**Laser**

**How powerful does my laser need to be?**

Surprisingly, not very powerful if your SLS machine is built properly. To give an idea, in order to sinter nylon powder heated to the temperature of 8 degrees below melting point with a beam focused down to 0.2 mm spot and using layer height of 0.2 mm with feed rate of 300 mm/s one needs optical power of about 140 mW, which is easily achievable with [commodity laser diodes](http://en.wikipedia.org/wiki/Laser#Examples_by_power).

You can do your own math using model from [here](http://forums.reprap.org/read.php?153,231867). The model takes into account heat losses due to contact heat transfer within the material (negligible, in fact), but assumes zero laser beam dissipation/reflection (i.e. black powder and visible light laser), and round laser spot (i.e. some corrective optics for the diode). Real life requirements will be higher due to imperfections in optics and beam energy dissipation, but it seems adequate lower bound estimate.

Note, that according to the model, the biggest controllable factor influencing the power requirement for laser is the temperature of the build chamber. If the chamber itself is kept with room temperature, the laser power requirement goes up to 2.6 W. But we know that such a big temperature gap is undesirable as it causes wrapping (see below), so some kind of heated volume is needed anyway.

(Source: <https://reprap.org/wiki/DIY_Selective_Laser_Sintering_FAQ> )