag	1 start off	410000 manual / visual	
100	annual layout								VA13.1
15700241	T50SOSFT6-E3		1200-0 requalification / product audit acc. DRW-spec incl. packageing (1 part-No for mentioned part group)			1 shot	acc. AUDIT		

PFC-No: **15700241**	**Process Flow Chart**	HellermannTyton
REV: 28.06.2016		
reviewed:	**T50SOSFT6-E3**	part-no: 15700241
GPN: 140904		drw-no: 14-0904-003-CSG

PROCESS	CONTROLS	PROCEDURE
100 goods receipt		VA10.1
	20 incoming inspection 01150005 PA66 HIRHS	VA13.1
	O K / N O K	
200 injection moulding		production plan
	50 process inspection +first / final shot + 1 per shift visuel attributes 1-9 by production 15700241 T50SOSFT6-E3	VA13.1
	O K / N O K	
500 packaging		packaging DB
	55 packaging inspection 15700241 T50SOSFT6-E3	VA13.1
	O K / N O K	
600 storage		VA15-1
700 shipping		VA15-1
1000 ARTICLE-AUDIT		
	100 annual layout 15700241 T50SOSFT6-E3	VA13.1
	O K / N O K	
Customer		

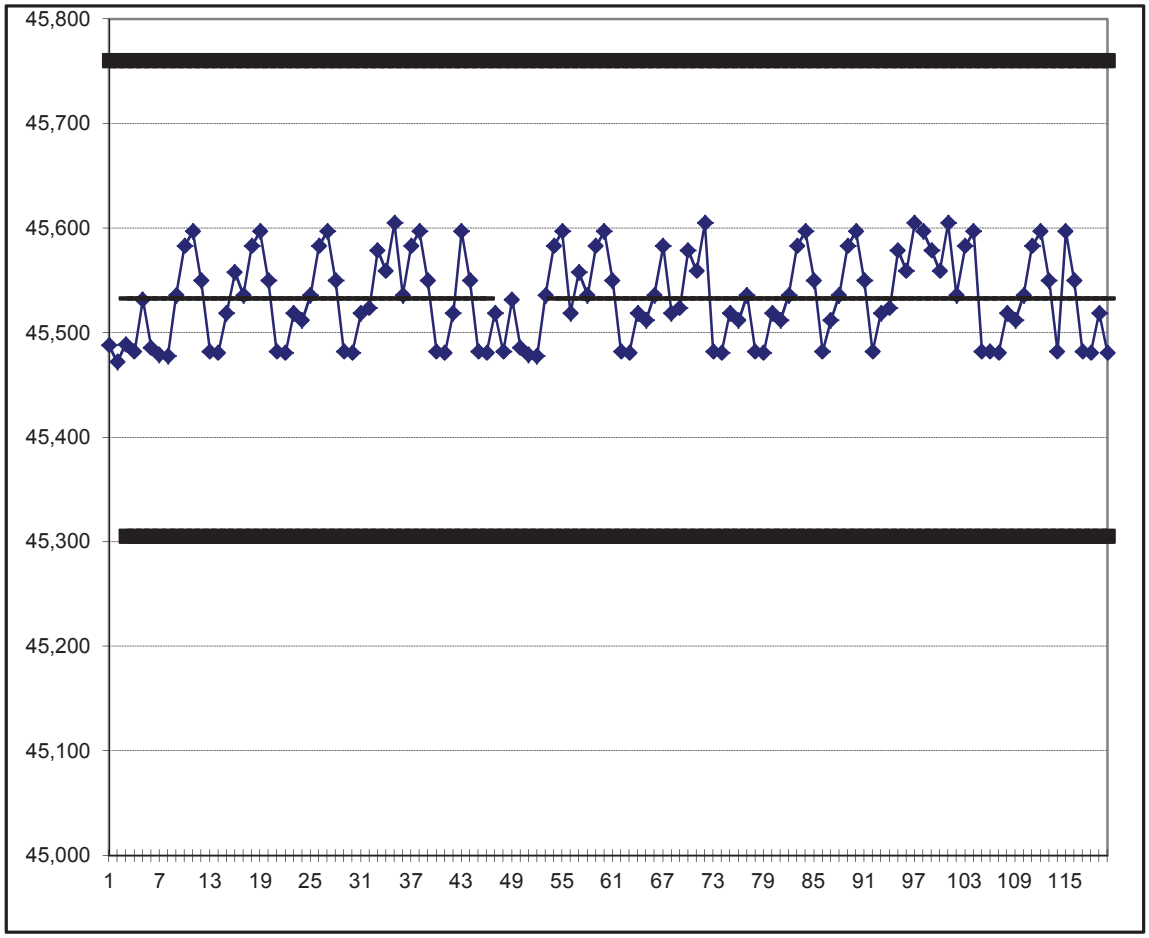
Ermittlung ppk-Wert Schussgewicht durch Technikum (24h-Test)

HellermannTyton

GPN 14-0904

T50SOSFT6-E3

NR	Gewicht
1	45,488
2	45,472
3	45,489
4	45,482
5	45,532
6	45,486
7	45,479
8	45,478
9	45,536
10	45,583
11	45,597
12	45,550
13	45,482
14	45,481
15	45,519
16	45,558
17	45,536
18	45,583
19	45,597
20	45,550
21	45,482
22	45,481
23	45,519
24	45,512
25	45,536
26	45,583
27	45,597
28	45,550
29	45,482
30	45,481
31	45,519
32	45,524
33	45,579
34	45,559
35	45,605
36	45,536
37	45,583
38	45,597
39	45,550
40	45,482
41	45,481
42	45,519
43	45,597
44	45,550
45	45,482
46	45,481
47	45,519
48	45,482
49	45,532
50	45,486
51	45,479
52	45,478
53	45,536
54	45,583
55	45,597
56	45,519
57	45,558



erlaubte Abweichung (+/-)	5	[$^{0}/_{00}$]

max	**45,6050**
min	**45,4720**
R	**0,1330**
S	**0,0428**
X/	**45,5332**
UT	**45,3055**
OT	**45,7609**
zulässig +/-	**0,2277**

ppk	**1,77**

(Vorgabe: >= 1.67)

Ermittlung ppk-Wert Schussgewicht durch Technikum (24h-Test)

58	45,536
59	45,583
60	45,597
61	45,550
62	45,482
63	45,481
64	45,519
65	45,512
66	45,536
67	45,583
68	45,519
69	45,524
70	45,579
71	45,559
72	45,605
73	45,482
74	45,481
75	45,519
76	45,512
77	45,536
78	45,482
79	45,481
80	45,519
81	45,512
82	45,536
83	45,583
84	45,597
85	45,550
86	45,482
87	45,512
88	45,536
89	45,583
90	45,597
91	45,550
92	45,482
93	45,519
94	45,524
95	45,579
96	45,559
97	45,605
98	45,597
99	45,579
100	45,559
101	45,605
102	45,536
103	45,583
104	45,597
105	45,482
106	45,482
107	45,481
108	45,519
109	45,512
110	45,536
111	45,583
112	45,597
113	45,550
114	45,482
115	45,597
116	45,550
117	45,482
118	45,481
119	45,519
120	45,481

HellermannTyton

REPEATABILITY AND REPRODUCIBILITY ANALYSIS REPORT

acc. to MSA 4th Edition

NON DESTRUCTIVE TEST

Specimen :	Plastic reference part (GPN 04-0865)	Gage type :	Weight scale	Plant :	Tornesch
Part. No. :	010-86504	Gage number :	PMN 02-0111	Date :	31.01.2017
Characteristic :	Shot weight (±3,5‰)	performed by:		approved by:	
Tolerance :	0,029 Units gramm	Name:	Michael Klenner		Jens Feil
		Signature:			

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

OPERATOR		A: Michael Klenner				B: Wolf Schröder				C: Senay Söylen		
		P		A		R		T				RESULTS
TRIAL #		1	2	3	4	5	6	7	8	9	10	AVG
A	1	4,104	4,102	4,103	4,104	4,106	4,105	4,106	4,105	4,103	4,102	A_1
	2	4,104	4,103	4,103	4,104	4,107	4,105	4,106	4,105	4,103	4,102	A_2
	3	4,104	4,102	4,103	4,104	4,107	4,105	4,106	4,106	4,103	4,102	A_3
Average		4,104	4,102	4,103	4,104	4,107	4,105	4,106	4,105	4,103	4,102	X_A **4,1041**
Range		0,000	0,001	0,000	0,000	0,001	0,000	0,000	0,001	0,000	0,000	R_A **0,0003**
B	1	4,104	4,102	4,104	4,104	4,107	4,105	4,106	4,105	4,103	4,103	B_1
	2	4,104	4,102	4,104	4,104	4,107	4,106	4,106	4,105	4,103	4,102	B_2
	3	4,105	4,102	4,104	4,104	4,107	4,106	4,106	4,105	4,103	4,102	B_3
Average		4,104	4,102	4,104	4,104	4,107	4,106	4,106	4,105	4,103	4,102	X_B **4,1043**
Range		0,001	0,000	0,000	0,000	0,000	0,001	0,000	0,000	0,000	0,001	R_B **0,0003**
C	1	4,104	4,102	4,104	4,104	4,107	4,105	4,106	4,105	4,103	4,103	C_1
	2	4,105	4,102	4,104	4,104	4,107	4,106	4,106	4,105	4,103	4,103	C_2
	3	4,105	4,103	4,105	4,105	4,108	4,106	4,107	4,106	4,104	4,103	C_3
Average		4,105	4,102	4,104	4,104	4,107	4,106	4,106	4,105	4,103	4,103	X_C **4,1047**
Range		0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,000	R_C **0,0009**
PART		4,1043	4,1022	4,1038	4,1041	4,1070	4,1054	4,1061	4,1052	4,1031	4,1024	R_{PART} = 0,0048

$R = R_A + R_B + R_C$ / No of operators 0,0003 + 0,0003 + 0,0009 / 3 → R = 0,0005

$X_{DIFF} = [Max(X)_{ABC}] - [Min(X)_{ABC}]$ = 4,1047 - 4,1041 → X_{DIFF} = 0,0005

$UCL_R = R * D_4$ = 0,0005 * 2,58 → UCL_R = 0,0013

D_4 = 3,27 for 2 trials 2,58 for 3 trials

Measurement Unit Analysis

	Total Variation Method	Tolerance Method
Repeatability : Equipment Variation (EV)		
$EV = R * K_1$		
EV = 0,0003 (Trials 3, K_1 0,5908)	% EV = 100[EV/TV]	% EV = 100[EV/(tol/6)]
	% EV = 18,98	**% EV =** 6,11
Reproducibility : Appraiser Variation (AV)		
$AV = [(X_{DIFF} * K_2)^2 - (EV^2 / nr)]^{1/2}$ (n parts, r trials)		
AV = 0,0003 (Oper 3, K_2 0,5231)	% AV = 100[AV/TV]	% AV = 100[AV/(tol/6)]
	% AV = 17,59	**% AV =** 5,66
Repeatability & Reproducibility (GRR)		
$GRR = (EV^2 + AV^2)^{1/2}$	%GRR=100[GRR/TV]	%GRR=100[GRR/(tol/6)]
GRR = 0,0004	**%GRR =** 25,88	**%GRR=** 8,33
Part Variation (PV)		
$PV = R_{PART} * K_3$ (Parts 10, K_3 0,3146)	% PV = 100[PV/TV]	
PV = 0,0015	**% PV =** 96,59	
Total Variation (TV)		
$TV = (GRR^2 + PV^2)^{1/2}$	**CONCLUSION:**	
TV = 0,0016		
Number of Distinct Categories (ndc)	**Gage system is satisfactory.**	
ndc = 1.41(PV / GRR)		
ndc = 5,26256		

- 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:

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

HELLERMANN TYTON
GROSSER MOORWEG 45
Tornesch, 25436
Attention: MR SEKULIC

Container ID: FV980-HPN326

Certificate Date: 25-MAY-16
Delivery No: 0382326956
Shipped Qty: 771.605 Lbs
(350.000 Kgs)
Customer P.O. No: 4500023424

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.

The material purchased was produced under a Quality System that meets ISO/TS16949:2008 criteria.

This Vydyne/Ascend nylon resin meets the relevant requirements of Directive 2011/65/EU ("RoHS 2 Directive") including all amendments through Directive 2015/863 on the restriction of the use of certain hazardous substances in electrical and electronic equipment and Directive 2012/19/EU on waste electrical and electronic equipment ("WEEE Directive").

If you have any questions or concerns about this letter, please call the Ascend Performance Materials Operations LLC Customer Service Department at 1-888-927-2363.

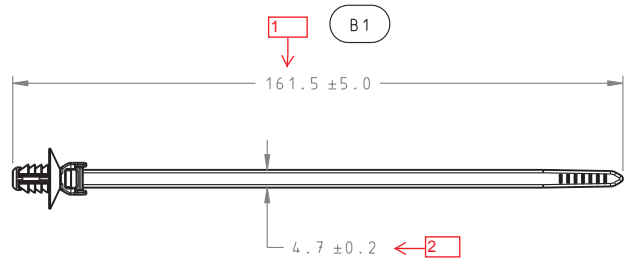
This product meets the requirements of the following specifications: SAE J1639, SAE J1639 PA0171, ASTM D6779-PA0161-Z1Z2, ASTM 4066 PA0161, FMVSS 302, Chrysler CPN-1826, ESB-M4D178-A2, WSS-M99P23-C1/C2, WSS-M99P9999-A1, WSSM4D706B1, WSS-M99P1111-A, WSK-M4D706-A, GMW16447P-PA66-T2, and GMP.PA66.015.

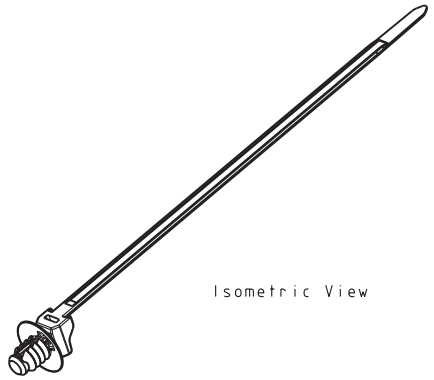
Material Type: VYDYNE 47H BK0644 **Material No:** 10397364 **Batch No** EC07FY01 **Date of Mfg** 07-MAR-2016

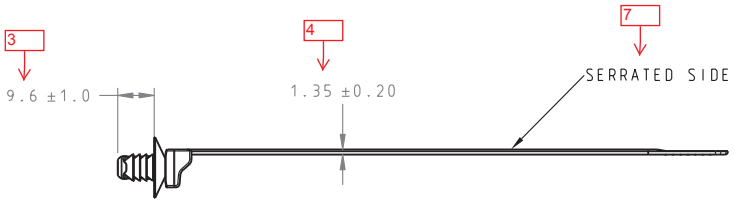
Ascend Performance Materials Operations LLC Specification

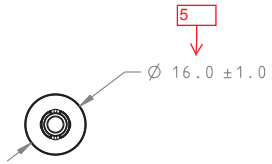
Lot Data **Property**	**Test Method**	**Min**	**Max**	**Result**	**Units**
Moisture	STM 00835	0.10	0.20	0.15	%
Copper	STM 00667	125	175	165	PPM
Strength @ Yld	STM 01253	50	70	58	MPa

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 tha 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.









LTRS	REVISIONS			
ORIGINATOR	CHECKER	ENGR APP	MATL APP	
RELEASED: FU5T-14E047-LA AELE-E-11789584-941 20151014				
M.KROHN	ZIMMERMANN	RVITALI	RVITALI	
A1: REVISED FIR TREE AELE-E-12982958-085 20151021				
TPUSILO	EHAFTAR	RVITALI	RVITALI	
B1: 5.0 TOLERANCE WAS 0.5 AELE-E-12982958-173 20160415				
TPUSILO	TPUSILO	RVITALI	RVITALI	

9 REFERENCE:
PERFORMANCE REQUIREMENTS AT DRY AS MOLDED:
1. FIR TREE PUSH IN FORCE: 45 NEWTONS (10 LBS) MAX
10 IN THE APPLICABLE NOMINAL HOLE SIZE AND A PLATE THICKNESS OF 1.8MM.
2. FIR TREE PULL OUT FORCE: 110 NEWTONS (25 LBS) MIN
11 IN THE APPLICABLE NOMINAL HOLE SIZE AND A PLATE THICKNESS OF 1.8MM.
3. SHEET METAL THICKNESS RANGE: 0.70MM - 3,5MM
4. APPLICABLE HOLE SIZE:
12 A. 6.5mm ± 0.4
5. CABLE TIE MIN LOOP TENSILE STRENGTH: 180 NEWTONS (40 LBS)
6. BUNDLE RANGE: 1-20MM
13
14

UNLESS OTHERWISE SPECIFIED:

8 PART MUST BE FREE OF BURRS, FLASH AND SHARP EDGES THAT MAY AFFECT THE FUNCTION, SAFE HANDLING, INSTALLATION OR REMOVAL OF THE PART.

PART AS RECEIVED AT THE FORD PLANT OR SERVICE PART PACKAGER/WAREHOUSE SHALL BE FREE OF ANY CORROSION ALIGNED WITH THE FORD CUSTOMER SERVICE DIVISION (FCSD) PACKAGING AND SHIPPING GUIDE. CORROSION INHIBITORS OR FOREIGN MATERIALS DETRIMENTAL TO THE INSTALLATION OR FUNCTION OF THE PART MUST BE REMOVABLE BY INTENDED CLEANING METHOD.

ENGINEERING APPROVAL OF SAMPLES FROM EACH SUPPLIER IS REQUIRED PRIOR TO AUTHORIZATION OF PART PRODUCTION

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.

FOR CURRENT RELEASE STATUS SEE THE WERS ENGINEERING NOTICE

SOURCES FOR MATERIALS DEFINED BY FORD MATERIAL SPECIFICATIONS SHALL BE SELECTED FROM THE FORD MOTOR COMPANY ENGINEERING MATERIAL APPROVED SOURCE LIST

6 MATERIAL: PA66 HIRHS WSS-M4D706-B1
COLOR: BLACK

HellermannTyton

REFERENCE T50SOSFT6-E3			
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 28.1		3RD ANGLE PROJ DIMENSIONS ARE IN MILLIMETERS	
CAD TYPE K-CATIA5	CAD LOC. TCe	CAD FILE FU5T-14E047-L-DWG-01	DTMC IS MASTER
OPER. NO. N/A	UNIT N/A	DRAWING FU5T-14E047-LA	
DESIGN S.ADAMS	DETAIL M.KROHN	TITLE RET WIR HRNS TIE STRAP	SHT 1 OF 1
CHECKED D.ZIMMERMANN	SAFETY N/A		N/A
SCALE 1:1	DATE 20151014	DIVISION N/A PLANT N/A	

FORD MOTOR COMPANY