

# Production control plan

<input type="checkbox"/> Pre-series <input checked="" type="checkbox"/> Series production		Contact / Phone Jörg Krüger / ++49-2203/9649-203					Date (first approval) / author 09/01/2003 / Carsten Plücker			
Part no.: <b>GTM-0913-010</b>		Project team Jörg Krüger, Michael Otto, Dennis Berninger, Christos Pasiadis, Andreas Ginschel, Savvas Pasiadis, Christian Schmitz.					Date / changed 06.04.2019 / Sergej Stoll			
							Date / approval 08.04.2019 / Jörg Krüger			
no.	Process step/ Name of procedure	Features		Spec. Features Classific.	Product/process Specification Limit values	Measurement technology	Random sample		Control method (Documentation)	Measure/s in case of variations
		Product	Process				Extent	Interval		
<b>1. Incoming goods, pellets</b>										
1	Inspection of pallets / granulate	Acceptance test certificate available and confirming?		-	Acceptance test certificate	see test on acceptance test certificate	standard: 1 spot check	each charge	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	size of pallets		-	<b>standard: even pallets</b> or material specific CAQ test instruction	<b>standard: visual check</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	colour of pallets		-	<b>standard: compare with reference sample</b> or material specific CAQ test instruction	<b>standard: visual check</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	dust in test lot		-	material specific CAQ test instruction	<b>standard: visual check</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	clue (angels hair) in lot		-	material specific CAQ test instruction	<b>standard: visual check</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	humidity		-	material specific CAQ test instruction	<b>standard: humidity testing device (H 53 Halogen Moistre Analyser DIN)</b>	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	length of pallets		-	material specific CAQ test instruction	<b>standard: calipper</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	DSC analysis		-	material specific CAQ test instruction	<b>standard: Mettler DSC 20</b> or material specific CAQ test instruction	<b>standard: 1 spot check</b> or material specific CAQ test instruction	<b>standard: each charge</b> or material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	MFI / MFR analysis (NFR standard)		-	material specific CAQ test instruction	<b>MFI-test device DIN EN ISO 1133 Bestimmung der Schmelze – Massefließrate (MFR)</b>	material specific CAQ test instruction	material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
2	Inspection of pallets / granulate	backlock of burn up (not standard)		-	material specific CAQ test instruction	Muffelofen DIN EN ISO 3451- 1 Bestimmung der Asche according to material specific CAQ test instruction	material specific CAQ test instruction	material specific CAQ test instruction	CAQ	complaint / blocking / Info material development, production, material preparation, Missing certificate will be requested /
<b>2. Material preparation</b>										
1	Check conformity of pellets/formula	Identity		-	Formula / MAT no. of the pellets	Visual inspection (material description of the individual components)	All pellets used	Continuous		Info to shift leader and internal supplier / return delivery / special approval if necessary
2	automatic material mixing		mixing ratio	-	automatic, depending on recipe	weighing unit in mixer, automatically check of ratio	each mixture	Continuous		Info to shift leader and internal supplier / special approval if necessary

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3	Mix pellets manually		Correct mixing ratio	-	Formula	Visual inspection of the scale's digital display	Every mix	Continuous		Do not use material / info SS / block / correction mix if necessary
4	dispenser station - production start	Identity		-	check recipe, machine, order plan	visual inspection	each change of material	Continuous	production release process	Info to shift leader and internal supplier / special approval if necessary
4	dispenser station - running production	Identity		-	check recipe, plugs in station, order plan	visual inspection	each plug in the station	once a day	material change chart	Info to shift leader and internal supplier / special approval if necessary
5	Dry pellets		Drying duration	-	Formula	Requirement and turnover are recorded in an excel sheet and the duration is derived from it	All pellets used	Continuously	Excel sheet	Drying duration too short = info SS / dry longer / extend dryer capacity / reduce throughput / allocate machine differently (reschedule)
6	Check temperature		Drying temperature	-	Formula	Sensor with digital display or analog display	All pellets used	Continuously	Recording on paper at work place	Temp. too low = raise temperature / Temp. too high = info SS / decision SS
7	Monitor dew point		Comply with dew point	-	< -28 °C	Visually read on digital display	1	24 hrs.	Enter the value into a list / form daily	Dew point beyond the limit values = info servicing / check residual moisture / info SS / machine off
8	Measure residual moisture		Residual moisture content	-	Formula	Moisture measuring device	Every dryer (material)	24 hrs.	Recording in CAQ	Residual moisture too high = dry longer / info SS / decision SS
9	Convey material into machine	Right material		-	Correct material according to conversion plan	Visual	All pellets used	Continuous		Change material / info shift supervisor
<b>3. Tool preparation</b>										
1	Inspection for damages / pollutants	Free of damage / pollutants		-	Work instruction	Visual inspection	Every tool	Before installation and after dismantling	Work order	Parts to inform for correction
2	Check identity	Identity		-	Work order	Visual inspection	100%	Continuous	Work order	Restore and install correct tool part
3	Assemble tool		Correct assembly	-	Drawing	Visual inspection	100%	Continuous	Work order	Assemble tool correctly, check again
<b>4. Injection molding</b>										
1	Start order		Numbers are identical	-	Order number / DNC data set	Visual inspection	1	Every order	PDA / order	Info to shift supervisor and planner
2	Install tool		Tool installed	-	Set up / Setup support AA Lean	Visual inspection	1	Every order	Order	Info to shift supervisor
3	Change of material	Formula number of material		-	Conversion plan / order	Visual inspection	1	Every order	Order	Info to shift supervisor
4	Start and optimize	Parts without visible errors		-	Setting data set / Start AA	Visual inspection	1 shot	Per start		
1	Check if quantity was reached		Quantity reached	-	Conversion plan	Counter reading / PDA	100%	Per order	PDA	Info to SS and if necessary post production of missing quantities
2	Stripping down of the old order		Stripping down	-	Work instruction, cleanliness of machine, identification of containers	Visual inspection	100%	Per order	PDA	Info to shift supervisor
3	Set up of the new order		Set up	-	Function, cleanliness of machine / tool, identification of containers	Visual inspection on the machine	100%	Per order	Work order / setup support	Info to tool preparation / Correctly assemble TP tool, check again
4	Attach identification of containers and machine		Varietal purity	-	Work instruction, cleanliness of machine, identification of containers	Visual inspection	100%	Continuous		Block and reject
5	Fill material by hand	Right material		-	Correct material according to conversion plan			Continuous		Change material
6	Load machine settings		Optimal machine settings	-	According to (setting card) / Setting data set	Evaluation of process / part	In case of conversion	Continuous	PDA	Optimize settings manually, check again

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7	Achieve stable process		Stable production process and cleanly demolded parts	-	Load data set, pay attention to setup support	Visual inspection and dimensional check	Random sample Sample	Continuous		Readjust machine settings and info to shift supervisor and QA
8	Operator self- control	Surface error of injection-molded part and gate		-	No optical errors (catalog of errors)	Visual inspection	1 shot (all cavities + gate) per change	Continuous	Work order / Checklist	Adjust machine / info to QA, check again
9	Inspection of tool		Injection molding tool error (coating / flash)	-	Work instruction, cleaning plan / checklist	Visual inspection	According to cleaning plan	Continuous	Cleaning plan	Clean tool, show parts to QA, if necessary
10	Start after disruption		Optimal machine settings	-	Work instruction, change container and/or selection flap activated	Visual inspection	1 shot (all cavities)	Continuous	PDA	Remove cause of disruption. Info to shift supervisor if error is repeated
11	Operator self- control	No visible errors		-	Catalog of errors	Visual inspection	1 shot (all cavities) every 2 hrs	Continuous	PDA	Machine or tool compensation, block parts according to operation instruction

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<b>5. Quality assurance</b>										
1	Production approval according to test instructions	Parts according to specification		CAQ test instructions	CAQ test instructions	CAQ test instructions	According to CAQ	After conversion	CAQ	Readjust machine settings / info to SS / tool to iform
2	Inspection of current production according to test instructions	No visible and dimensional errors		CAQ test instructions	CAQ test instructions	CAQ test instructions	According to CAQ	Continuous	CAQ	Readjust machine settings / info to SS / tool to iform / grind in parts up to 3,000, otherwise quarantine store
3	Visual inspection on the machine according to catalog of errors	No visible errors		CAQ test instructions	Catalog of errors	Visual inspection	Every machine	Continuous	PDA	Grind in parts up to 3,000, otherwise quarantine store / info series responsibility
<b>6. Transport</b>										
1	Print labels and mark DSB		Correct identification	-	According to work instruction QM-2-293 / Order to machine	Compare with production order	100%	Continuous	Merlin (Scale file)	If printing is not possible, manual entry or info to QA
2	Preparing DSB		DSB supply	-	According to work instruction	Visual inspection	All DSB	Continuous	Axapta	Info to concerned division
3	Inspection for pollutants		Free of pollutants	-	Drawing / Catalog	Visual inspection	100%	Continuous	Plant log	In NIO parts (dirt) – For separation or QA quarantine store
4	Compress		Varietal purity	-	According to work instruction QM-2-214 / labels	Visual inspection	Every label, 1 part each from every DSB	Continuous	-	Block parts, info to QA
<b>7. Separation</b>										
1	Separate gates		Fully separated gates	-	According to work instruction	Visual inspection	100%	Continuous	Plant log	In niO – sort result again
2	Inspection for varietal purity		Varietal purity	-	Follow work instructions, order and cleanliness, identifications, lid on DSB	Visual inspection	100%	Continuous	Plant log	In niO – sort result again, block and info to QA
3	Inspection for pollutants		Free of pollutants	-	Application of suitable separation method. Cleaning of plants and containers according to regulation.	Visual inspection	100%	Continuous	Plant log	In niO – sort result again

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17. Warehousing – Arrival										
1	Check identity	Identity		-	Label	Visual inspection	100%	Continuous	-	Block and to QA for clarification
2	Check if all targets are stamped		All process operations conducted	-	According to label	Visual inspection	100%	Continuous	-	Return to originator
3	Inspection for varietal purity		Varietal purity	-	According to work instruction	Visual inspection	Visual inspection of each container	Continuous	-	Block and to QA for clarification
4	Inspection for pollutants	Free of pollutants		-	Drawing / Catalog	Visual inspection	100%	Continuous	-	In nIO – Block result and get it newly sorted
5	Inspection for visible errors	No visible errors		-	Reference sample	Visual inspection	100%	Continuous	-	Block and to QA for clarification
18. Warehouse packaging – Commissioning										
1	Check identity	Identity		-	According to job order card	Visual inspection	100%	Continuous	Job order card	Info to warehouse, provide correct items, check again
2	Weigh quantity		Correct quantity	-	According to job order card	Count / Weigh	Per order	Continuous	Job order card	Info to warehouse, provide correct quantity, check again
3	Inspection for varietal purity		Varietal purity	-	According to work instruction	Visual inspection	Visual inspection of each package	Continuous	-	Block and to QA for clarification
4	Labeling according to specification		Correctly labeled parts	-	According to work instruction and/or note on card	Visual inspection	Visual inspection of each package	Continuous	-	Back to packer, attach correct labels
5	Packaging according to specification		Correctly packed parts	-	Packaging regulation	Visual inspection	Visual inspection of each package	Continuous	-	Back to packer, pack correctly
19. Shipping										
1	Check if delivery complete	Delivery complete (number of packages)		-	According to job order card	Count	100%	Continuous	-	Info to warehouse about faulty compilation
2	Inspection for correct address	Correct address / parts		-	According to invoice / order	Visual inspection	100%	Continuous	Merlin	Info to warehouse about faulty compilation
3	Inspect parts	No visible errors		-	Optically clean and no defective parts	Visual inspection	100%	Continuous		Info to QA
4	Inspection for varietal purity		Varietal purity	-	Work instruction	Visual inspection	100%	Continuous		Info to QA

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<b>20. Requalification</b>										
1	Requalification	Conformity to drawing and compliance with all customer-specific requirements (if applicable)	Inspection of all dimensions required by the drawing (like initial sampling)	-	Drawing / catalog / QAA / Product development plan / other customer requirements (if applicable)	According to CAQ software	1 part per cavity	After each correction, if not otherwise agreed with the customer	Recording of product portfolio and CAQ software	Info to sales / customer, initiate corrective action