# New approaches for seam tracked laser beam brazing and welding

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**Abstract**

Laser brazing of steel and laser welding of aluminum and steel parts with filler wire are state of the art in mass production processes, e.g. in the automotive industry. As the standard supplier for wire guided brazing/welding optics Scansonic frequently receives inquires about customized beam shaping. Within this contribution beam shaping approaches aiming on process optimization by optimized energy distributions are presented. Therefore, technical approaches, resulting intensity distributions at the work piece and processing results are discussed. One example shown here is beam shaping by the use of a diffractive optical element (DOE) inside of the brazing and welding optics Scansonic ALO3. The DOE shapes the collimated laser beam for a resulting characteristic intensity distributionin the focal plane. The application addressed in this contribution is the Bifocal Hybrid Laser Welding (BHLW), an innovative technique for welding aluminum alloys with high surface quality and reduced hot cracking susceptibility of the weld seam. The DOE allows for bringing the BHLW process with laser powers up to P = 8 kW from research to industrial application.