

Part Submission Warrant

Part Name T30LOS Cust. Part Number 118-04900 -
 Shown on Drawing No. 14.1555 Org. Part Number 118-04900
 Engineering Change Level 2 Dated 23.02.2016
 Additional Engineering Changes n/a Dated n/a
 Safety and/or Government Regulation ☐ Yes ☒ No Purchase Order No. 118-04900 Weight (kg) 0.0009
 Checking Aid No. n/a Checking Aid Engineering Change Level n/a Dated n/a

ORGANIZATION MANUFACTURING INFORMATION

HellermannTyton GmbH DUNS: 315430892

Organization Name & Supplier/Vendor Code

Großer Moorweg 45

Street Address

Tornesch

25436

Germany

City

Region

Postal Code

Country

Production Location: Great Britain

CUSTOMER SUBMITTAL INFORMATION

Nursan

Customer Name/Division

(30471)

Gulcin Akbas

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: 55025873

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.

Print Name

/

i.A. S. Fölster

Quality Assistant

+49 (0) 4122 701 330

Fax No.

+49 4122 701 241

Title

E-mail

O.Pracht@HellermannTyton.de

Date

9-Jan-19

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature

Date

Print Name

Customer Tracking Number (optional)



Internal PB-No.:

70760

Production Part Approval Dimensional Test Results

[illegible]

Blanket statements of conformance are unacceptable for any test results.

<u>SIGNATURE</u>	<u>TITLE</u>	<u>DATE</u>
i.A. S. Fölster 	Quality Assistant	9-Jan-19



Internal PB-No.:

70760

Production Part Approval Material Test Results

[illegible]

Blanket statements of conformance are unacceptable for any test results.

<u>SIGNATURE</u>	<u>TITLE</u>	<u>DATE</u>
i.A. S. Fölster 	Quality Assistant	9-Jan-19



HELLERMANN TYTON UK
SHARTON GREEN BUSINESS PARK

Attention: HAYLEY MURPHY

Container ID: MSCU6760136

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

Certificate Date: 27-APR-18
Delivery No: 0382428269
Shipped Qty: 48,000.000 Lbs
(21,772.800 Kgs)
Customer P.O. No: p093807/4

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** GC13VY20 **Date of Mfg** 13-MAR-2018

Ascend Performance Materials Operations LLC Specification

Lot Data

<u>Property</u>	<u>Test Method</u>	<u>Min</u>	<u>Max</u>	<u>Result</u>	<u>Units</u>
Relative Visc.	ASTM D789[9.34]	45.0	48.0	46.6	N/A
VISCOSITY NUM. SULFURIC	ISO 307	136.9	142.8	140.0	ml/g
Moisture	ASTM D6869	0.12	0.20	0.12	%
Copper	STM 00667	80	100	91	PPM
Strength @ Yld	ISO 527-1,2 / 1A	78	98	80	MPa
Nom. Str.@ Brk	ISO 527-1,2 / 1A	17.5	35.0	28.0	%
Notched Izod	ISO 180 / 1A	3.5	8.0	4.5	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 the hazards presented by this or any other material under actual fire conditions. Each end user should determine whether potential fire hazards are associated with the finished product, and whether this resin is suitable for the particular end use.

Ascend and Vydyne are registered trademarks of Ascend Performance Materials Operations LLC.

FMEA No.	Generic Auto Pack	Prepared By Ian Stahler		HellermannTyton								FMEA No.:		Auto Pack	Original Issue Date:			12-Dec-12			
Part No:	Cell auto Pack											Latest revision Date:		Mar-17		Current Issue Level		5			
Part Description	Cabel ties auto packed @ machine											Key Date		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					
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)	silos stock on electronic monitor	2	32										
					8	planning	1	daily stock take (forecast)	silos stock on electronic monitor	2	16										
					8	purchasing	1	daily stock take (forecast)	silos 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							
Request & deliver tool 18-21	Issue tool	Start of manufacture	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							
			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
							1	process parameters	process pack		7	56						
							1	incorrect nozzle tip	process pack		7	56						
							1	blocked nozzle tip	visual		8	64						

[illegible]

Commence production 22- 24	Start up	does not meet standard	flash	8	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
					environment (temp change)	1	company procedures	audit	8	64
					preventive maintenance tool	1	company procedures	audit	8	64
					preventive maintenance machine	1	company procedures	audit	8	64
					Platen fault (faces not parallel)	1	preventive 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

PROCESS FLOW DIAGRAM										Plan Number:	Page 1 of 1	Date :	14-Mar-17
HellermannTyton Manchester	Part Number:		Cell auto Pack				Process Team		I. Stahler, R. Jesser, J Pilkington, M. Briggs,A Gibbons, J Chapman, A Enriles				Issue: 4
	Description:		Cable ties Auto Cell & 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				
Mould & Pack @ machine	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				
Logistics	25	X					Commence Auto Pack production		L				
	26				X		In process inspection	Moulding faults/ pack machine faults	M/H				
	27				X		In process testing		L				
	28		X				Cross dock and Transfer stock to Logistics centre		L				
	29			X									
	30	X				Order assembly	Incorrect goods	L					
	31	X				Despatch	Incorrect goods	L					

Proto Pre Launch Prod. X			HellermannTyton			Process Control & Quality Plan		Date (Orig.) 12/12/2012		Date (Rev.) 14-Mar-17		
Plan No.			Manchester							Issue No. 8		
Part No./ Latest Issue Level (If Reqd.)			Key Contact/ Phone Ian Stahler 284					Customer Eng. Approval/ Date (If Reqd.)				
Part Name/ Description Cell auto Pack Non X120R			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 August 16					Other Approval/ Date (IF Reqd.)				
Part/ Process Number	Process Name/ Operation Description	Machine, Device Jig, Tools For Mfg.	Characteristics			Special Char. Class.	Methods					Reaction Plan
			No.	Product	Process		Product/Process Spec/ Tol.	Evaluation Technique	Sample		Control Method	
									Size	Freq.		
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	
					UV and 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
20	Install Tool	Workstation		Machine Identification	Working Tonnage, Scrap		Works Order / Production Plan	Visual	100%	1	Workstation Identification on Machine	Planning
21-22	Set Up Machine & Raw materials	Workstation		Machine Identification	Process Pack		Nominal 5% from agreed settings	Visual/Audit	100%	1	Visual Audit	Technical Team
		Silo ID		Raw Material Type			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			Zero Material	Alarm	100%		Alarm	
		Material dryers		Moisture			0.1 - 0 .2%	Material cert supplier	100%		Moisture check @ GI	

23	Commence production	Auto cell		Flash	Clamp pressure		Master Sample/ First off	Visual	First Off Check	Each Process Change	Visual Audit to First Off / Master Sample	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 position		+ / - 0.5 mm	Linear transducer	100%		Computer prog in machine controls	
					Injection speed		+/-5%	Linear transducer	100%		Computer prog	
					Material Melt Temperature		+/-5%	Thermocouple	100%		Computer prog in machine controls	
					Mould Misalignment		0%	Gauge			Location Rings	
					Incorrect Machine Size			Tool Design	Tool Trial		Machine Specification	
					Blocked Vents		0%	Visual	100%		TPM	
					Mould Temperatures		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 position		+ / - 0.5 mm	Linear transducer	100%		Computer prog in machine controls	
					Variation of Cycle time		+/-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	
				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	
	First Off	Master sample		Full Shot	Inspect		visual inspect to master sample, Insertion. (brittleness as WPD met)	Visual	Full Shot	Start-up	Attribute chart	Inform Supervision If required Inform QC Department. Stop Process &
				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	

24-27	In process Inspection	Visual		Full Shot	QC Inspect		Attribute chart	Visual	Full Shot	1 per shift	Attribute chart	Stop Process & Reset. Quarantine / repack Defect Parts QPD NC001
				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	
	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
	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	Inform Supervision If required Inform QC Department. Stop Process & Reset. Quarantine / repack Defect Parts QPD
	Packing & Labelling	Sealer		Bag seal intact			Seal Intact	Air in bag check	each pack	100%	Auto check function at each machine for each attribute	Inform Supervision If required Inform QC Department. Stop Process & Reset. Quarantine / repack Defect Parts QPD NC001
		Robot function			seal check and reject							
		Tamper function		tie through seal			no ties through seal	ties through seal beam	each pack	100%		
		Scales		full ties count			Scale setting -0 + 2	initial set and end of order	each pack	100%		
		Confirm water dose correct		water weight addition			Water weight cross ref table	set and check beginning/ end	each pack	100%		
		Confirm water dosepresent		water weight addition	Check water in Bag		Attribute chart	visual	2 bags	per box	Attribute chart	
28-31	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/ barcode data		Works Order / Label Data	Barcode	100%	1	Barcode	Logistics Centre / Customer Services

Machine Number: 035465
 Material: 03FHS or 22HSP+105F or OM0055
 Date: 11.08.2010
 Characteristic: Strap Thickness

Job Number: T30LOS.HB
 Colour: Black
 Time:
 Specification: 1,2

Tool Number: 1
 %L.D.R.:
 Total Tolerance: 0,4
 Operator: M.Janik

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
1,220	1,200	1,200	1,200	1,200	1,190	1,250	1,200	1,220	1,210	1,220	1,200	1,200	1,200	1,200															
1,230	1,200	1,200	1,200	1,190	1,220	1,230	1,210	1,210	1,200	1,230	1,200	1,200	1,200	1,190															
1,250	1,200	1,190	1,200	1,220	1,190	1,200	1,200	1,210	1,190	1,250	1,200	1,190	1,200																
1,250	1,190	1,190	1,220	1,190	1,220	1,200	1,200	1,200	1,200	1,250	1,190	1,190	1,220																
1,250	1,200	1,220	1,210	1,200	1,230	1,200	1,200	1,200	1,190	1,250	1,200	1,220	1,210																
1,230	1,210	1,210	1,200	1,190	1,250	1,200	1,190	1,200	1,220	1,230	1,210	1,210	1,200																
1,200	1,200	1,210	1,190	1,200	1,250	1,190	1,190	1,220	1,190	1,200	1,200	1,210	1,190																

DISTRIBUTION SHOULD APPROXIMATE TO NORMAL

Cp = $\frac{\text{TOLERANCE}}{6 \times \text{SIGMA}}$

Cpu = $\frac{\text{USL} - \text{Xbar}}{3 \times \text{SIGMA}}$

Cpl = $\frac{\text{Xbar} - \text{LSL}}{3 \times \text{SIGMA}}$

AVERAGE(Xbar)= 1,208
 RANGE(R)= 0,060
 SIGMA(S)= 0,0173

Cp = 3,852
 Cpk = 3,700
 Cr = 0,260 = 25,96 %

Xmax = 1,250
 Xmin = 1,190

USL= 1,400
 LSL= 1,000

Cpu= 3,700
 Cpl= 4,004

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

Gage R&R Study

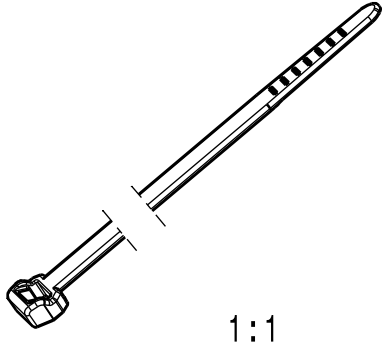
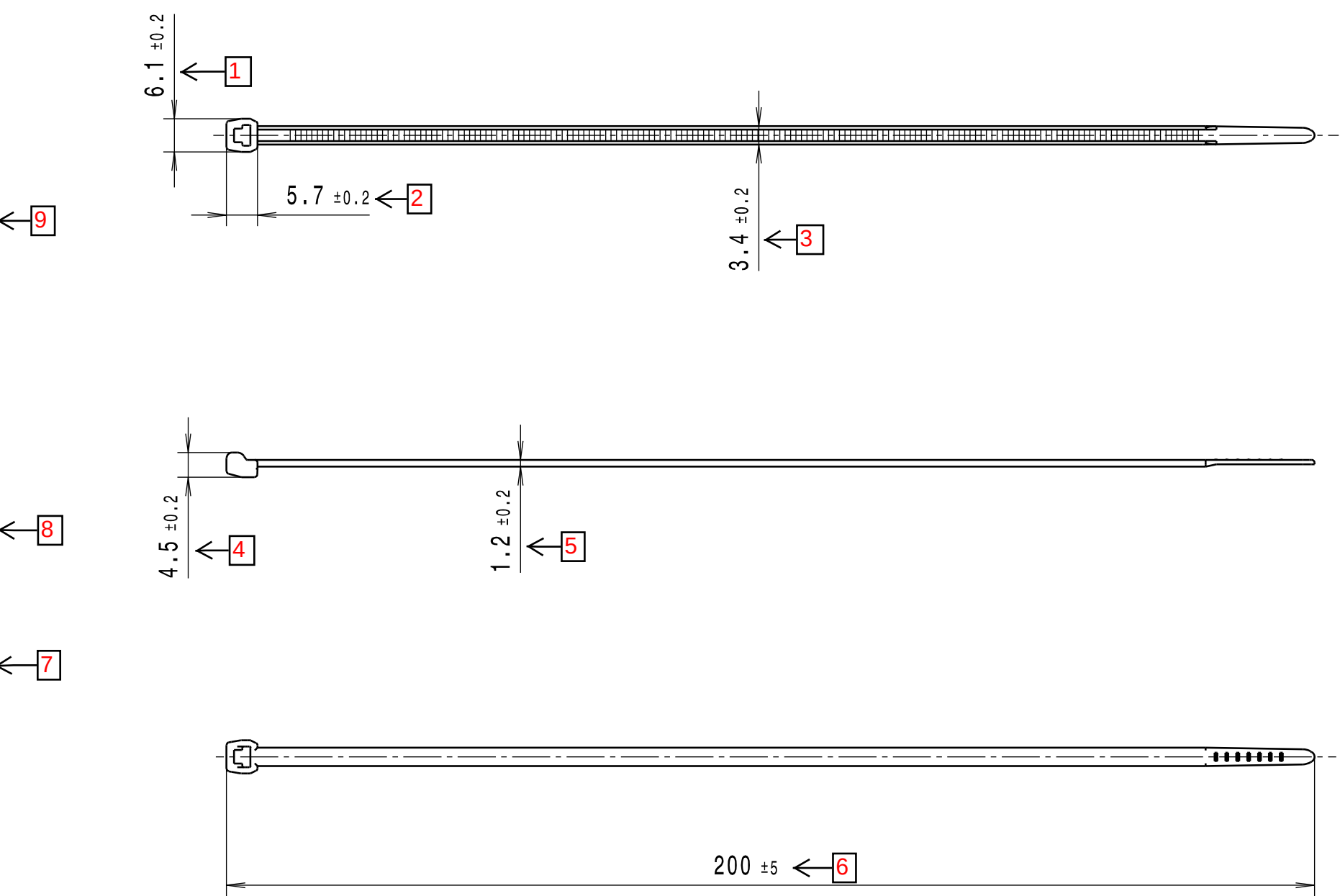
Date:	21.07.2017	Operator 1:	Hayley.Murphy
Gage Name:	Lab Vernier	Operator 2:	Martyna.Smigielska
Gage Number:	DCI 038238	Operator 3:	Edyta.Bogon
Gage Type:	Digital Vernier		
Product:	Various		
Characteristic:			
Upper Specification Limit:			
Lower Specification Limit:			
Performed By:	C.Gorman		

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

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	Masse nach Group Standard angepasst	Schiwek	09.09.03	bma	09.09.03
2	0	Farbe entfernt; CAD Systemwechsel; Schlaufenhaltekraft alt 133N auf neu 135N geaendert	Hiller	23.02.16	Wulf	23.02.16

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)	135N
Hole Size Trou Ø Loch Ø	
Panel Thickness Epaisseur Support Blechdicke	
Bundle Ø Toron Ø Buendel Ø	1,6 - 50mm
Material Matière Werkstoff	PA6.6
Tolerances Dimension without tolerances: Tolérances Cotes sans tolérances: Toleranzen Masse ohne Toleranzangaben :	
Angle/ Winkel	± 3°
≤ 6	± 0,3
≤ 30	± 0,5
≤ 60	± 0,7
≤ 120	± 1,5
≤ 400	± 5
≤ 1000	± 10
PERFORMANCE SPECIFICATION AUSFUEHRUNG SPEZIFIKATION	



Ausdruck nur zur Information /
Printed copy for information only

The copyright of this drawing is reserved by HELLERMANN TYTON. It is issued on condition that it is not reproduced, copied or disclosed to a third party, either wholly or in part, without the consent of HELLERMANN TYTON. La propriété de ce plan est réservée à la société HELLERMANN TYTON. Il est distribué à condition qu'il ne soit pas reproduit, communiqué ou révélé à une tierce partie, soit complètement ou en partie, sans le consentement de la société HELLERMANN TYTON. Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht ausdruecklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte fuer den Fall der Patenterteilung oder Gebrauchsmuster-Eintragung vorbehalten.	Drawn Dessiné Par Gezeichnet	braeuss	02.10.01	Scale Echelle Maszstab	1:1	Project Number Numéro de projet Projektnummer	NT 822/99
	Approved Approuvé Par Geprueft	bma	02.10.01	Title Titre Benennung	T30LOS Kabelbinder / cable tie		
HellermannTyton				Drawing-No Plan-No Zeichnungs-Nr	14.1555		
Manchester Telephone: +44 (0) 161 945 4181 Facsimile: +44 (0) 161 947 2228 Trappes Téléphone: +33 (0) 1 30 13 80 00 Télécopie: +33 (0) 1 30 13 80 60 Tornesch Telefon: +49 (0) 41 22 / 701 - 1 Telefax: +49 (0) 41 22 / 701 - 400				Format D.Size		A3	
						Sheet Page Blatt	1 / 1