Plastic Finishing

Laser texturing and polishing plastic for a high quality metal-like finish

A major manufacturer of laser marking machines partnered with Synrad Application Engineers to create a new laser marking system that delivers a "premium" metallic finish on plastic cell phone frames. These cell phone frames have a gloss coating which is typically a polyurethane/acrylic hybrid like Alberdingk UC 90 or Primal HG 1000, which are subject to melting and disfiguration when exposed to common laser wavelengths.

The Challenge

Finding a solution could prove to be a significant cost reduction point for cell phone manufacturers while potentially improving usability:

Material Cost Reduction - the material cost savings when switching from metal casings to plastic casings would be significant since plastics are easier to source and molding cases is far less expensive than stamping and cutting.

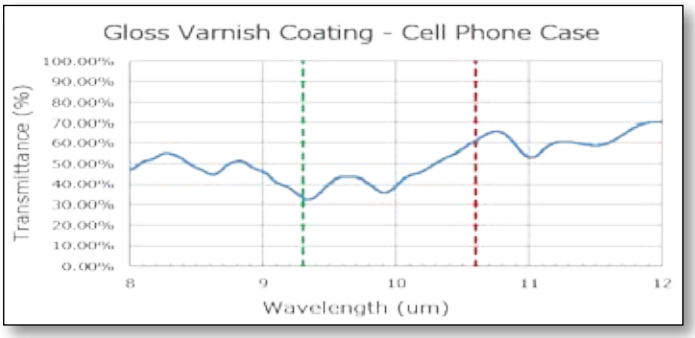
Weight Reduction - significant savings in overall weight would be realized from the users "feel-in-hand" to shipping costs from manufacturer to retailer to end user.

Improved Usability - adding a textured surface, especially to the edges of the cell phone casing increases the user's grip to prevent slipping.

The Solution

Matching the quality appearance of a metal cell phone case with a plastic case required two different finishes, a highly polished "chrome-like" edge and a brushed satin finish for the flat surfaces.

The plastic cell phone frames had a glaze coating and Synrad Application Engineers determined that impacting the gloss coating without affecting the underlying base plastic both increases the metallic appearance of the mark and provides better durability. The first technical challenge would be finding the right laser wavelength. Using a spectrometer to measure transmission data Synrad Application Engineers plotted the data on a curve to determine the best wavelength.



The transmission curve indicated that a laser at 9.3 µm had 25% less transmission than the more common 10.6 µm lasers available. The lower transmission rate would enable a Synrad laser to lightly mark the gloss coating at high speed while avoiding any damage to the underlying base plastic.

Identifying the 9.3 µm was key, however testing did not end here since Synrad offers several lasers with the 9.3 µm wavelength, including low-power options. To achieve higher production throughput Synrad recommended the ti100p laser, the 100 W power combined with a 9.3 µm wavelength ensured proper texturing and polishing of the gloss coating while delivering maximum throughput speed. When finishing a plastic cell phone frame with a high-quality metal-like finish the ti100p with a 9.3 µm wavelength and wide frequency range delivers both a polished, chrome-like finish and a soft, brushed metal finish.

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