Laser Cutting Overview

Machines can accurately produce complex exterior contours. The laser beam is typically 0.2 mm (0.008 in) diameter at the cutting surface with a power of 1000 to 4000 + Watts.

Laser cutting can be complementary to the CNC/Turret process. The CNC/Turret process can produce internal features such as holes readily whereas the laser cutting process can produce external complex features easily.

Laser cutting takes direct input in the form of electronic data from a CAD drawing to produce flat form parts of great complexity. With 3-axis control, the laser cutting process can profile parts after they have been formed on the CNC/Turret process.

Lasers work best on materials such as carbon steel or stainless steels. Metals such as aluminum and copper alloys are more difficult to cut due to their ability to reflect the light as well as absorb and conduct heat. This requires lasers that are more powerful.

Lasers cut by melting the material in the beam path. Materials that are heat treatable will get case hardened at the cut edges. This may be beneficial if the hardened edges are functionally desirable in the finished parts. However, if further machining operations such as threading are required, then hardening is a problem.

A hole cut with a laser has an entry diameter larger than the exit diameter, creating a slightly tapered hole.

The minimum radius for slot corners is 0.75 mm (0.030 in). Unlike blanking, piercing, and forming, the normal design rules regarding minimum wall thicknesses, minimum hole size (as a percent of stock thickness) do not apply. The minimum hole sizes are related to stock thickness and can be as low as 20% of the stock thickness, with a minimum of 0.25 mm (0.010 in) for up to 1.9 mm (0.075 in). Contrast this with normal piercing operations with the recommended hole size 1.2 times the stock thickness.

Burrs are quite small compared to blanking and shearing. They can be almost eliminated when 3D lasers are used and further, eliminate the need for secondary deburring operations.

As in blanking and piercing, considerable economies can be obtained by nesting parts, and cutting along common lines. In addition, secondary deburring operations can be reduced or eliminated.

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