

## Laser Hardening for Tool Steels

Laser hardening offers an efficient technique for selectively hardening the critical areas of finish machined tool steel pieces.

The laser hardening process is a heat treatment process which uses extremely fast heating and cooling rates to produce a hardened microstructure at the surface of a steel or cast iron component. The part remains cool during processing so there is usually no distortion caused by the hardening process. This means that laser hardening can be used as the final manufacturing step after all of the finish machining is complete, this is ideal because the machining can be conducted on the steel in its soft state.

### Typical applications include:

- Cast iron piston ring grooves
- The Edges of Blanking or forming tools
- Gear surfaces
- Bearing surfaces

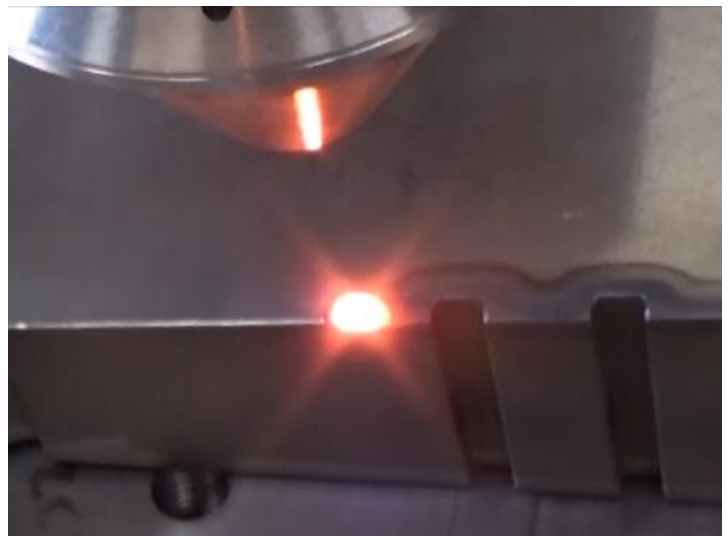
### Hardening Properties:

#### Hardness:

D2 tool steel:

Base 15-16 HRC

Laser Hardened Area 59-60 HRC



### Process Considerations:

- The depth and magnitude of hardening can be varied, a depth of about 1.5 mm from the surface is quite normal
- Laser Hardening relies on the bulk of the component to rapidly draw heat away from the surface. Therefore any component must be of a sufficient size for the quenching process to be successful. As a guide the component should be at least 5 mm thick for optimum results.
- The surface finish and reflectivity of the component must be clean and consistent in order for the hardening depth and quality to be consistent. Generally a good machined or ground finish is acceptable.

Base Material (15 HRC)

Laser Hardened Zone (60 HRC)

