Parameter sheet

Machine, software and material parameters
FORMIGA P 100 / PSW 3.3
FORMIGA P 110 / PSW 3.6
EOSINT P 395, EOSINT P 800 / PSW 3.6
EOS P 396, EOSINT P 760 / PSW 3.7

Material-specific parameters

Material-specific parameters are included in the EOS default jobs.
EOS default jobs may not be changed.

☞ *Process software* → **Options** menu → **HWI** options → *HWI parameters* window → *Material* tab → *Load EOS default job* button → *EOS_DefaultJobs* folder → <*material type*> folder → <*material type*><*layer thickness*><*version_number*>.*eosjob*

Shrinkage scaling FORMIGA P 100 / FORMIGA P 110

The values given are for guidance in %.

Scaling factors / Material	X Axis	Y Axis	Z Axis			
			FORMIGA P 100		FORMIGA P 110	
			0 mm	300 mm	0 mm	300 mm
PA 1101	4.0	4.0	3.4	2.5		
PA 1102 black	4.0	4.0			3.5	2.8
PA 2200	3.2	3.2	2.2	1.6	2.4	2.0
PA 2201	3.2	3.2	2.2	1.6	2.6	2.0
PA 2221	3.2	3.2	2.4	2.0		
PA 3200 GF	2.4	2.4	1.7	1.2	1.9	1.3
Alumide®	2.0	2.15	1.5	1.1	2.0	1.3
PrimePart® ST	2.8	3.0	2.4	1.5		
PrimeCast® 101	0.7 - 1.0	0.7 - 1.0	0.0 – 0.1 *	0.0 – 0.1 *	0.0 – 0.1 *	0.0 – 0.1 *
PA 2105	3.5	3.5			2.5	2.0

* For small parts (< 100 mm), a negative scaling factor might be necessary.

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Shrinkage scaling EOS P 396

The values given are for guidance in %.

Scaling factors / Material	X Axis	Y Axis	Z Axis EOS P 396	
			0 mm	600 mm
PA 1101	4.0	4.0	2.9	2.5
PA 1102 black				
PA 2200	3.2	3.2	2.55	1.4
PA 2201	3.2	3.2	2.2	1.6
PA 2202 black	3.5	3.5	2.8	1.8
PA 2210 FR				
PA 2221	3.2	3.2	2.55	1.4
PA 2241 FR	3.1	3.1	2.55	1.4
PA 3200 GF	2.4	2.4	1.7	1.2
Alumide®	2.0	2.2	1.5	1.1
CarbonMide®	0.5	2.0	3.6	2.2
PrimePart® ST	2.6	2.8	1.1	1.1
PrimeCast® 101	0.7 - 1.0	0.7 - 1.0	0.0 – 0.1 *	0.0 – 0.1 *

* For small parts (< 100 mm), a negative scaling factor might be necessary.

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Shrinkage scaling EOSINT P 395 / EOSINT P 760 / EOSINT P 800

The values given are for guidance in %.

Scaling factors / Material	X Axis	Y Axis	Z Axis					
			EOSINT P 395		EOSINT P 760		EOSINT P 800	
			0 mm	600 mm	0 mm	600 mm	0 mm	250 mm
PA 1101	4.2	4.2	2.9	2.5	2.9	2.5		
PA 1102 black	3.9	3.9	3.7	2.3				
PA 2200	3.2	3.2	2.55	1.4	2.65	1.45		
PA 2201	3.2	3.2	2.2	1.6	2.2	1.6		
PA 2202 black	3.5	3.5	2.8	1.8				
PA 2210 FR	3.4	3.4	2.2**	1.6**	2.2**	1.6**		
PA 2221	3.2	3.2	2.55	1.4	2.65	1.45		
PA 2241 FR	3.1	3.1	2.55	1.4	2.65	1.45		
PA 3200 GF	2.4	2.4	1.7	1.2	1.7	1.2		
Alumide®	2.2	2.2	1.5	1.1	1.5	1.1		
CarbonMide®	0.5	2.0	3.6	2.2				
PrimePart® ST	2.6	2.8	1.1	1.1				
PrimeCast® 101	0.7 - 1.0	0.7 - 1.0	0.0 – 0.1 *	0.0 – 0.1 *	0.0 – 0.1 *	0.0 – 0.1 *		
EOS PEEK HP3	4.5 ± 0.5	4.5 ± 0.5					4.5 ± 0.5	3.0 ± 0.5

* For small parts (< 100 mm), a negative scaling factor might be necessary.

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Beam Offset
FORMIGA P 110 / EOSINT P 395 / EOS P 396 / EOSINT P 760 / EOSINT P 800

☞ The values given are for guidance in mm

Machine / Material	EOS default job	FORMIGA P 100	FORMIGA P 110	EOSINT P 395	EOS P 396	EOSINT P 760	EOSINT P 800
PA 1101	PA1101_100_0xx	0.20					
	PA1101_120_0xx			0.22	0.25	0.22	
PA 1102 black	PA1102_120_0xx			0.20			
	PA1102_100_0xx		0.20				
PA 2200	PA2200_060_xxx		0.21	0.20	0.20	0.20	
	PA2200_100_1xx		0.24	0.25	0.27	0.25	
	PA2200_120_1xx		0.29	0.33	0.35	0.33	
	PA2200_150_xxx			0.36	0.38	0.36	
	PA2200_180_xxx			0.40	0.42	0.40	
PA 2201	PA2201_100_0xx		0.28	0.25	0.25	0.25	
	PA2201_120_0xx			0.33	0.33	0.33	
	PA2201_150_0xx			0.36	0.36	0.36	
PA 2202 black	PA2202_150_0xx			0.35	0.35		
PA 2210 FR	PA2210FR_150_0xx			0.33*		0.33*	
PA 2221	PA2221_100_0xx			0.25	0.27	0.25	
	PA2221_120_0xx			0.33	0.35	0.33	
	PA2221_150_0xx			0.36	0.38	0.36	
PA 2241 FR	PA2241FR_100_0xx			0.27	0.27	0.27	
	PA2241FR_150_0xx			0.33	0.33	0.33	
PA 3200 GF	PA2201GB_100_0xx		0.29	0.33		0.33	
	PA2201GB_120_0xx			0.33	0.33	0.33	
	PA2201GB_150_0xx			0.33	0.35	0.33	
Alumide®	PA2203ALG_100_0xx		0.25	0.33		0.33	
	PA2203ALG_120_0xx			0.33	0.33	0.33	
	PA2203ALG_150_0xx			0.33	0.33	0.33	
CarbonMide®	PA2202CF_150_0xx			0.43	0.43		
PrimePart® ST	PEBA2301_100_0xx	0.40					
	PEBA2301_150_0xx			0.40	0.40		
PrimeCast® 101	PS3302_100_0xx		0.25				
	PS3302_150_0xx			0.20	0.20	0.20	
PA 2105	PA2105_060_0xx		0.16				
EOS PEEK HP3	PAEK1304_120_0xx						0.39

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Heating

The values given are for guidance. During the commissioning of the machine EOS Service defines which nominal temperatures are to be set.

☞ *Process software* → **Options** menu → **HWI** options→ *HWI parameters* window → *Material* tab

Nominal temp. [°C] / Material	FORMIGA P 100		FORMIGA P 110		EOSINT P 395/EOS P 396	
	Process chamber	Removal chamber	Process chamber	Removal chamber	Process chamber	Removal chamber
PA 1101	180 - 190	150			180 - 195	150
PA 1102 black			178-186	150	180 - 195	150
PA 2200	168 - 170	150	168 – 170	150	170 - 185	130
PA 2201	171 – 173	150	169 - 171	150	170 - 185	130
PA 2202 black					170 - 185	135
PA 2210 FR*					170 – 185	130
PA 2221	170 - 172	150			170 - 185	130
PA 2241 FR					170 - 185	130
PA 3200 GF	168 – 170	150	168 – 170	150	170 - 185	130
Alumide®	171 – 173	150	170 – 172	150	170 - 185	130
CarbonMide®					170 - 185	130
PrimePart® ST	130	70			125 - 140	50
PrimeCast® 101	107 - 109	60	104 - 106	60	103 - 107	50
PA 2105			169 – 171	155		

Nominal temp. [°C] / Material	EOSINT P 760			EOSINT P 800		
	Process chamber	Building platform	Exchange-able frame	Process chamber	Building platform	Exchange-able frame
PA 1101	180 – 195	160	140			
PA 2200	170 - 180	160	140			
PA 2201	170- 180	160	140			
PA 2210 FR*	170- 180	160	140			
PA 2221	170 - 180	160	140			
PA 2241 FR	170 - 180	160	140			
PA 3200 GF	170- 180	160	140			
Alumide®	170- 180	160	140			
PrimeCast® 101	103 - 107	50	50			
EOS PEEK HP3				365 - 369	343 - 347	343 - 347

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Determine building temperature with *OEPs (original EOS parameter sets)*: Non-curl temperature + material-dependent temperature offset

The non-curl temperature is determined on commissioning the material. The building temperature to be set subsequently is calculated by adding the material-specific temperature offset to the non-curl temperature (at the related recommended material regeneration rate). The result is a general figure that may need to be adjusted to the specific case depending on the part requirements.

Temperature offset [°C] / Material	FORMIGA P 100	FORMIGA P 110	EOSINT P 395	EOS P 396	EOSINT P 760	EOSINT P 800
PA 1101	*		*	*	*	
PA 1102 black		*	*			
PA 2200	4 - 5	4 - 5	7	7	7	
PA 2201		1 - 2	1	1	1	
PA 2202 black			*	*		
PA 2210 FR			1 – 2**		1 – 2**	
PA 2221	4 - 6		7	7	5 – 6	
PA 2241 FR			3	3	3	
PA 3200 GF		4 - 5	4	4	2 - 3	
Alumide®		4 - 5	3	3	2 - 3	
CarbonMide®			3	3		
PrimePart® ST	3		3	3		
PrimeCast® 101						
PA 2105		1				
EOS PEEK HP3						*

* Specific method for determining building temperature

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Determine start temperature for *PPPs (Part Property Profile* parameter sets): Non-curl temperature + PPP-dependent temperature offset

The non-curl temperature is determined on commissioning the material. The start value for the subsequent determination of the PPP building temperature is calculated by adding the temperature offset to the non-curl temperature (at the related recommended material regeneration ratio). Only the determination of the PPP building temperature as defined by EOS by means of part tests and an evaluation file will enable the PPP part properties to be achieved.

Temperature offset [°C] / Material	FORMIGA P 110	EOSINT P 395	EOS P 396	EOSINT P 760
PA 2200 – *TopQuality*	4 - 5 **	*		*
PA 2200 – *Performance*	4 – 5 **	*	*	*
PA 2200 – *Balance*	4 – 5 **	7	7	5 - 6
PA 2200 – *Speed*		*		*
PA 2200 – *TopSpeed*		*		*

* See Online Training Center PPP building temperature search - www.eos.actxc.de
** PPP building temperature search not approved

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Warm up phase

☞ *Process software* → **Start building process** button

		FORMIGA P 100 / P 110	EOSINT P 395 / EOS P 396	EOSINT P 760	EOSINT P 800
Minimum warm up time [min]	**PA 1101**	Auto	180	180	
	PA 1102 black	Auto	180		
	PA 2200	Auto	120	180	
	PA 2201	Auto	120	180	
	PA 2202 black		180		
	PA 2210 FR		180*	180*	
	PA 2221	Auto	120	180	
	PA 2241 FR		120	180	
	PA 3200 GF	Auto	120	180	
	Alumide®	Auto	120	180	
	CarbonMide®		120		
	PrimePart® ST	Auto	120		
	PrimeCast® 101	Auto	120	180	
	PA 2105	Auto			
	EOS PEEK HP3				Auto
Powder base thickness [mm]		Auto	Auto	Auto	Auto
Powder base thickness [mm] using PA 2202 black			9		
Additional layers when nominal temperature of exchangeble frame is reached.					0

* *BasicModule* optics only

Settings heating radiator EOSINT P 800

☞ Guidance values for position and orientation settings of the heating radiators in the process chamber

	Heating radiator				
	left	**right**	**front**	**rear**	**corners**
Distance to side wall [mm]	43 ± 2	43 ± 2	128 ± 2	103 ± 2	
Distance to building plane [mm]	230 ± 2	230 ± 2	270 ± 2	254 ± 2	
Orientation [°]	47 ± 1	47 ± 1	109 ± 1	108 ± 1	
Weighting (base value) [%]	60	60	100	70	125

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Compressed air admission pressure

☞ Pneumatic service unit

		FORMIGA P 100 / P 110	EOSINT P 395 / EOS P 396	EOSINT P 760	EOSINT P 800
Nitrogen supply [bar]		5.5	5.5	5.5	5.5
Fluidisation [bar]	**PA 1101**		2		
	PA 1102 black		2		
	PA 2200		2		
	PA 2201		2		
	PA 2202 black		2		
	PA 2210 FR		2*		
	PA 2221		2		
	PA 2241 FR		2		
	PA 3200 GF		2		
	Alumide®		2		
	CarbonMide®		2		
	PrimePart® ST		4		
	PrimeCast® 101		2		
	PA 2105				
	EOS PEEK HP3				

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Nitrogen / Compressed air flow rate

☞ Clearing, fluidisation flow rate and sealing air indicators

		FORMIGA P 100 / P 110	EOSINT P 395	EOS P 396	EOSINT P 760	EOSINT P 800
Clearing nozzle pyrometer [l/min]		4 ± 0.5	4	4	1.5 ± 0.5	3.5 ± 0.5
Clearing nozzle F-Theta lens / Window for the F-Theta lens / Laser Window [l/min]		11 ± 1	*BasicModule* 10.5 ± 0.5 *SurfaceModule* 13 ± 0.5	13 ± 0.5	*BasicModule* 16 ± 0.5 *SurfaceModule* 13 ± 0.5	2 x 12 ± 0.5
Cooling [l/min]		1.5 ± 0.5				
Fluidisation [l/min]	**PA 1101**		5	5		
	PA 1102 black		5			
	PA 2200		10	10		
	PA 2201		10	10		
	PA 2202 black		5	5		
	PA 2210 FR		8*			
	PA 2221		10	10		
	PA 2241 FR		10	10		
	PA 3200 GF		5	5		
	Alumide®		5	5		
	CarbonMide®		8	8		
	PrimePart® ST		15	15		
	PrimeCast® 101		8	8		
	PA 2105					
	EOS PEEK HP3					
Sealing air *SurfaceModule* optics [l/min]			1 ± 0.5	1 ± 0.5	1 ± 0.5	

* *BasicModule* optics only

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Blade geometry FORMIGA P 100 / FORMIGA P 110

☞ Shape of recoater blade

	FORMIGA P 100			FORMIGA P 110		
	Curved (1213-0109)	Curved (2200-4502)	Flat (2200-4119)	Curved (1213-0109)	Curved (2200-4502)	Flat (2200-4119)
PA 1101	X					
PA 1102 black				X		
PA 2200	X				X	
PA 2201	X				X	
PA 2221	X					
PA 3200 GF	X				X	
Alumide®			X		X	
PrimePart® ST		X				
PrimeCast® 101			X			X
PA 2105						X

Blade geometry FORMIGA P 110

☞ The required shape of recoater blade depending on the used *Part Property Profile*

Blade geometry / Part Property Profile	Curved (1213-0109)	Curved (2200-4502)	Flat (2200-4119)
PA 2200 *Balance*		X	
PA 2200 *Performance*		X	
PA 2200 *Top Quality*			X

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Blade modules EOSINT P 395, EOS P 396, EOSINT P 760, EOSINT P 800

☞ The required blade module depending on the used EOS default job (for *Original EOS Parameterset* or *Part Property Profile*) and the machine.

Blade module / Material	EOS default job	EOSINT P 395			EOS P 396			EOSINT P 760			EOSINT P 800
		I (green)	II (blue)	III (red)	I (green)	II (blue)	III (red)	I (green)	II (blue)	III (red)	II
PA 1101	PA1101_120_0xx			X			X			X	
PA 1102 black	PA1102_120_0xx			X							
PA 2200	PA2200_060_xxx	X			X			X			
	PA2200_100_1xx		X			X			X		
	PA2200_120_1xx		X				X		X		
	PA2200_150_xxx			X			X			X	
	PA2200_180_xxx			X			X			X	
PA 2201	PA2201_100_0xx		X			X			X		
	PA2201_120_0xx		X			X			X		
	PA2201_150_0xx			X			X			X	
PA 2202 black	PA2202_150_0xx			X			X				
PA 2210 FR	PA2210FR_150_0xx			X*					X*		
PA 2221	PA2221_100_0xx		X			X			X		
	PA2221_120_0xx		X				X		X		
	PA2221_150_0xx			X			X			X	
PA 2241 FR	PA2241FR_100_0xx		X			X			X		
	PA2241FR_150_0xx			X			X			X	
PA 3200 GF	PA2201GB_100_0xx			X					X		
	PA2201GB_120_0xx			X			X		X		
	PA2201GB_150_0xx			X			X		X		
Alumide®	PA2203ALG_100_0xx			X					X		
	PA2203ALG_120_0xx			X			X		X		
	PA2203ALG_150_0xx			X			X		X		
CarbonMide®	PA2202CF_150_0xx			X			X				
PrimePart® ST	PEBA2301_150_0xx			X			X				
PrimeCast® 101	PS3302_150_0xx			X			X		X		
EOS PEEK HP3	PAEK1304_120_0xx										X

* *BasicModule* optics only

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Settings recoater blade gap EOSINT P 800

☞ Guidance values for the distance of the recoater blade to the building plane

	Recoater blade gap	
	front	**rear**
Aluminum building plane [mm]	1.8 ± 0.1	1.8 ± 0.1
Steel building plane [mm]	1.0 ± 0.1	1.0 ± 0.1

Settings dust protection ducts EOSINT P 800

☞ Guidance values for the distance of the upper side of the recoater to the dust protection ducts

	Dust protection duct	
	front	**rear**
Distance to recoater [mm]	2.5 ± 0.2	2.5 ± 0.2

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Type of fluidisation EOSINT P 395 / EOS P 396

☞ Adjustments at the pneumatic service unit

	EOSINT P 395 / EOS P 396 Type of fluidisation
PA 1101	Pulsed operation
PA 1102 black	
PA 2200	
PA 2201	
PA 2202 black	
PA 2210 FR	
PA 2221	
PA 2241 FR	
PA 3200 GF	
CarbonMide®	
PrimePart® ST	
PrimeCast® 101	
Alumide®	Continuous operation

Powder conveying Vibro-Kit
EOSINT P 395, EOS P 396, EOSINT P 760, EOSINT P 800

☞ Adjustments at switching cabinet of powder conveying Vibro-Kit

		EOSINT P 395 / EOS P 396	EOSINT P 760	EOSINT P 800
Compressed air supply [bar]		6	6	6
Activation of powder conveying Vibro-Kit	**PA 1101**	Optional	Optional	
	PA 1102 black	Optional		
	PA 2200	Optional	Optional	
	PA 2201	Optional	Optional	
	PA 2202 black			
	PA 2210 FR			
	PA 2221	On	On	
	PA 2241 FR			
	PA 3200 GF			
	Alumide®			
	CarbonMide®			
	PrimePart® ST	Ein		
	PrimeCast® 101			
	EOS PEEK HP3			On

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Powder refreshing

☞ The values given specify the minimal refreshing with new powder and may vary depending on application and environmental condition.

Material	EOSINT P 3, P 7, P 8 EOS P 396 Min. refreshing [%]	Powder bin FORMIGA P 100 * / FORMIGA P 110 *		
		Weight recycled powder [kg]	Weight new powder [kg]	Density [kg/l]
PA 1101	50	2.4	2.4	0.48
PA 1102 black	50	2,4	2,4	0,48
PA 2200	50	2.2	2.2	0.44
PA 2201	50	2.2	2.2	0.44
PA 2202 black	60	Not released		
PA 2210 FR	100	Not released		
PA 2221	30	3.1	1.3	0.44
PA 2241 FR	50	Not released		
PA 3200 GF	70	1.8	4.2	0.61
Alumide®	100	-	-	-
CarbonMide®	100	Not released		
PrimePart® ST	50	1.85	1.85	0,37
PrimeCast® 101	10	5.4	0.6	0.61
PA 2105	50	2.2	2.4	0.44
EOS PEEK HP3	100	Not released		

* The values given are valid for a mixing process with the Mixing Station for a 15 l powder bin of the FORMIGA 100 / FORMIGA P 110 with a recommended filling level of 10 l and the min. refreshing.
ATTENTION! The density may vary.

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Material humidity

The material humidity is referred to as the recommended value of relative humidity of powder in % mixed in the Mixing & Qualification Station (MQS). The plastic powder can not be used for the building process immediately. After discharging from the MQS it must be stored in the multibox for at least 24 hours.

☞ MQS control → *Produce mixed powder* dialog → *Conditioning (rel. Humidity)* check box

The materials approved for the machine and the MQS are listed in the material information *Compatibility Material- IPCM P plus.*

Material	Relative humidity [%]
PA 1101	45
PA 1102 black	45
PA 2200	45
PA 2201	45
PA 2202 black	35
PA 2210 FR	Not released
PA 2221	45
PA 2241 FR	45
PA 3200 GF	45
Alumide®	Not released
CarbonMide®	Not released
PrimePart® ST	35
PrimeCast® 101	Not released
PA 2105	Not released

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Cleaning interval laser window
EOSINT P 395 (with *SurfaceModule* optics)
EOS P 396
EOSINT P 760 (with *SurfaceModule* optics)

☞ See the latest issue of the operating instructions (*Troubleshooting, Maintenance and Spare Parts* manual, *Inspection and servicing plans*) for the correct cleaning of the laser window.
The cleaning interval may vary depending on material.

Interval / Material	EOSINT P 395 / EOS P 396 / EOSINT P 760	
	After the job	Weekly
PA 1101	X	
PA 1102 black	X	
PA 2200		X
PA 2201		X
PA 2210 FR*	X	
PA 2202 black		X
PA 2221		X
PA 2241 FR	X	
PA 3200 GF		X
Alumide®		X
CarbonMide®		X
PrimePart® ST	X	
PrimeCast® 101		X

* *BasicModule* optics only

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