HellermannTyton | HellermannTyton GmbH internal remarks: | PB-No.: **52927**

Part Describtion: T50ROS GPN 98-0602

Part Submission Warrant

Part Name **T50ROS** | Cust. Part Number **-** **-**

Shown on Drawing No. **14.1434** | Org. Part Number **118-05040**

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. **118-05040** | 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

Production Location:

CUSTOMER SUBMITTAL INFORMATION

Nursan Otomotive EOOD (**30712**)
Customer Name/Division

Hyusein Tahir
Buyer/Buyer Code

Ford
Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? ☑ Yes ☐ No ☐ n/a

Submitted by IMDS or other customer format: **ID: 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: We hereby affirm that our production rate is able to fulfill customer demands

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☑ n/a

Organization Authorized Signature **i.A.** Stefan Fölster Date 2-Oct-18

Print Name **i.A. S. Fölster** +49(0)4122 701 5722 Fax No. +49 4122 701 241

Title **Quality Assistant** E-mail S.Foelster@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.: **52927**

Production Part Approval
Dimensional Test Results

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

ITEM	DIMENSION / SPECIFICATION	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)			OK	NOT OK
					mean	**min**	**max**		
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**	**6,80**	**6,89**	☑	☐
5	**4,6**	**± 0,2**			**4,6**	**4,6**	**4,7**	☑	☐
6	**200**	**± 5,0**			**198**	**198**	**198**	☑	☐
								☐	☐
								☐	☐
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Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. S. Fölster	Quality Assistant	2-Oct-18

Production Part Approval, Material Test Results

HellermannTyton

Internal PB-No.: **52927**

Production Part Approval
Material Test Results

ORGANIZATION:	**HellermannTyton GmbH**	PART NUMBER:	**-**
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
7	**Material**				**Material is**	✓	
	PA6.6				**PA6.6**		

Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. S. Fölster	Quality Assistant	2-Oct-18

Production Part Approval, Performance Test Results

HellermannTyton

Internal PB-No.: **52927**

Production Part Approval
Performance Test Results

ORGANIZATION:	**HellermannTyton GmbH**
SUPPLIER/VENDOR CODE:	**DUNS: 315430892**
MATERIAL SUPPLIER:	
*CUSTOMER SPECIFIED SUPPLIER/VENDOR	
*If source approval is req`d, include the Supplier (Source) Customer assigned code.	
PART NUMBER:	**-**
PART NAME:	**T50ROS**
DESIGN RECORD CHANGE LEVEL:	2 16.05.2011
ENGINEERING CHANGE DOCUMENTS:	

	MATERIAL SPEC. NO. / REV / DATE	SPECIFICATION / LIMITS	TEST DATE	QTY. TESTED	SUPPLIER TEST RESULTS (DATA) / TEST CONDITIONS	OK	NOT OK
						☐	☐
8	**Bundle**	**1,6 - 50,0 mm**			**Is suitable for bundle 1,6 - 50,0 mm**	☑	☐
						☐	☐
9	**Tensile force min.**	**225 N**			**mean 277 N / min. 249 N / max. 310 N**	☑	☐
						☐	☐

Blanket statements of conformance are unacceptable for any test results.

SIGNATURE	TITLE	DATE
i.A. S. Fölster	Quality Assistant	2-Oct-18

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

HELLERMANN TYTON UK
SHARTON GREEN BUSINESS PARK

Attention: HAYLEY MURPHY

Container ID: FCIU 577706-1

Certificate Date: 03-AUG-18
Delivery No: 0382441827
Shipped Qty: 48,060.000 Lbs
(21,800.016 Kgs)
Customer P.O. No: P096584-2

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/TS16949:2009 criteria.

This 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 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), GMP.PA66.018, CMP NY057 AA, MSDB 41 CPN 1076, MSDB 41 CPN 1899, FMVSS 302*, CPN3490, D4000 PA012, SAE J1639 PA0121.

Material Type: VYDYNE 22HSP NT **Material No:** 10397780 **Batch No** GF11VY23 **Date of Mfg** 11-JUN-2018

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	139.0	ml/g
Moisture	ASTM D6869	0.12	0.20	0.17	%
Copper	STM 00667	80	100	89	PPM
Strength @ Yld	ISO 527-1,2 / 1A	78	98	78	MPa
Nom. Str.@ Brk	ISO 527-1,2 / 1A	17.5	35.0	33.6	%
Notched Izod	ISO 180 / 1A	3.5	8.0	3.9	kJ/m^2
Flex Modulus	ISO 178;2MM/MIN	2500		2841	MPa

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

All information contained in this letter is provided for informational purposes only and is not meant to alter or waive the appropriate contractual product specifications. Moisture values are representative of the product at the time it was sampled. If numerical flame spread ratings appear herein, they are not intended to reflect 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.

FMEA No.	Generic	Prepared By	Ian Stahler	HellermannTyton								FMEA No.:	1	Original Issue Date:	01-Jun-18				
Part No:	FMEA Moulding Bulk to source											Latest revision Date:		Current Issue Level	1				
Part Description	Moulding Flex bay Bulk to Source											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													
																ACTION RESULTS			
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	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	Purge routine established, Screw	Technical (RJ) maintenace 9BG)	Purge experiments confirm material/	10	1	4	40		
						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									
				full shots (all cavities)	8	poor catchments of parts	1	company procedures	count	7	56									
						miscount	1	Training	Audit	8	64									
				damaged or missing pawl	8	process parameters	1	process pack	Audit	7	56									
						material		process pack	visual	8	64									
						mould temp		process pack	visual	8	64									
						damaged insert		company procedures	visual	9	72									
						mould temp	1	process pack	visual	8	64									
						process parameters	1	process pack	Audit	7	56									

				insertion	8	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		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
			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
			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 box	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 :** 01-Jun-18

HellermannTyton Manchester

Part Number: Moulding Bulk to Source **Process Team** I. Stahler, R. Jesser, J Pilkington, M. Briggs,A Gibbons, J Chapman, A Enriles **Issue:** 1

Description: Moulding Bulk to Source

	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
Pack Bulk	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	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.) **01/06/2018**	Date (Rev.)
Control Plan No. **Mould Hand Packing Bulk to source**	Manchester	**Quality Plan**		Issue No. **1**
Part No./ Latest Issue Level (If Reqd.)	Key Contact/ Phone Ian Stahler 284		Customer Eng. Approval/ Date (If Reqd.)	
Part Name/ Description **Flex bay hand pack bulk to source**	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 June18**		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		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	Sealer		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					
32 - 35	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
	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

HellermannTyton

Capability study

Partname: **98-0602**

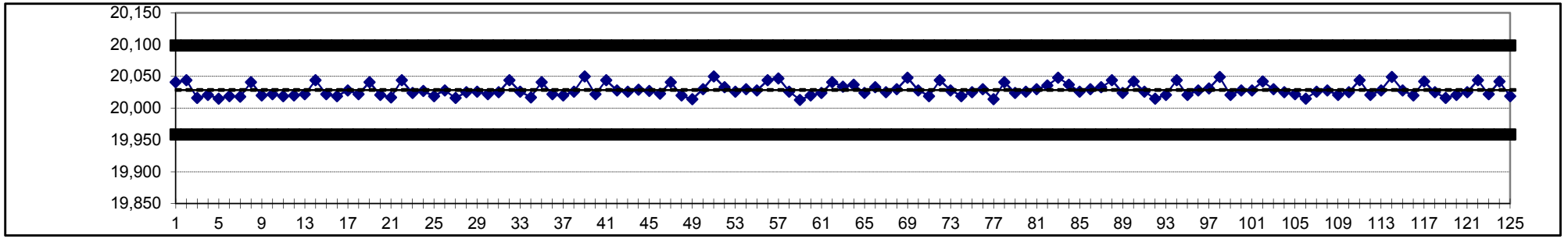
No.:	weight (g)	No.:	weight (g)	No.:	weight (g)	No.:	weight (g)	No.:	weight (g)
1	20,041	26	20,028	51	20,050	76	20,030	101	20,028
2	20,044	27	20,016	52	20,033	77	20,014	102	20,042
3	20,016	28	20,025	53	20,026	78	20,041	103	20,030
4	20,021	29	20,026	54	20,030	79	20,024	104	20,025
5	20,015	30	20,022	55	20,028	80	20,026	105	20,022
6	20,019	31	20,025	56	20,044	81	20,030	106	20,015
7	20,018	32	20,044	57	20,047	82	20,036	107	20,026
8	20,041	33	20,026	58	20,026	83	20,048	108	20,028
9	20,020	34	20,017	59	20,013	84	20,037	109	20,021
10	20,022	35	20,041	60	20,020	85	20,026	110	20,025
11	20,019	36	20,022	61	20,024	86	20,030	111	20,044
12	20,020	37	20,020	62	20,041	87	20,033	112	20,021
13	20,022	38	20,026	63	20,034	88	20,044	113	20,028
14	20,044	39	20,050	64	20,037	89	20,024	114	20,049
15	20,022	40	20,022	65	20,024	90	20,042	115	20,028
16	20,019	41	20,044	66	20,033	91	20,026	116	20,020
17	20,028	42	20,028	67	20,025	92	20,015	117	20,042
18	20,022	43	20,026	68	20,030	93	20,021	118	20,025
19	20,041	44	20,029	69	20,048	94	20,044	119	20,016
20	20,021	45	20,027	70	20,028	95	20,021	120	20,021
21	20,017	46	20,023	71	20,019	96	20,028	121	20,025
22	20,044	47	20,041	72	20,044	97	20,031	122	20,044
23	20,024	48	20,020	73	20,028	98	20,049	123	20,022
24	20,027	49	20,014	74	20,019	99	20,021	124	20,042
25	20,019	50	20,030	75	20,025	100	20,028	125	20,019

acceptable tolerance (+/-) **3,5** [‰]

max	**20,0500**
min	**20,0130**
R	**0,0370**
S	**0,0098**
X/	**20,0287**
LT	**19,9586**
UT	**20,0988**
valid +/-	**0,0701**

ppk 2,40

(demand: >= 1.67)



Gage R&R Study

Date:	21.07.2017	Operator 1:	Hayley.Murphy
Gage Name:	Lab Vernier	Operator 2:	Martyna.Smigielska
Gage Number:	DCI 038238	Operator 3:	Edyta.Bogon
Gage Type:	Digital Vernier		
Product:	Various		
Characteristic:	N/A		
Upper Specification Limit:	N/A		
Lower Specification Limit:	N/A		
Performed By:	C.Gorman		

Operator	Trial/Part	1	2	3	4	5	6	7	8	9	10
Hayley.Murphy	1	1,34	1,33	1,36	1,35	1,34	1,17	1,34	1,34	1,34	1,48
Hayley.Murphy	2	1,34	1,33	1,36	1,35	1,34	1,18	1,34	1,34	1,34	1,47
Hayley.Murphy	3	1,34	1,33	1,36	1,36	1,34	1,17	1,34	1,34	1,34	1,47
Martyna.Smigielska	1	1,34	1,33	1,36	1,35	1,34	1,17	1,34	1,34	1,34	1,48
Martyna.Smigielska	2	1,34	1,33	1,36	1,35	1,34	1,17	1,34	1,34	1,34	1,47
Martyna.Smigielska	3	1,34	1,33	1,36	1,35	1,34	1,17	1,34	1,34	1,34	1,47
Edyta.Bogon	1	1,35	1,34	1,36	1,35	1,35	1,16	1,35	1,35	1,34	1,47
Edyta.Bogon	2	1,34	1,33	1,36	1,35	1,34	1,16	1,34	1,34	1,34	1,48
Edyta.Bogon	3	1,34	1,33	1,36	1,35	1,34	1,16	1,34	1,34	1,34	1,47

Gage Repeatability and Reproducibility Report

Gage Name: Lab Vernier
Gage No. DCI 038238
Gage Type: Digital Vernier

Product: Various
Characteristic:
USL:
LSL:

Date: 21.07.2017
Performed by: C.Gorman

Rbar=	0,004	*XbarDiff=*	0,001667	*Rp=*	8,832222
K1=	0,5908	*K2=*	0,5231	*K3=*	0,3146

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV)		
EV = Rbar * K1	% EV = 100(EV/TV)	% EV = 100(EV/(USL-LSL)/6)
= 0,00236	= 0,08	= N/A
Reproducibility - Appraiser Variation (AV)		
AV= Sqrt((XbarDiff * K2)^2 - (EV^2)/nr))	% AV = 100(AV/TV)	% AV = 100(AV/(USL-LSL)/6)
= 0,00076	= 0,03	= N/A
Repeatability & Reproducibility (R & R)		
R&R= sqrt(EV^2 + AV^2)	% R&R = 100(R&R/TV)	% R&R = 100(R&R/(USL-LSL)/6)
= 0,00248	= 0,09	= N/A
Part Variation (PV)		
PV= Rp * K3	% PV = 100(PV/TV)	% PV = 100(PV/(USL-LSL)/6)
= 2,77862	= 100	= N/A
Total Variation (TV)		
TV= sqrt(R&R^2 + PV^2)	ndc= 1.41(PV/R&R)	
= 2,77862	= 1579,78	

Conclusion

***** **% R&R under 10% of Total Variation: Measurement system is acceptable**

% R&R from 10% to 30% of Total Variation: Measurement system may be acceptable based the application

% R&R over 30% of Total Variation: Measurement system needs improvement

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

Hole Size
Trou Ø
Loch Ø

-

Panel Thickness
Epaisseur Support
Blechdicke

-

Bundle Ø
Toron Ø
Buendel Ø

1.6 - 50 mm

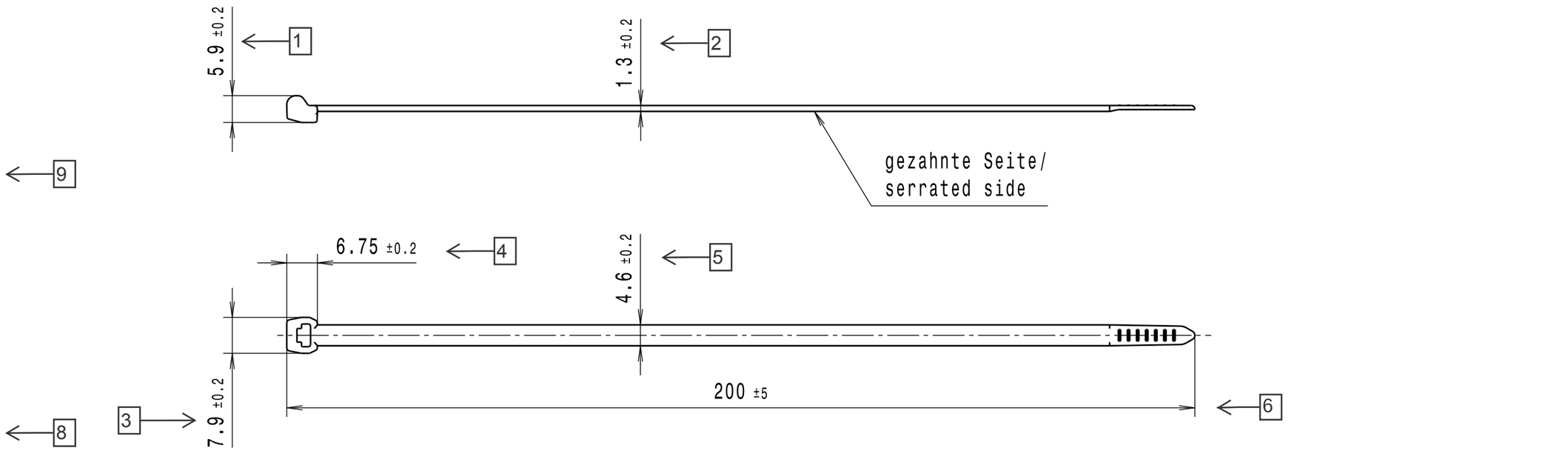
Material
Matière
Werkstoff

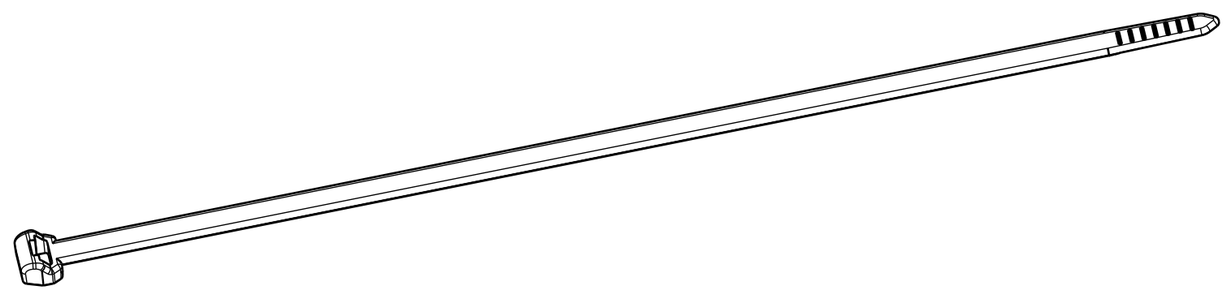
PA 6.6 (2)

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

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

PERFORMANCE SPECIFICATION
AUSFUEHRUNG SPEZIFIKATION





Drawn Dessiné Par Gezeichnet	braeuss	09.11.99
Approved Approuvé Par Geprueft	bma	09.11.99

HellermannTyton

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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