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# Production of Gratings for High-Energy Petawatt-Class Lasers

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# Production of Gratings for High-Energy Petawatt-Class Lasers

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At the time of this writing, we have manufactured and delivered more than 25 multilayer dielectric diffraction gratings from 470-800 mm in long aperture for pulse compression on Petawatt-class, 1-micron laser systems being built at government and university facilities in the U.S and elsewhere. We present statistics of diffraction efficiency and its spatial uniformity, diffracted wavefront, and laser damage results on witness gratings. We also discuss yield, failure modes, and manufacturing improvements necessary to improve upon the current state of the art.

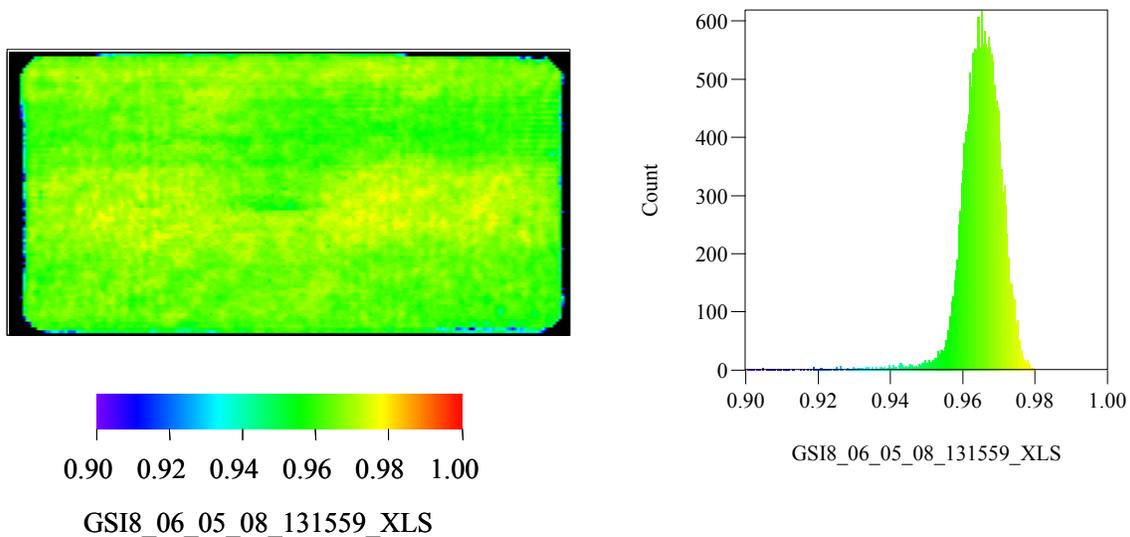


Figure 1. Diffraction efficiency map of 800x400 mm 1740 l/mm MLD grating made for the Texas Petawatt laser.

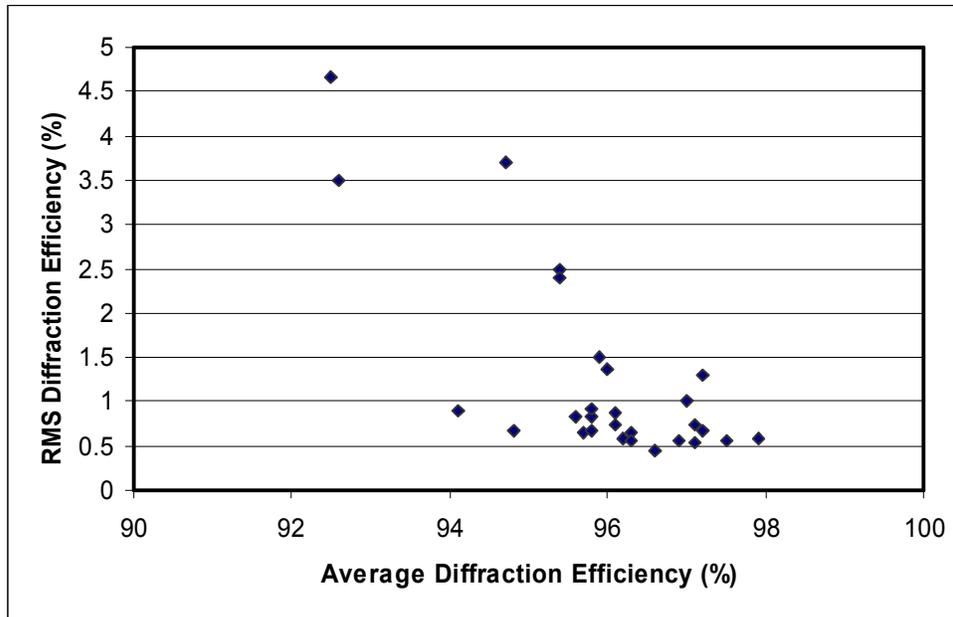


Figure 2. Statistics of average and RMS diffraction efficiency of 21 1740 l/mm MLD gratings made for various laser systems; 470x430 mm or 800x400 mm aperture.