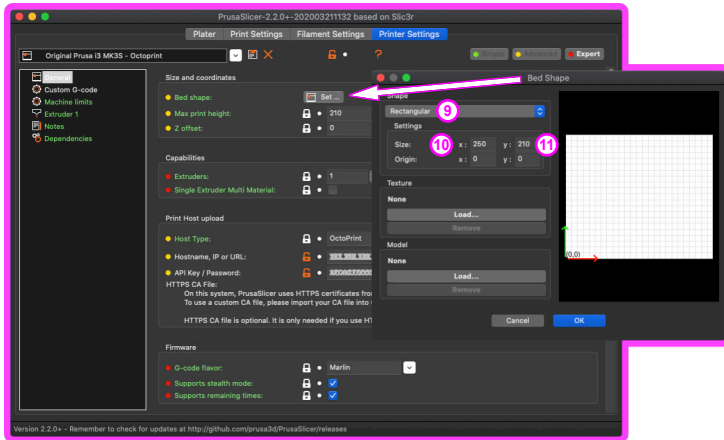
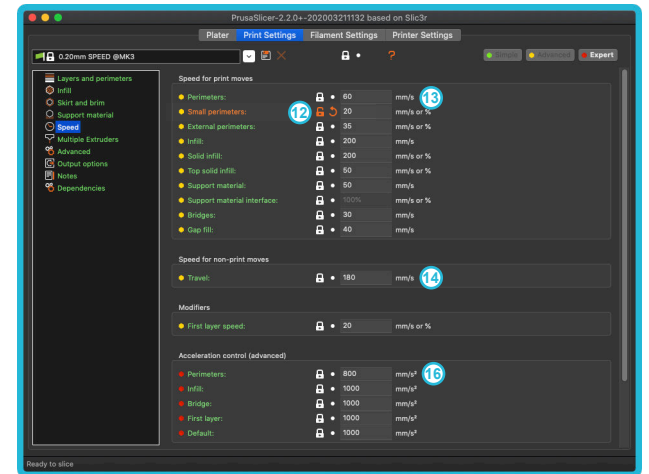
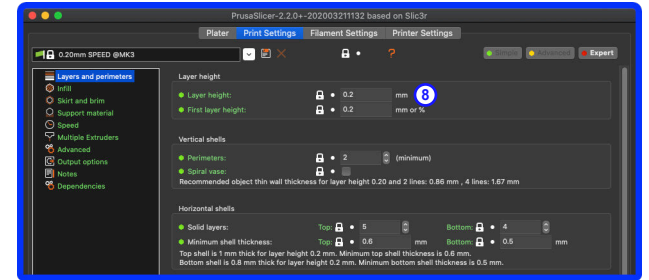
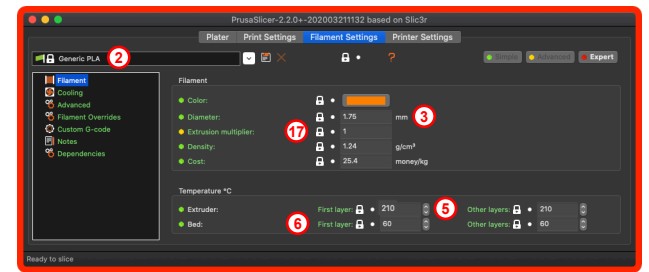


"K-factor Calibration Pattern" with "PrusaSlicer"

Printer:	Mk3s	1	
Filament:	PLA	2	
Filament Diameter:	1.75	3	Diameter of the used filament (mm)
Nozzle Diameter:	0.4	4	Diameter of the nozzle (mm)
Nozzle Temperature:	210	5	Nozzle Temperature (°C)
Bed Temperature:	60	6	Bed Temperature (°C)
Retraction Distance:	0.8	7	Retraction distance (mm)
Layer Height:	0.2	8	Layer Height (mm)
Print Bed:			
Bed Shape:	Rectangular	9	Rectangular or round bed. Round beds will activate Origin Bed Center
Bed Size X:	250	10	Size (mm) of the bed in X
Bed Size Y:	210	11	Size (mm) of the bed in Y
Origin Bed Center:	<input type="checkbox"/>		Set the origin position (X0 Y0) to bed center instead of front-left corner
Speed:			
Use mm/s:	<input checked="" type="checkbox"/>		Use mm/s instead of mm/min
Slow Printing Speed:	20	12	Slow printing speed
Fast Printing Speed:	60	13	Fast printing speed. This should differ noticeably from Slow Speed
Movement Speed:	180	14	Movement speed
Retract Speed:	35	15	Retract Speed of the extruder
Acceleration:	800	16	Set printing acceleration (mm/s ²)
Jerk X:	-1		Set the jerk for the X-axis. -1 to use firmware default
Jerk Y:	-1		Set the jerk for the Y-axis. -1 to use firmware default
Jerk Z:	-1		Set the jerk for the Z-axis. -1 to use firmware default
Jerk E:	-1		Set the jerk for the Extruder. -1 to use firmware default
Pattern:			
Lin Advance Version:	1.5		Select version 1.0 for Marlin 1.1.8 and earlier. Select 1.5 for Marlin 1.1.9 / 2.0 and up
Pattern Type:	Standard		Select standard or alternate pattern
Starting Value for K:	0		Starting value for the K-factor
Ending Value for K:	2		Ending value of the K-factor
K-factor Stepping:	0.2		Stepping of the K-factor in the test pattern. Needs to be an exact divisor of the K-factor Range (End-Start)
Slow Speed Length:	20		Length of the Slow Speed test-line (mm)
Fast Speed Length:	100		Length of the Fast Speed test-line (mm)
Test Line Spacing:	4		Distance between the test lines. This will impact print size
Print Anchor Frame:	<input type="checkbox"/>		Adds a frame around the start and end points of the test lines. May improve adhesion
Printing Direction:	Left to Right (0°)		Rotates the print in 45° steps
Line Numbering:	<input checked="" type="checkbox"/>		Prints the K-value besides every second test line
Advanced:			
Nozzle Line Ratio:	1.2		Ratio between extruded line width and nozzle diameter. Should be between 1.05 and 1.2
Z-Offset:	0		Offset the Z-axis for manual Layer adjustment
Use Bed Leveling:	Leveling ON		Level bed or load a saved mesh (i.e. for UBL) before printing. Bed leveling has to be activated in Configuration.h! Loading a mesh requires UBL to be activated!
Use FW Retract:	<input type="checkbox"/>		Use Firmware Retract. Needs to be activated in Marlin
Extrusion Multiplier:	1	17	Usually 1.0
Prime Nozzle:	<input checked="" type="checkbox"/>		Prime the nozzle before starting the test pattern
Prime Extrusion Multiplier:	2.5		The default of 2.5 results in roughly 1mm of filament for 10mm line length
Prime Printing Speed:	30		Speed of the prime move
Dwell Time:	2		Inserts a pause of x seconds before starting the test pattern to bleed off any residual nozzle pressure
Filename:	LA15-<Filament>-<Printer>	2	1 Generate G-code Save as default



Good starting point for direct extruder should be:

Starting Value for K: 0
Ending Value for K: 0.3
K-factor Stepping: 0.02

For bowden setups:

Starting value for K: 0
Ending Value for K: 2
K-factor Stepping: 0.2

Increase "Fast Speed Length" to accelerate, reach max speed and decelerate. If that is too short you might never reach the Fast Printing Speed you are looking for.

Suggestions for improvement? Feel free to contact me: <https://github.com/mmuellerphoto>

Linear Advance informations: https://marlinfw.org/docs/features/lin_advance.html

Prusa Slicer: <https://www.prusa3d.com/prusaslicer/>

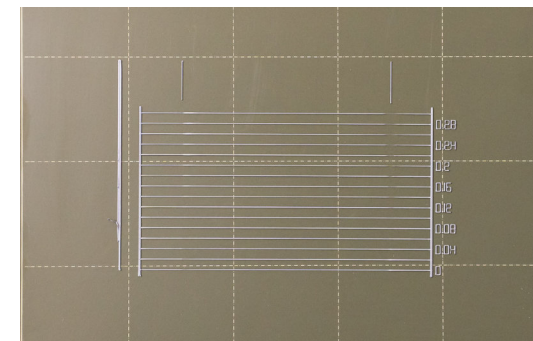
Many thanks to 3d-gussner for the support creating this document!

"K-factor Calibration Pattern" with "PrusaSlicer" - Usage Example

First Run:

K-Values starting from 0.00 to 0.30 in 0.02 incrementals. Due to search for the "most even line" the best results are in range of 0.08 to 0.12

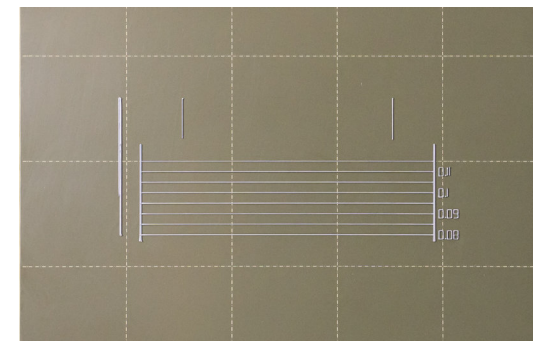
Pattern:		
Lin Advance Version:	1.5	Select version 1.0 for Marlin 1.1.8 and earlier. Select 1.5 for Marlin 1.1.9 / 2.0 and up
Pattern Type:	Standard	Select standard or alternate pattern
Starting Value for K:	0	Starting value for the K-factor
Ending Value for K:	0.3	Ending value of the K-factor
K-factor Stepping:	0.02	Stepping of the K-factor in the test pattern. Needs to be an exact divisor of the K-factor Range (End - Start)
Slow Speed Length:	20	Length of the Slow Speed test-line (mm)
Fast Speed Length:	100	Length of the Fast Speed test-line (mm)
Test Line Spacing:	5	Distance between the test lines. This will impact print size
Print Anchor Frame:	<input checked="" type="checkbox"/>	Adds a frame around the start and end points of the test lines. May improve adhesion
Printing Direction:	Left to Right (0°)	Rotates the print in 45° steps
Line Numbering:	<input checked="" type="checkbox"/>	Prints the K-value besides every second test line



Second Run:

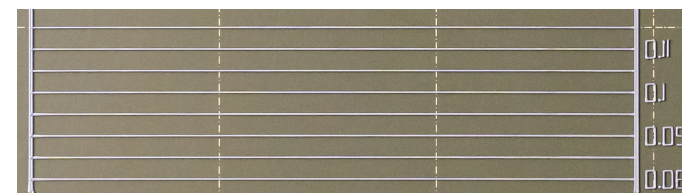
K-Values starting from 0.08 to 0.12 in 0.005 incrementals. "Most even line" so best results in range of 0.010 to 0.115.

Pattern:		
Lin Advance Version:	1.5	Select version 1.0 for Marlin 1.1.8 and earlier. Select 1.5 for Marlin 1.1.9 / 2.0 and up
Pattern Type:	Standard	Select standard or alternate pattern
Starting Value for K:	0.08	Starting value for the K-factor
Ending Value for K:	0.12	Ending value of the K-factor
K-factor Stepping:	0.005	Stepping of the K-factor in the test pattern. Needs to be an exact divisor of the K-factor Range (End - Start)
Slow Speed Length:	20	Length of the Slow Speed test-line (mm)
Fast Speed Length:	100	Length of the Fast Speed test-line (mm)
Test Line Spacing:	5	Distance between the test lines. This will impact print size
Print Anchor Frame:	<input checked="" type="checkbox"/>	Adds a frame around the start and end points of the test lines. May improve adhesion
Printing Direction:	Left to Right (0°)	Rotates the print in 45° steps
Line Numbering:	<input checked="" type="checkbox"/>	Prints the K-value besides every second test line



Result:

Detail view of K-values of 0.08 to 0.12. Not that much difference - decided K-value for this filament with 0.4mm nozzle will be **0.11**



PrusaSlicer Settings:

K-value of **0.11** will be set in the *Filament Settings* -> *Custom G-code* -> *Start G-code* ...

```
M900 K{if printer_notes=~/. *PRINTER_MODEL_MINI.* / and nozzle_diameter[0]==0.6}0.12{elsif printer_notes=~/. *PRINTER_MODEL_MINI.* /}0.2{elsif nozzle_diameter[0]==0.6}0.04{else}0.11{endif} ; Filament gcode LA 1.5
{if printer_notes=~/. *PRINTER_MODEL_MINI.* /};{elsif printer_notes=~/. *PRINTER_HAS_BOWDEN.* /}M900 K200{elsif nozzle_diameter[0]==0.6}M900 K18{else}M900 K44{endif} ; Filament gcode LA 1.0
```

Suggestions for improvement? Feel free to contact me: <https://github.com/mmuellerphoto>

Linear Advance informations: https://marlinfw.org/docs/features/lin_advance.html

Prusa Slicer: <https://www.prusa3d.com/prusaslicer/>

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