Unitek Miyachi Lasers

Applications

Suitability of Materials for Nd:YAG Pulsed Laser Welding

Material	*Comments*
Aluminum	Welding is limited to certain grades such as 6061 to 4047 or 4032, 1050, 3003 and 5005. High energy levels required to overcome surface reflectivity. Other aluminum alloys should be tested thoroughly for joint design and crack sensitivity.
Beryllium Copper	Good welds. Alloys containing less copper are best due to reduced reflectivity. A safety hazard exists from the toxic beryllium oxide fumes
Carbon Steel	Good welds, carbon content should be less than 0.12%.
Copper	Generally limited to spot welds. High energy levels required to overcome surface reflectivity.
Hastalloy-X	Good welds
Kovar	Good welds
Molybdenum	Good welds, slight brittleness.
Nickel	Good welds
Phosphor Bronze	Good welds
Stainless steel	304 & 304L produce excellent welds 316 & 316L are ok provided Cr/Ni ratio is greater than 1.7 Other 300 series require testing, though 303 should be avoided 400 series require testing for crack sensitivity.
Tantalum	Good welds
Titanium	Good welds
Tungsten	Very brittle welds

For information on unlisted materials contact laser applications lab

Material Coatings/Platings

These can have an affect on weld quality, and generally require testing as case specific. One example of coating sensitivity is gold/nickel or nickel coatings. Coating should be electrolytic, avoiding excessive phosphorus that creates increased cracking susceptibility, and gold coating thickness should be minimized to 50 micro inches.

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