



# LaserAge Ltd.

## Using Lasers as Manufacturing Tools

### Laser Hardening

The very high rates of heating and quenching make the surface hardness of components applied 20% higher than with conventional hardening processes. Furthermore, laser hardening offers the following advantages:

- Low heat input and minimum deformation of components
- No post-finishing required
- Can be applied locally
- High, homogenous hardness to a depth of 1.5 mm
- Flexible
- Environmentally friendly

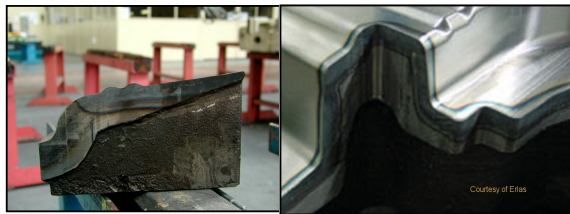
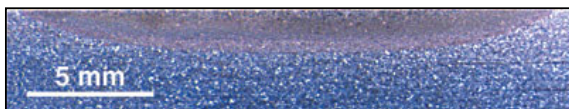


Figure (a) Flame hardening versus (b) laser hardening.



Track width can be varied to between 5 and 30 mm & case depths between 0.2 to 1.5 mm

### Applications

- Local Martensitic hardening of tools, moulds and dies for sheet metal forming, deep-drawing, cutting, bending, injection molding and light metal die casting
- All commercially hardenable steels as well as their corresponding cast qualities
- Examples of feasible hardness values
  - 1.1730 (C 45 W) 57 HRC
  - 1.2311 (40 CrMnMo 7) 57 HRC
  - 1.2320 (60 CrMo 10 7) 60 HRC
  - 1.2738 (40 CrMnNiMo 8 6 4) 57 HRC
  - 0.7070 (GGG 70 L) 61 HRC

Normally when hardening cutting tool inserts one track is traversed over the cutting side with approximately 10 mm track width, as seen in Figure (a). At the edge there exists 1.5 to 2 mm hardening zone around the corner. Performing a second track will cause an annealed (soft) zone in the first track.

It is an inherent part of the heating process that once there is a thermal load on a component, it distorts. This is unavoidable. However in the case of laser hardening, it is much less if not impossible to register, any distortion compared to induction hardening or flame hardening.

The hardening process is fast and accurate and does not depend on manual experience. Low heat input assures minimal distortion. Costs are reduced because the process is rapid and there is no rework and no post machining afterwards. Because of the repeatable nature of the process quality is assured. This leads to an increase in production and a reduction in Turn Around Times.

LaserAge offers support and advice to prospective or existing industrial laser users. LaserAge re-manufacture and repair components for the Aerospace, Injection Mould Medical and Power Generation Industries.

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