

**A. Designing for Remote Laser Welding: Understanding the Affects of Remote Laser Welding on the Weld Profile**  
*by K. Klingbeil, Process Engineering Manager*

Remote laser welding is a fast and flexible way to weld assemblies. This innovative type of laser welding technology is most beneficial for stitch and spot welding because of the high positioning speeds between welds. Remote laser welding can also be beneficial for assembly lines when parts are moving on a conveyor under the laser processing area. One of the inherent characteristics of remote laser welding for large areas is that as the processing travels from the center of the work volume to the outer edges, the angle of incidence of the laser beam will change from  $0^{\circ}$  to a maximum degree which is generally around  $20^{\circ}$ . Due to this change in the angle of incidence, the weld penetration and weld profile would be expected to change if the same parameters are used throughout the work volume. Because of the differences in processing parameters between stitch welding and spot welding, namely that the beam is continuously moving for stitch welding, the difference between the two types of welds was also investigated. The results of the testing showed little difference between spot welding and seam welding. At the center of the work volume, a weld penetration of 4.0mm was measured along the profile of the weld for stitch welding and a penetration of 3.9mm was measured for spot welding. Using the same weld parameters throughout the work volume the penetration near the outer edges of the work volume was 3.4mm for stitch welding and 3.5mm for spot welding. The weld cross section was also measured to have an angle of  $18^{\circ}$  near the outer edges of the work volume for stitch welding and an angle of  $19^{\circ}$  for spot welding.