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.: **91632** with submission date 28.05.2021 will be considered as complete and valid automatically on **27.06.2021** unless otherwise disposed!

HellermannTyton | HellermannTyton GmbH internal remarks: | PB-No.: **91632** | Part Describtion: T50ROS | GPN 980602

Part Submission Warrant

Part Name **T50ROS** | Cust. Part Number **EU5T-14E047-ZA**

Shown on Drawing No. **141434** | Org. Part Number **11805040**

Engineering Change Level **2** | Dated **16.05.2011**

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

Safety and/or Government Regulation ☐ Yes ☑ No | Purchase Order No. **11805040** | Weight (kg) **0,0013**

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: **4235724**

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-May-21

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

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

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature Date

Print Name Customer Tracking Number (optional)

Production Part Approval, Dimensional Results

HellermannTyton

Internal PB-No.: **91632**

Production Part Approval
Dimensional Test Results

ORGANIZATION:	**HellermannTyton GmbH**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**
INSPECTION FACILITY:	**QS-Laboratory**
PART NUMBER:	**EU5T-14E047-ZA**
PART NAME:	**T50ROS**
DESIGN RECORD CHANGE LEVEL:	2 16.05.2011
ENGINEERING CHANGE DOCUMENTS:	
NAME of LABORATORY:	

ITEM	DIMENSION / SPECIFCATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA) mean	min	max	OK	NOT OK
1	5,9	± 0,2			5,8	5,8	5,9	☑	☐
2	1,3	± 0,2			1,3	1,3	1,3	☑	☐
3	7,9	± 0,2			7,9	7,8	7,9	☑	☐
4	6,75	± 0,2			6,86	6,8	6,89	☑	☐
5	4,6	± 0,2			4,6	4,6	4,7	☑	☐
6	200	± 5			198	198	198	☑	☐

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-May-21

Production Part Approval, Performance Test Results

HellermannTyton

Internal PB-No.: **91632**

Production Part Approval
Performance Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E047-ZA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50ROS**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	2 16.05.2011
*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
					mean	**min**	**max**	☐	☐
7	**Tensile force min.**	**225 N**			**277 N**	**249 N**	**310 N**	☑	☐
								☐	☐
8	**Bundle-Ø**	**1,6 - 50 mm**			**Suitable for bundle-Ø 1,6 - 50,0 mm**			☑	☐

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-May-21

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **91632**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**EU5T-14E047-ZA**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**	PART NAME:	**T50ROS**
MATERIAL SUPPLIER:		DESIGN RECORD CHANGE LEVEL:	2 16.05.2011
*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
						☐	☐
9	**PA 6.6**				**Material is PA 6.6**	☑	☐
						☐	☐
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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-May-21

ASCEND
PERFORMANCE MATERIALS

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

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

Container ID: 00000000000002010296

Certificate Date: 18-JAN-21
Delivery No: 0382548625
Shipped Qty: 36,500.000 Lbs
(16,556.400 Kgs)
Customer P.O. No: 4500129185 / 10

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: ASTM D4066 PA0121, ASTM D6779 PA0121, WSK-M4D648A (ESF-M4D 82A), MRS # 75, Rev. 7, Date 2-Jan-2019, GMP.PA66.018, CMP NY057 AA, MSDB 41 CPN 1076, MSDB 41 CPN 1899, FMVSS 302*, CPN3490, D4000 PA012, SAE J1639 PA0121, Ford WQ 100A.

Material Type: VYDYNE 22HSP NT **Material No:** 10425537 **Batch No** IK11VY03 **Date of Mfg** 11-NOV-2020

Ascend Performance Materials Operations LLC Specification

Lot Data Property	Test Method	Min	Max	Result	Units
Relative Visc.	ASTM D789[9.34]	45.0	48.0	46.2	N/A
VISCOSITY NUM. SULFURIC	ISO 307	136.9	142.8	139.4	ml/g
Moisture	ASTM D6869	0.12	0.20	0.15	%
Copper	STM 00667	80	100	90	PPM
Strength @ Yld	ISO 527-1,2 / 1A	78	98	84	MPa
Nom. Str.@ Brk	ISO 527-1,2 / 1A	17.5	35.0	28.5	%
Flex Modulus	ISO 178;2MM/MIN	2500		2833	MPa
Notched Izod	ISO 180 / 1A	3.5	8.0	4.7	kJ/m^2

FMEA No.	Generic	Prepared By	Ian Stahler	HellermannTyton	FMEA No.:	1	Original Issue Date:	01-Jun-95	
Part No:	Moulding hand pack & logistics flow chart				Latest revision Date:	Apr-17	Current Issue Level	22	
Part Description	Moulding Flex bay hand pack & logistics				Key Date	N/A			
					Vehicle Details	N/A	Model/Year	N/A	
Core Team	I. Stahler, R. Jesser, J Pilkington, M. Briggs,A Gibbons, J Chapman, A Enriles			Process Responsibility	Manchester Injection Moulding				

Process Step/ Function	Process Description	Process Purpose/ requirement	Potential Failure Mode	Potential Effects of Failure	Severity	Potential Cause(s) / Mechanism(s) of Failures	Occurrence	Current Process Controls	Current Process Controls Detection	Detection	RPN	Recommended Action(s)	Area/Individual Responsible & Target Completion Date	Actions Taken	ACTION RESULTS Severity	Occurrence	Detection	RPN	Ref No
Order input/ enter into plan (steps 1- 2)																			
Raw material (steps 3-11)	Goods Inwards	Ensure stock of useable raw material and additive	No stocks	Unable to start manufacture	8	delivery	2	daily stock take (forecast)	silo stock on electronic monitor	2	32								
					8	planning	1	daily stock take (forecast)	silo stock on electronic monitor	2	16								
					8	purchasing	1	daily stock take (forecast)	silo stock on electronic monitor	2	16								
			Incorrect material accepted	Use wrong material	8	human error	1	cross check of delivery documents		2	16								
			Incorrect moisture content	rejected on delivery	5	Supplier error	1	supplier system	Certificate of analysis & QC test of moisture	3	15								
			contamination	brittleness	10	Supplier error	1	none	None	9	90	Supplier improvement Also UV and visual check @ GI	Audit at suppliers Dec 16 target for all actions QC check @ GI UV	Improvement in process but still failures GI Check contam and UV inplace Aug 2016	10	1	2	20	
			Incorrect quantity	Halt production.	6	Poor Stock control	1		Stock check each morning manual stock (D & P)	1	6								
Generate work order etc 12-17	Production planning	prepare for manufacture	No consumables eg bags boxes	Production does not run to schedule	3	Poor stock control	4	supplier audits and improvement targets under way	Put under control of stores and MPS system also Goods inward checks on quality of supply (D & P)	1	12								
			Incorrect material	Wrong specification	2	material mix	3	BOM and plan list materials	Multi point start up check sheet training of setters etc. (P)	1	6								
			Cooling / heating equipment major repair not done	Loss of production	8	Tool will not produce	1		Preventative maintenance also attendance at planning meetings Main and Tool room supervision	1	8								
			Wrong tool issued	Loss of production produce wrong parts	3	Incorrect planning or selection of tool	3		Root & Structure and work order details requirements (P)	1	9								
			Tool not ready	Loss of production	4	Poor administration	1		Tool room manager attends planning meetings (P)	1	4								

Request & deliver tool 18-21	Issue tool	Start of manufacture	wrong eye bolts	Loss of production	8	Inadequate	1	All tools have lifting bolts made at tool manufacture and spares held for all SWL in use (P)		1	8								
			No 1st off approval	Faulty parts	2	process not controlled	3	Multi point start up check sheet training of setters etc.)P)		2	12								
			1st off not acceptable	Faulty parts	2	Incorrect set up	4		Process packs & setting charts (P)	1	8								
			Shorts, Flash, Poor Colour	Reject part	3	Wrong or poor material blend	2	G2 software in use linked to BOM	Maguire units in use (P)	1	6								
					3	Incorrectly set	2	Multi point start up check sheet training of setters etc.		2	12								
			Gas Marks	Poor appearance	3	Poor venting or waxed tool	2	Tool cleaned on machine (P)		2	12								
			Damaged heads	Cable tie will not function	8	Damage caused by tool setters & tool wear	1	In process checks by operator for main function (P)	In process checks by operator for main function (P)	2	16								
			Sticking on tool	Loss of product	3	Incorrectly set	4	Process pack settings		2	24	Use setting process packs and gate freeze		Implemented & ongoing	3	4	2	24	
Commence production 22-27	Start up & Run production		does not meet standard	shorts	8	process parameters	1	process pack	visual	7	56								
						incorrect nozzle tip	1	process pack	visual	7	56								
						blocked nozzle tip	1		visual	8	64								
						check ring	1		visual	8	64								
						barrel out of line	1	process pack	visual	7	56								
						tip manifold temp	1	process pack	visual	7	56								
						water temp	1	process pack	visual	7	56								
						blocked vents	1	tool service	visual	7	56								
						air valves	1	process pack	visual	7	56								
						material	1	process pack	visual	7	56								
						material mix	1	process pack	visual	7	56								
						melt temp	1	process pack	visual	7	56								
						environment (temp change)	1	company procedures	visual	8	64								
						preventive maintenance tool	1	company procedures	audit	8	64								
						maintenance machine	1	company procedures	audit	8	64								
				flash	8	process parameters	1	process pack	visual	7	56								
						incorrect nozzle tip	1	process pack	visual	7	56								
						tip manifold temp	1	process pack	visual	7	56								
						water temp	1	process pack	visual	7	56								
						air valves	1	process pack	visual	7	56								
						material	1	process pack	visual	7	56								
						material mix	1	process pack	visual	7	56								
						melt temp	1	process pack	visual	7	56								
						change)	1	company procedures	audit	8	64								
						maintenance tool	1	company procedures	audit	8	64								
						maintenance	1	company procedures	audit	8	64								
						not parallel)	1	maintenance machine	visual	8	64								
				slippage	8	water temp	1	process pack	visual	7	56								
						material	1	process pack	visual	7	56								
						material mix	1	process pack	visual	7	56								
						process parameters	1	process pack	visual	7	56								
						maintenance tool	1	company procedures	audit	8	64								
				contamination (in material)	10	poor clean down material mix units	1	company procedures	visual	8	80	Purge routine established, Screw /barrel clean routine	Technical (RJ) maintenace 9BG) Quality (AC)	Purge experiments confirm material/ Maintenance schedule	10	1	4	40	
				full shots (all cavities)	8	poor catchments of parts	1	company procedures	count	7	56								
						miscount	1	Training	Audit	8	64								
				damaged or missing	8	process parameters	1	process pack	Audit	7	56								
						material	1	process pack	visual	8	64								

				pawl		mould temp		process pack	visual	8	64								
						damaged insert		company procedures	visual	9	72								
				insertion	8	mould temp	1	process pack	visual	8	64								
						process parameters	1	process pack	Audit	7	56								
						tool alignment	1	tool service	visual	7	56								
						damaged insert	1	tool service	visual	7	56								
						damaged pin	1	tool service	visual	7	56								
				sinking	8	process parameters	1	process pack	visual	8	64								
						mould temp	1	process pack	visual	8	64								
				colour	5	Temperature too high	1	process pack	visual	8	40								
						moisture too high in raw material	2	Dew point controls daily (P)		1	10								
						process parameters	1	process pack	visual	8	40								
				wrong material	8	set up incorrect	5	company procedures		6	240	Operator training, labelling of pipe work, manifold, material bay upgraded material bay audits etc	technical team mods, upgrade to area material bay auidits	operator training, dedicated silo use, signage renewed	8	2	2	32	
				visual defect	8	Visually matches quality standard	2	Quality Standard	visual	2	32								
Hand Packing 28-32	Convert bulk product to finished stock		Cable tie count incorrect	Customer receives wrong quantity	2	Check weigh machine setting error manual	3	Audit of settings twice per shift (D & P)	Audit of settings twice per shift (D & P)	1	6								5a
			Moisture content incorrect	Cable ties too soft or brittle	4	delay in packing allows moisture to absorb	5	procedure stating 7 day cut off before moisture check on product before packing		10	200	absorption rate in summer is high reduce permitted delay before moisture check 7 - 3 days	IS review control and re issue	Controls re issued see PAC001	4	3	4	48	5c
					4	Manual pack lines water dosing incorrect	2		Audit of settings twice per shift (D & P)	1	8	modifications to improve capability in packing re pressure etc	Technical JC etc	tank added to stabalise pressure in water suystem and foot peadle	4	1	1	4	5d
			Box Quantity incorrect	Customer receives wrong quantity	2	Manual pack line count wrong	2		Audit of settings twice per shift (D & P)	2	8								5e
			Cable tie count incorrect in bag	Customer receives wrong quantity	2	manual pack scales set incorrectly	2	Audit of settings twice per shift (D & P)	Audit of settings twice per shift (D & P)	2	8								6a
			Box Quantity incorrect	Customer receives wrong quantity	3	Wrong quantity of goods issued	2		Audit of settings twice per shift (D & P)	1	6								6b
			Wrong product packed	Customer receives wrong product	3	Wrong goods issued	2	Audit of settings twice per shift (D & P)	Audit of settings twice per shift (D & P)	1	6								6c
			Parts mixed in bags	Unusable	3	Mixed products issued to packer or wrong goods put in box at machine	2	Tote box quantity level to prevent spill and Audit of settings twice per shift (D & P)	Tote box quantity level to prevent spill and Audit of settings twice per shift (D & P)	1	6								6d
Dispatch (Logistics) 33-36	Send order to customer		Wrong product sent	Customer receives wrong product	6	Order input error	2		Cross check at sales desk and some EDI	1	12								6e
			Wrong product packed	Customer receives wrong product	6	Picking error	2		Dual operator pick and check	1	12								6f
			Incorrect quantity	Customer receives wrong quantity	6	Picking error	2		Dual operator pick and check	1	12								6g
			Wrong address	Not delivered	5	Order input error	1		Cross check at sales desk and some EDI	2	10								6h

PROCESS FLOW DIAGRAM **Plan Number:** Page 1 of 1 **Date :** 08-Mar-17

HellermannTyton **Part Number:** Moulding hand pack & logistics flow chart **Process Team** I. Stahler, R. Jesser, J Pilkington, M. Briggs,A Gibbons, J Chapman, A Enriles **Issue:** 12

Manchester **Description:** Moulding hand pack & logistics

	Process Step	Operation	Transport	Storage	Inspect	Delay	Operation Description	Sources of Variation / Product attributes	Risk H / M / L
Input and planning order material and store	1	X					Order input	Order errors	L
	2	X					Plan production TXT	Incorrect planning	L
	3				X		Goods In Inspection of Raw Material	Conformation to note, Transit Damage, Documentation	L
	4				X		Check Documentation	Conformation to drawing	L
	5				X		Certification for Material	Material not to spec.	L
	6				X		Moisture check	Damp material = process problems	L
	7				X		UV light check /Contamination check	Contamination	H
	8		X				Move material to stock/Fill silo		L
	9			X			Store Material	Damage to packaging .	L
	10	X					Add stock label	Stock Control Data.	L
	11				X		Check Stock Control Data		L
	12	X					Generate works order	Incorrect material ordered.	L
	13				X		Check correct material ordered and issued	Incorrect quantity selected	L
	14				X		Check correct quantities		L
	15		X				Deliver material to blending area	None	L
	16	X					Issue material and consumables to machine	Wrong mix	L/M
	17	X					Post batch No. at machine	Wrong No.	L
Moulding	18	X					Request tool	Tool not ready	L
	19		X				Deliver tool	None	L
	20	X					Install tool in machine	Wrong tool	L
	21	X					Set up machine & Materials	Incorrect settings	L
	22	X					Generate First off		L
	23	X					Commence production		L
	24				X		First off check		L
	25	X					Commence bulk production		L
	26				X		In process inspection	Moulding faults	M/H
	27				X		In process testing		L
Hand Packing	28	X					Book stock in for stock control		L
	29		X				Transfer stock to packing		L
	30	X					Allocate stock to packers	Issue wrong stock	M
	31	X					Pack goods	Wrong count	M
	32				X		In process packing checks	Moisture content, Quantity, labels	L
Logistics	33		X				Cross dock and Transfer stock to Logistics centre		L
	34			X					
	35	X					Order assembly	Incorrect goods	L
	36	X					Despatch	Incorrect goods	L

Proto Pre Launch Prod. X	HellermannTyton	Process Control &	Date (Orig.) 01/06/1999	Date (Rev.) 14-Mar-17
Control Plan No. **Mould Hand Packing and logistics control plan**	Manchester	**Quality Plan**		Issue No. **16**
Part No./ Latest Issue Level (If Reqd.)	Key Contact/ Phone Ian Stahler 284		Customer Eng. Approval/ Date (If Reqd.)	
Part Name/ Description **Ties and clips Flex bay hand pack**	Core Team **I. Stahler, R. Jesser, J Pilkington, M. Briggs,A Gibbons, J Chapman, A Enriles**		Customer Quality Approval/ Date (If Reqd.)	
Hellermann Division ***Manchester*** Supp Code	Hellermann Approval & Date **I Stahler March 17**		Other Approval/ Date (IF Reqd.)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device Jig, Tools For Mfg.	Characteristics No.	Product	Process	Special Char. Class.	Methods Product/Process Spec/ Tol.	Evaluation Technique	Sample Size	Sample Freq.	Control Method	Reaction Plan
3-11	Accept delivery of Bulk material into silo	Production schedule and material delivery schedule to supplier		Bulk raw material granules	Check spec'n and delivery condition		Agreed spec	C of A evaluation	100%	every delivery	check delivery details, C of A input into spreadsheet evaluate results	Material handler Adjust. If required Inform QC Department/ Inform purchasing. Quarantine / Scrap Defected material QPD NC001
					Moisture check sample of material		0.1 - 0 .2%	moisture check	3 samples	every delivery	Moisture check thermogravimetric analyser	
					contamination check		No visible evidence contam or UV light reflection	UV light box/sample probe	3 samples	every delivery	Visual and UV light box	
					Add Material into silo		check stock level	Stock level indicator	100%	every delivery	Schedule	
15-16	Deliver Consumables to Machine	Logistics Centre / Store		Consumables (Bag, Box, Box, Pallet)	Identification at High Level		Works Order Quantities / MRP	Visual / Audit	100%	1	Visual Audit	Logistics Centre / Planning
	Obtain Totes, Dolav	Logistics Centre / Store		None itemised consumable Tote Box, Dolav	Identification at High Level (Dolav is not labelled)		Works Order	Visual / Audit	100%	1	Visual Audit	Logistics Centre
18-19	Request Tool	Bill Of Material		Tool Reference			Tooling Inventory JBA	Visual	100%	1	Identification Stamped on Tool	Tool Room
	Deliver Tool	Moulding Tool		Tool Reference	Visual		Tooling Inventory JBA	Visual	100%	1	Identification Stamped on Tool	Tool Room
				Tool Reference	Visual		Works Order	Visual	100%	1	Identification Stamped on Tool versus Works Order	Planning

19	Install Tool	various		Machine Identification	Visual		Works Order / Production Plan	Visual	100%	1	Workstation Identification on Machine	Planning
20 - 21	Set Up Machine & Raw materials	various		Machine Identification	Process Pack/ Setting Sheet		Nominal 5% from agreed settings	Visual/Audit	100%	1	Visual Audit	Technical Team
		Silo ID		Raw Material Type	Works order		Correct material	Visual	100%	1	BOM	Material handler Adjust. If required Inform QC Department. Stop Process & Reset. Quarantine / Scrap Defected Parts QPD NC001
		Vacuum Pump		Correct material delivery	MacGuire Unit		Zero Material	Alarm	100%		Alarm	
		Material dryers		Moisture	material dryer		0.1 - 0 .2%	Material cert supplier	100%		Moisture check @ GI	
22	Commence production	flexi bay		Flash	Clamp pressure		Master Sample/ First off	Visual	First Off Check	Each Process	Visual Audit to First Off / Master	Inform setter, If required Inform QC Department. Stop Process & Reset. Quarantine / Scrap Defected Parts QPD NC001
							1%	Visual	1 per shift		Visual	
					Injection Pressure		+/-5%	Visual	1 per shift		Computer prog in machine controls	
					Change over		+ / - 0.5 mm	Linear transducer	100%		Computer prog in machine controls	
					Injection speed		+/-5%	Linear transducer	100%		Computer prog	
					Material Melt		+/-5%	Thermocouple	100%		Computer prog in machine controls	
					Mould		0%	Gauge			Location Rings	
					Incorrect Machine			Tool Design	Tool Trial		Machine Specification	
					Blocked Vents		0%	Visual	100%		TPM	
					Mould		Preset	Visual	1 per shift		Visual	
				Shorts	Inadequate Injection Pressure		0% +5%	pressure gauge	100%		Computer prog	
					Shot Volume		+/-5 mm	Linear transducer	100%		Computer prog	
					Shortage of Material		Zero Material	Alarm	100%		Alarm	
					Change over		+ / - 0.5 mm	Linear transducer	100%		Computer prog in machine controls	
					Variation of Cycle		+/-1%	Machine Timer	100%		Computer prog	
					Blocked vents		0%	Visual	1 shot	2 hourly	Visual	
					Plasticizer Time		+ / - 0.1 sec	Timer	100%		Computer prog in machine controls	
					Injection speed		+/- 5 %	Linear transducer	100%		Computer prog	
				Nylon Strands	Barrel Temperatures		+/- 5 Deg C	Thermocouple	100%		Computer prog	
					Shot Volume		+/-5 mm	Linear transducer	100%		Computer prog	
					Incorrect Decompression setting		+/-5mm	Linear transducer	100%		Computer prog	
					Material Melt Temperature		+/- 5 deg C	Thermocouple	100%		Computer prog in machine controls	
				Missing Pawls	Shot Volume		+/-5 mm	Linear transducer	100%		Computer prog	
					Injection Pressure		0% +5%	pressure gauge	100%		Computer prog	
					Material Melt Temperature		+/- 5deg C	Thermocouple	100%		Computer prog in machine controls	
					Holding Time		+/-1%	Machine Timer	100%		Computer prog	
					Water temperature		+/- 5deg C	Visual	1 per shift		Visual	
					Moulding blocked vents/form		Ice Blast/ clean tool faces	visual	tool	weekly	Visual	

				Under Packed	Water temperature		+/- 5deg C	Visual	1 per shift		Visual	
					Holding Time		+/-1%	Machine Timer	100%		Computer prog	
					Shot Volume		+/-5 mm	Linear transducer	100%		Computer prog	
				Contamination (degraded material)	Barrel Temperatures		+/- 5 Deg C	Thermocouple	100%		Computer prog in machine controls	
					Hot runners		Preset	Thermocouple	1 per shift		visual	
				Contamination (Granules)	Material feed		Clean	Visual	Start-up		Visual	
23	First Off	Master sample		Full Shot	Inspect		Visual inspect to master sample, Insertion. (brittleness on WB mat)	Visual	Full Shot	Start-up	Attribute chart	Inform Supervision If required Inform QC Department. Stop Process & Reset. Quarantine / repack Defect Parts QPD NC001
24-25	In process Inspection	Visual		Full Shot	Operator Inspect		Attribute chart	Visual	Full Shot	Attribute Chart	Attribute Chart	
				Full Shot	Operator Insertion/Slip test		Attribute chart	Function of tie	Full Shot	Attribute Chart	Attribute Chart	
				Full Shot	QC Inspect		Attribute chart	Visual	Full Shot	1 per shift	Attribute chart	
				Full Shot	QC Insertion/slip test		Attribute chart	Function of tie	Full Shot	1 per shift	Attribute chart	
				tool and settings	Setter		Daily check list	Visual	1	24 hours	Attribute chart	
26	In process testing	Function & Push on gauges if needed		Full Shot	form & function		Drawing	Hand no break	Full shot	Attribute Chart	Attribute chart	Inform Supervision If required Inform QC Department. Stop Process & Reset. Quarantine / repack Defect Parts QPD NC001
	Annual Layout	LI1, LI2, LI3, and gauges log, Vernier		Full Shot	Tensile/Insertion, Dimensional, min max bundle, drawing specs		Drawing	Nexygen software etc	Full Shot	Once per year	Annual log at back of control chart	
27 - 30	Packing & Labelling	Scaler		Bag seal intact			Seal Intact	Visual / Audit	each pack	100%	Packing SOP and audit routine PAC 001	Inform Supervision If required Inform QC Department. Stop Process & Reset. Quarantine / repack Defect Parts QPD NC001 and trouble shot guide PAC001
		Calibrate scales		Part count			Scale setting -0 + 2	initial set and end of order	audit routine	beginning and end of pack order		
		use fixed calibrated water dispenser		water weight addition			Water weight cross ref table	Set and check beginning/ end of items	set and check beginning / end	dose required		
31	Label bag & box Palletise	Add label to bag		Label details and position			Detail & position correct	Visual	each pack	100%		
		Box bag		box content			Bag count					
		Box on Pallet		Box position			Pallet neatness					
	Cross Dock Movement	Agility		Finished Packed Product	Agility/ barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	IT Department / Planning / QC Department
	Delivery date review 14 days or less	Agility/JBA		Finished Packed Product	Agility/ barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services
	Marshalling Lane	Agility		Finished Packed Product	Agility/barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services

32 - 35	Delivery date review 15 or more	Agility/JBA		Finished Packed Product	Agility / JBA/ Barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services
	Withdraw from store to Marshalling Lane @ 14 days	Agility		Finished Packed Product	Agility / barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services
	Pre delivery checks	Agility reports		Finished Packed Product	Agility/ Barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre
	Deliver to Customer	Marshalling Lane		Finished Packed Product	Agility / JBA		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services

Machine Number:	035465	**Job Number:**		**Tool Number:**	3
Material:	PA66	**Colour:**	Black	**%L.D.R.:**	
Date:	08.03.2007	**Time:**		**Total Tolerance:**	0,4
Characteristic:	Strap Width	**Specification:**	4,6	**Operator:**	SR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
4,630	4,600	4,610	4,560	4,610	4,610	4,590	4,590	4,570	4,580	4,610	4,580	4,590	4,590	4,590															
4,600	4,580	4,620	4,600	4,590	4,580	4,610	4,610	4,580	4,590	4,570	4,600	4,590	4,620	4,590															
4,600	4,590	4,580	4,600	4,570	4,600	4,610	4,580	4,590	4,590	4,610	4,590	4,580	4,600																
4,580	4,590	4,600	4,590	4,590	4,610	4,590	4,600	4,610	4,560	4,570	4,610	4,620	4,610																
4,590	4,600	4,590	4,590	4,590	4,620	4,600	4,590	4,600	4,610	4,620	4,580	4,580	4,620																
4,580	4,600	4,600	4,570	4,570	4,600	4,610	4,610	4,580	4,590	4,610	4,590	4,610	4,600																
4,610	4,580	4,570	4,610	4,600	4,600	4,600	4,580	4,590	4,610	4,600	4,600	4,610	4,600																

DISTRIBUTION SHOULD APPROXIMATE TO NORMAL

$$Cp = \frac{\text{TOLERANCE}}{6 \times \text{SIGMA}} \qquad Cpu = \frac{\text{USL - Xbar}}{3 \times \text{SIGMA}} \qquad Cpl = \frac{\text{Xbar - LSL}}{3 \times \text{SIGMA}}$$

AVERAGE(Xbar)=	4,595	**RANGE(R)=**	0,070	**SIGMA(S)=**	0,0146

Cp	=	4,567	**Cpk**	=	4,457	**Cr**	=	0,219	=	21,90	%

Xmax =	4,630	**USL=**	4,800	**Cpu=**	4,677
Xmin =	4,560	**LSL=**	4,400	**Cpl=**	4,457

Cr to be no greater than 75%
Cp to be no less than 1.33, ideally >1.67
Cpk to be no less than 1.33, ideally >1.67
USL & LSL from Product Specification, calculated automatically

HellermannTyton

GAGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET
VARIABLE DATA RESULTS

Part Number	Gage Name	Appraiser A		
T50ROS/3	Mitutoyo Vernier	Beata Barlya		
Part Name	Gage Number	Appraiser B		
T50ROS	DC10	Hayley Murphy		
Characteristic / Specification	Gage Type	Appraiser C		
Strap Thickness 1,1 1,5	Vernier Caliper	Stephen Davenport		
Characteristic Classification	Trials	Parts	Appraisers	Date Performed
Thickness	3	10	3	10.05.2018

APPRAISER/ TRIAL #		PART 1	2	3	4	5	6	7	8	9	10	AVERAGE
1. A	1	1,3000	1,2800	1,2900	1,2800	1,3000	1,3000	1,2900	1,2800	1,3000	1,3100	1,293
2,	2	1,3000	1,2800	1,2900	1,2800	1,3000	1,3000	1,2900	1,2900	1,3000	1,3200	1,295
3,	3	1,3000	1,2800	1,3000	1,2800	1,3100	1,3000	1,2900	1,2900	1,3000	1,3100	1,296
4,	AVE	1,30	1,28	1,29	1,28	1,30	1,30	1,29	1,29	1,30	1,31	x_a= 1,295
5,	R	0,00	0,00	0,01	0,00	0,01	0,00	0,00	0,01	0,00	0,01	r_a= 0,004
6. B	1	1,2900	1,2900	1,2900	1,2800	1,3000	1,3000	1,2900	1,2900	1,3000	1,3000	1,293
7,	2	1,2900	1,2900	1,2900	1,2800	1,3000	1,3000	1,2900	1,2800	1,3000	1,3000	1,292
8,	3	1,2900	1,2900	1,2900	1,2800	1,3000	1,3000	1,2900	1,2900	1,2900	1,2900	1,291
9,	AVE	1,29	1,29	1,29	1,28	1,30	1,30	1,29	1,29	1,30	1,30	x_b= 1,292
10,	R	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	r_b= 0,003
11. C	1	1,2900	1,2800	1,2900	1,2800	1,2900	1,3000	1,2900	1,2800	1,3000	1,3000	1,290
12,	2	1,3000	1,2800	1,2900	1,2900	1,3000	1,3000	1,2900	1,2900	1,3000	1,3000	1,294
13,	3	1,2900	1,2800	1,2900	1,2800	1,2900	1,3000	1,2900	1,2900	1,3000	1,2900	1,290
14,	AVE	1,29	1,28	1,29	1,28	1,29	1,30	1,29	1,29	1,30	1,30	x_c= 1,291
15,	R	0,01	0,00	0,00	0,01	0,01	0,00	0,00	0,01	0,00	0,01	r_c= 0,005
16. PART AVERAGE		1,29	1,28	1,29	1,28	1,30	1,30	1,29	1,29	1,30	1,30	X= 1,293 / R_p= 0,021
17,	$(r_a + r_b + r_c) / (\#\ OF\ APPRAISERS)$ =											R= 0,004
18,	x_{DIFF} = (Max X - Min X) =											x_{DIFF}= 0,003
19,	* UCL_R = R x D_4 =											UCL_R* 0,010

* D_4 =3.27 for 2 trials and 2.58 for 3 trials. UCL_R represents the limit of individual R's. Circle those that are beyond this limit. Identify the cause and correct. Repeat these readings using the same appraiser and unit as originally used or discard values and re-average and recompute R and the limiting value from the remaining observations.

Notes:

GAGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET
VARIABLE DATA RESULTS

Part Number	Gage Name	Appraiser A		
T50ROS/3	Mitutoyo Vernier	Beata Barlya		
Part Name	Gage Number	Appraiser B		
T50ROS	DC10	Hayley Murphy		
Characteristic	Gage Type	Appraiser C		
Strap Thickness	Vernier Caliper	Stephen Davenport		
Characteristic Classification	Trials	Parts	Appraisers	Date Performed
Thickness	3	10	3	10.05.2018

Measurement Unit Analysis

Repeatability - Equipment Variation (EV)

EV = R x K_1

= 0.004 x 0.5907

= 0,002

Trials	K1
2	0,8865
3	0,5907

Reproducibility - Appraiser Variation (AV)

AV = $\{(x_{DIFF} \times K_2)^2 - (EV^2/nr)\}^{1/2}$

= {(0.003 x 0.5236)^2 - (0.002 ^2/(10 x 3))}^1/2

= 0,002

n = parts r = trials

Appraisers	2	3
K_2	0,7087	0,5236

Repeatability & Reproducibility (GRR)

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

= {(0.002^2 + 0.002^2)}^1/2

= 0,003

Parts	K_3
2	0,7071
3	0,5231
4	0,4467
5	0,4030
6	0,3742
7	0,3534
8	0,3375
9	0,3249
10	0,3146

Part Variation (PV)

PV = R_P x K_3

= 0.021 x 0.3146

= 0,007

Tolerance (Tol)

Tol = Upper - Lower / 6

= (1.5 - 1.1) / 6

= 0,067

% Tolerance (Tol)

% EV = 100 (EV/Tol)

= 100(0.002/0.067)

= 3,54

% AV = 100 (AV/Tol)

= 100(0.002/0.067)

= 2,54

% GRR = 100 (GRR/Tol)

= 100(0.003/0.067)

= 4,36

Gage system O.K

% PV = 100 (PV/Tol)

= 100(0.007/0.067)

= 9,96

ndc = 1.41(PV/GRR)

= 1.41(0.007/0.003)

= 3

Gage discrimination low

GAGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET
VARIABLE DATA RESULTS - GUIDELINES

Guidelines For Acceptance of GR&R.	
Under 10%	Generally Consider to be Acceptible
10% - 30%	May be Acceptible based upon the importance of application, cost of repairs etc.
Over 30%	Not Acceptible. Every effort should be made to improve.

Number of Distinct Categories (NCD)

The number of distinct categories NDC shows the number of different values that your man/equipment combination is capable of confidently recording within the expected range of results.

NDC less than 2	The measurement system cannot be differential one part from another - Not suitable to measure the process.
NDC = 2	The data can be divided into high and low I.e Attribute Control
NDC = 3	The data can be divided into high, middle and low.
NDC = 5 or More	Not Acceptible. Every effort should be made to improve.

What if you get a value below 5. What next?

Analyse more distinct parts that truly represent the entire rnage of the process or Increse the precision of the measurement tool.

CATIA V5

Durch das Herstellverfahren bedingte Geometrieaenderungen (Anspritzung, Auswerfermarkierungen, etc.) zulaessig. Einzelheiten der Ausfuehrung bleiben dem Hersteller ueberlassen./ The manufacturing-related geometry changes (injection point, ejectors marks, etc.) allowed. Design of the details are left to suppliers discretion.

Revision level Indice Aenderungsstand		Revision Record Désignation Beschreibung der Aenderung	Changed Modifié Geaendert	Date Datum	Approved Approuvé Geprueft	Date Datum
Drawing Dessin Zeichnung	Part Pièce Solid					
1	0	Ansichten ueberarbeitet und Rahmen neu.	Mueller	05.07.04	Schiwek	05.07.04
2	0	Farbeintrag entfaellt; CAD-Systemwechsel	Wagner	16.05.11	Schiwek	16.05.11

Intended For Welded Screw Ø
Pour Goujon Soudé à Filets Couchés Ø
Aufnahme fuer Schweissbolzen Ø

-

Tensile Force (N)
Tenue au serrage (N)
Schlaufenhaltekraft (N)

min. 225 N 7

Hole Size
Trou Ø
Loch Ø

-

Panel Thickness
Epaisseur Support
Blechdicke

-

Bundle Ø
Toron Ø
Buendel Ø

1.6 - 50 mm 8

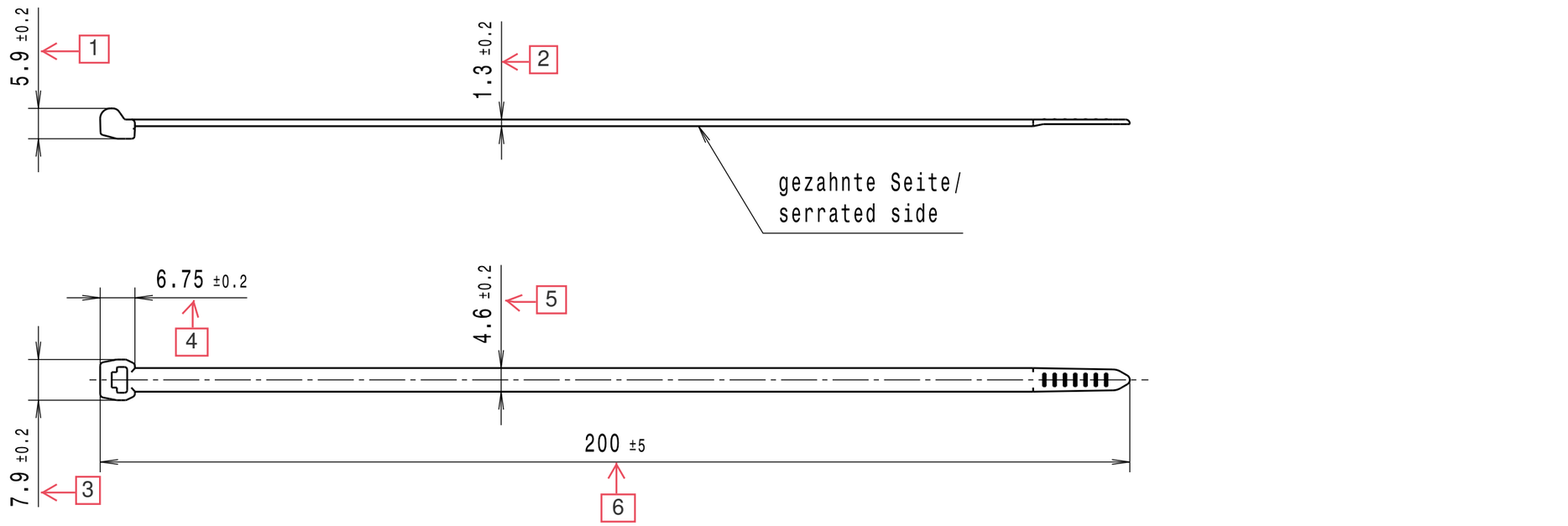
Material
Matière
Werkstoff

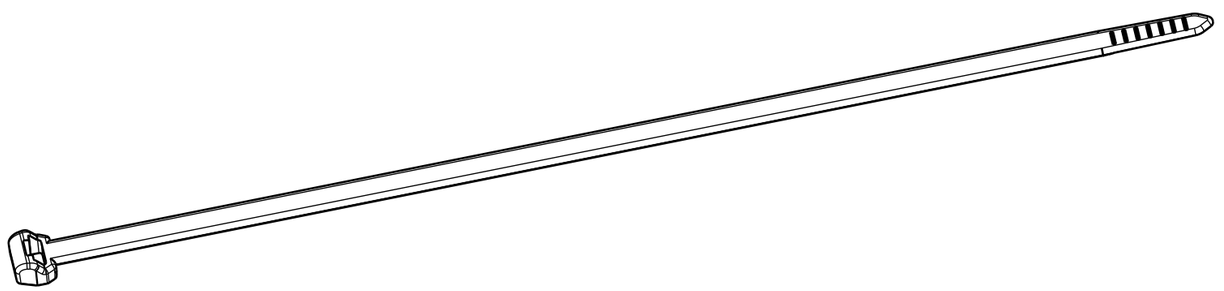
PA 6.6 (2) 9

Tolerances
Dimension without tolerances:
Tolérances
Cotes sans tolérances:
Toleranzen
Masse ohne Toleranzangaben :

Angle/ Winkel	
≤ 6	
≤ 30	
≤ 60	
≤ 120	
≤ 400	
≤ 1000	

PERFORMANCE SPECIFICATION
AUSFUEHRUNG SPEZIFIKATION





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Approved Approuvé Par Geprueft	bma	09.11.99

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Scale Echelle Maszstab: 1:1

Project Number Numéro de projet Projektnummer: NT 602-98

Title Titre Benennung: **T50ROS**

Kabelbinder / Cable tie

Drawing-No Plan-No Zeichnungs-Nr: **14.1434**

Format D.Size: **A3**

Sheet Page Blatt: 1 / 1