

MARKFORGED FEATURE OVERVIEW

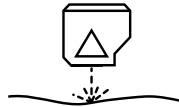
ADAPTIVE BED LEVELING

A level bed is critical to the success of any 3D print — every printer has a bed leveling procedure that allows users to ensure that prints execute properly. However, most of these procedures assume print beds are perfectly flat. That assumption is untrue in practice — fabrication tolerances allow beds to have slightly variable topography. Regardless of how meticulously an imperfect bed is leveled and checked, its topography will yield an imperfect first layer. Adaptive bed leveling solves this by using laser scan data to dynamically adapt to bed imperfections on a print's early layers. By compensating for slight topography changes, Markforged Industrial Series machines ensures your prints come out exactly how you want them.

IMPLEMENTATION

Adaptive bed leveling uses a four step process to ensure all prints start flawlessly. It simultaneously determines whether or not a bed is leveled correctly while constructing a bed topography, which it compensates for during the print.

BED SCAN



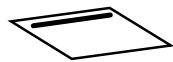
Before each print, the machine conducts a 56 point bed scan with its print head mounted laser. This scan is accurate to 1 micron and takes into account minute topography changes in both the gantry and print bed.

CHECK LEVEL



The machine algorithmically constructs a bed plane from the scan data and assesses the levelness of the bed. The algorithmic plane is more accurate than standard leveling processes, which only take into account three points when leveling.

CALIBRATE



After determining the bed is level, the machine prints and scans a calibration line. This verifies that in addition to the bed being level, the machine is also properly extruding and depositing material.

COMPENSATE



The machine makes minute adjustments in the Z axis on early layers of the print, ensuring that the print has a consistently adhered first layer and excellent bottom surface finish.

ADVANTAGES

Adaptive bed leveling holds several advantages over conventional processes. It improves print quality by yielding better bottom surfaces and greatly decreases the odds of print failure.

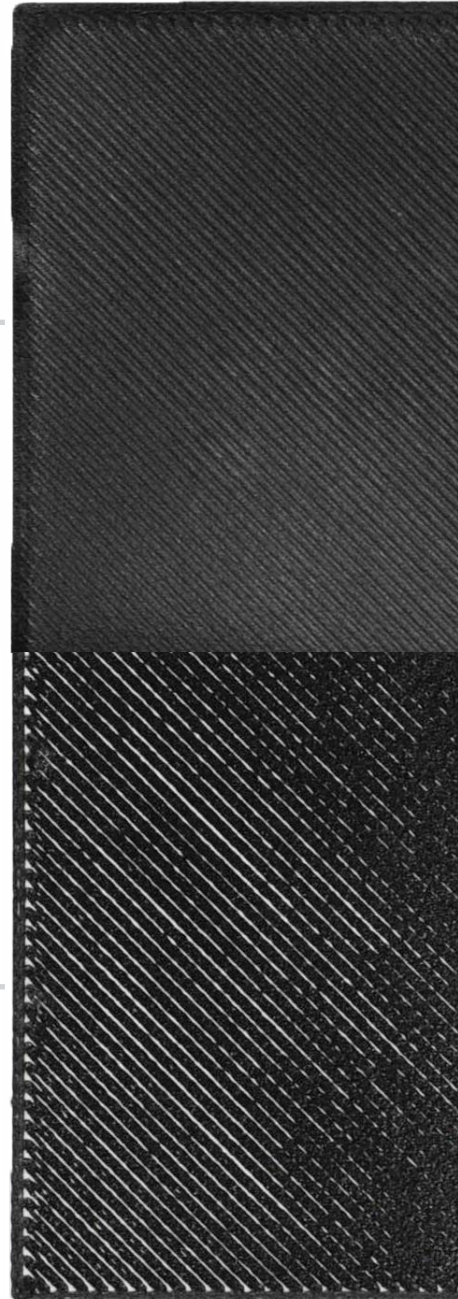
PERFECT LEVEL

A properly leveled printer's first layer yields a cohesive plastic mat of consistent thickness, with no gaps or tears.



POOR LEVEL

If a printer is leveled improperly, the first layer will either not print (high bed) or print with many gaps and strings (pictured, low bed). Either leveling error decreases print success and part quality.



COMPOSITE 3D PRINTING

INDUSTRIAL SERIES

Adaptive bed leveling is included on all Industrial Series machines.

These industrial grade, large-format printers deliver exceptional accuracy, reliability and repeatability. They are the go-to solution for manufacturing tooling (Jigs, Jaws, Tools, & Fixtures). Save time and money printing tools previously machined out of aluminum.



X3

The strength and stiffness of carbon fiber meet the versatility of tough nylon. Engineering class parts that are 20% stronger and 40% stiffer than ABS.



X5

For load-bearing applications that require real strength, these parts make the grade. Now you can print parts faster and cheaper than machining metal.



X7

Exceptionally strong, supremely stiff, ultra lightweight, and incredibly versatile - X7 parts deliver unparalleled performance without compromise.