

What's Happening?

Update

Ralcon has developed a line of gratings that achieve near 100% diffraction efficiency at high angles, typically 46 to 48 degree half angles. These are believed to be unique because the dispersion is very high and both polarizations are diffracted equally and fall off on each side of center in the same direction. We call this new grating the Dickson grating in honor of its inventor LeRoy Dickson, a retired IBM research scientist. Manufacturing is handled by <http://wasatchphotonics.com>. A white paper on the subject of this grating and DWDM can be found in pdf format and downloaded [here](#).

This is what's happening (or happened through Sept 2005)

Volume Phase Gratings (VPG) for spectrographic applications has become an important part of WPs business. WP has listed the specific gratings that have been made by frequency, wavelength, bandwidth or size and many more are for OEM customers. Go to their website for more detailed technical information and pricing.

General VPH information

Most of our production gratings are between 1 inch and 8 inches on a side or diameter and work between 350 nm and 2400 nm. Most are on low iron or borosilicate sheet glass and a few are on fused silica. The largest ones are on Pilkington float glass. The gelatin layer is typically 5 to 20 microns and the spatial frequencies run from 90 1/mm to about 2000 1/mm, but can be much higher. Bandwidths are typically several hundred nm and are free of anomalies. The Bragg sensitivity or Blaze angle is adjustable with small tilts and the modulation can be peaked for either linear polarization or equal for both polarizations at a particular wavelength. These are very versatile gratings and come with durable AR coatings if required. The peak efficiencies are in the 90% range and the roll-off is smooth on both sides and slightly asymmetric, favoring longer wavelengths.

Fractional wave performance is easily achieved with symmetrical designs (same angle in and out). Typically we expose the gratings in DCG with well collimated light on glass that is only flat to a few fringes per inch. Then if fractional wave performance is needed, the gratings can be capped with a flatter cover-glass on one or both sides. Most of the phase shifts due to uneven surfaces are index matched out in the lamination process. The final diffracted wavefront will then be well corrected and the covers also carry the AR coatings. Alternatively the plate glass can be polished flat and coated after the grating has been exposed, tuned and capped. Less frequently we coat the gelatin directly on an AR coated flat and cap with the same. Substrate sizes less than 4 inches are not good candidates for this method and we always require several extra flats so we can do a "batch" and select the best.

We have a few Mathcad templates for gratings design and performance analysis that can be had for the asking.

We now have a Zygo phase shifting interferometer and can test diffracted wave fronts to 1/100th wave if needed.

Ralcon is now in partnership with a new startup grating manufacturer called Wasatch Photonics headquartered in Logan UT. Visit <http://wasatchphotonics.com> for details.