

LASER POWER

As changes in imaging technology occur, laser power requirements also change. To meet industry demands for improved speed and for compatibility with different plate types, manufacturers have gradually introduced lasers that are capable of generating more power.

When addressing the subject of laser power, it is important to understand the differences in laser power requirements between the various plate emulsions. To illustrate these differences, we've compared the power requirements based on the average sensitivity of each emulsion type. We've assigned a value of "one" to the average sensitivity of the most sensitive emulsion, silver halide. We then established the power requirements for other plate emulsions compared to silver plate.

Emulsion	Range of Plate Sensitivities	Average mJ cm ² Sensitivity	Laser Power required relative to Silver Halide
Violet Silver Halide	.005 - .010 mJ cm ²	.075	1
Violet Photopolymer	.050 - .100 mJ cm ²	.75	10
Violet Chemistry-Free	.050 - .100 mJ cm ²	.75	10
Thermal Plates	120 - 150 mJ cm ²	135	13,500
Thermal Processless	275 - 325 mJ cm ²	300	30,000
Thermal Chemistry-Free	300 mJ cm ²	300	30,000
Thermal Processless (Fuji)	120 mJ cm ²	120	12,000
Conventional (Majority of Plates)	75 - 120 mJ cm ²	100	10,000
Conventional (Low Energy Plates)	50 - 70 mJ cm ²	60	6,000

Clearly, violet photopolymer and chemistry-free plates require more laser power than silver plates, and thermal and conventional plates require significantly more power than any of the violet plate types. Thermal processless and chemistry-free require even more energy for exposure. Given the wide range of power requirements of plates on the market, it is wise to determine the laser power in any machine you are considering purchasing, and to confirm it has sufficient power to image the plates you want to use. For a more detailed spreadsheet of various plates on the market and their sensitivity rating turn to pages 8 - 9.

In thermal devices, manufacturers have increased laser power by either increasing the number of diodes or by increasing the wattage of the lasers used in their machines. Machines with higher laser power are generally faster, and are compatible with a wider variety of plates. Laser power is especially of concern if you wish to use Agfa's or Kodak's chemistry-free/processless plates. Agfa's Azura and Kodak's Thermal Direct both require 275-325 mJ per cm² of power to expose, compared to the 120 to 150 mJ needed to expose thermal plates that require processing. While the information presented by the manufacturers is somewhat inconsistent, it can be surmised that a minimum of 24 W of laser power is required to image these plates. In addition, these plates may further require reduction of the drum speed in order to increase the dwell time. However, if the laser wattage is not adequate, even a slower drum setting will not provide the saturation required to expose the emulsion. As a result, not all existing thermal platesetters are capable of exposing the Agfa and Kodak thermal processless plates. Fuji, on the other hand, represents that their Pro-T processless thermal plate has an emulsion sensitivity of 120 mJ per cm², which allows it to be run on all existing thermal platesetters, since its sensitivity is well within the range required for conventional thermal plates.

One should be cautious when attempting to expose low sensitivity plates such as the Azura and Thermal Direct when using a platesetter with marginal laser power. In addition to slowing the drum speed, it may be necessary to adjust the power setting of the laser to obtain acceptable quality. Increasing the laser power setting has the effect of decreasing the diode life. This can be a hidden cost that only comes to light after the damage is done.

Laser power is also an important consideration with violet platesetters. Since most violet platesetters, except those offered by Fuji, use only one laser, additional laser diodes cannot be added to increase the laser power. Rather, manufacturers increased laser power by using increasingly higher wattage lasers in their platesetters. When originally introduced, violet platesetters used 5 mW lasers, as this laser was the most available and affordable laser at the time. Diode manufacturers were able to supply a low cost product by culling the most powerful diode from the thousands available for DVD and CD consumer products. The 5 mW lasers perform well for exposing silver-based plates, but are insufficient for imaging photopolymer plates, which are becoming increasingly popular. Photopolymer plates have no silver content, thus eliminating a major pollutant that plagues the printing industry. For most photopolymer plates, exposure is attainable with a 30 mW laser, but a 60 mW laser might be required, depending on the sensitivity of the plate and engineering design of the platesetter. Since 2004, 60 mW lasers have become the standard in violet platesetters for most manufacturers.

Violet-sensitive plates and violet laser diodes continue to evolve. Violet chemistry-free plates have been in development by Fuji and Agfa for several years. At Drupa 2008, both manufacturers finally demonstrated a commercially viable product. These plates should work with lasers that are 30 mW or higher. The laser industry is also continually developing stronger diodes, and is on the threshold of producing 150 to 250 mW violet diodes, opening new horizons for both violet and conventional UV plates. In fact, at Ipex 2006, Luscher introduced a platesetter capable of imaging conventional plates using a 405 nm laser. This platesetter uses 120 mW laser diodes, and can be outfitted with 32 to 128 of these diodes in order to create the laser power required to expose less sensitive conventional plates.

The following pages show a representation of various plates from different manufacturers and their sensitivities. For comparison purposes, they are grouped by types, i.e. thermal, silver, photopolymer, processless or waterless.