LASER

CUT QUALITY GUIDE

MATE®
PRECISION TECHNOLOGIES
RESPECT • SUPPORT • INSPIRE

Laser Cut Quality Guide

LASER TECHNOLOGIES

OPTIMIZE THE CUT QUALITY FOR ANY MATERIAL USING THE FOLLOWING STEPS:

1. Use the closest known settings to the material you are trying to cut.
2. Verify that the lens and/or window is clean and in good condition.
3. Verify that the nozzle is in good condition and is centered properly.
4. Create a test part that has interior and exterior features.
5. Adjust the focus either up or down until the best possible edge quality is visually achieved.
6. Adjust the gas pressure up or down until the best possible edge quality is visually achieved.
7. Begin by setting feed rate 10% below the recommended setting. Adjust the feed rate up in increments of 5% with each improving test part. When the cut begins to visually degrade, set the feedrate back to the previous setting achieving optimum edge quality.

BALANCE HEAT LEVELS AND GAS FLOW:

Cutting mild steel with a laser is a balance of how much material is heated up with the laser beam and how much assist gas flows through the cut. Heating up too small of an area or not having enough assist gas flow through the cut will result in the kerf (width of the cut) being too narrow. Heating up too large of an area or having too much assist gas flow will result in the kerf being too wide.

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EXAMINE THE CUT

- Look at striation marks
  - Top or bottom of cut
  - Leading or lagging
  - Oxidation
- Cut angularity
- Dross

FACTORY CUT CHART SETTINGS

The following pages show 12, 6 and 3.2mm (1/2”, 1/4” and 10ga) mild steel cut with oxygen on a 2kw fiber laser and examples of the same part cut with 1 variable changed to show how it affected the cut quality. The examples of the adjustments made will be similar for any CO_2 or fiber laser cutting mild steel with O_2.

KERF TOO NARROW

Kerf too narrow common characteristics visually result in a smooth cut edge on the top with a lack of oxidation on the bottom and/or heavy dross.

KERF TOO WIDE

Kerf too wide common characteristics visually result in a rougher cut edge, more corner burning of the part, increased angularity on the cut edge and occasionally dross.

EXAMPLE OF A CLEAN LASER CUT

12mm (1/2”)

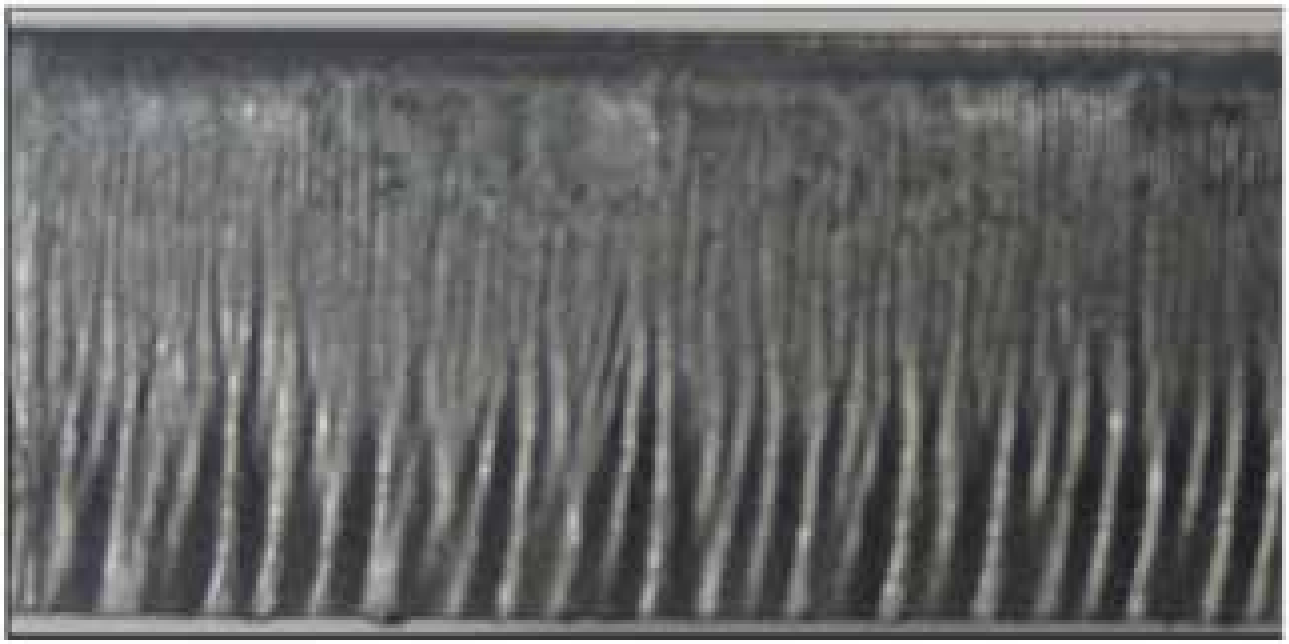
6mm(1/4”)

3.2mm (10ga)

IF THE **FOCUS IS TOO HIGH** THE **KERF IS TOO WIDE**

IF THE **FOCUS IS TOO LOW** THE **KERF IS TOO NARROW.**

IF THE **FEED RATE IS TOO SLOW** THE **KERF IS TOO WIDE**



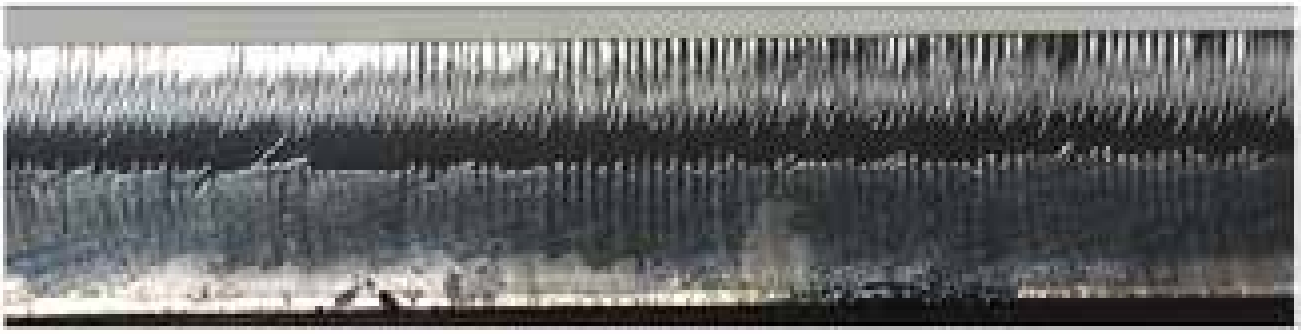
FEED RATE

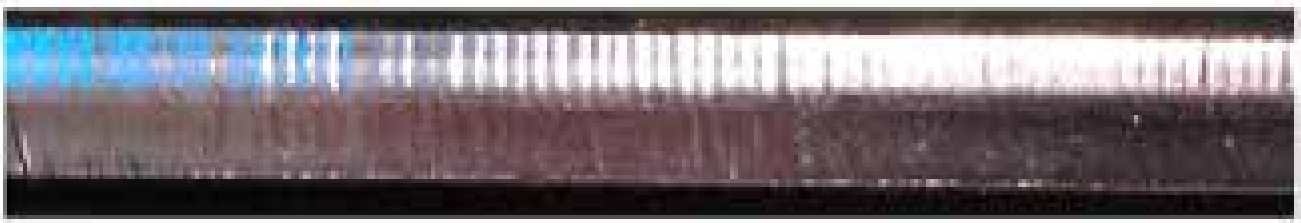
IF THE **FEED RATE IS TOO FAST** THE **KERF IS TOO NARROW**

IF THE **STANDOFF IS TOO HIGH** THE **KERF IS TOO WIDE**

STANDOFF

IF THE **STANDOFF IS TOO LOW** THE **KERF IS TOO NARROW.**



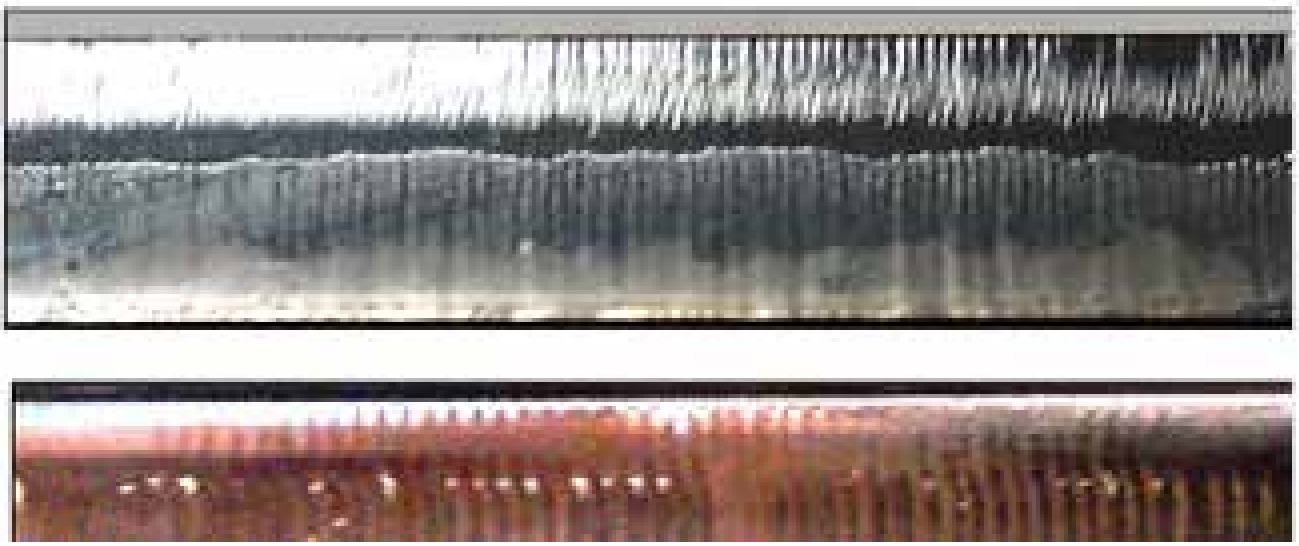


IF THE **GAS PRESSURE IS TOO HIGH** THE **KERF IS TOO WIDE.**

PRESSURE

IF THE **GAS PRESSURE IS TOO LOW** THE **KERF IS TOO NARROW.**

IF THE **NOZZLE SIZE IS TOO BIG** THE **KERF IS TOO WIDE.**

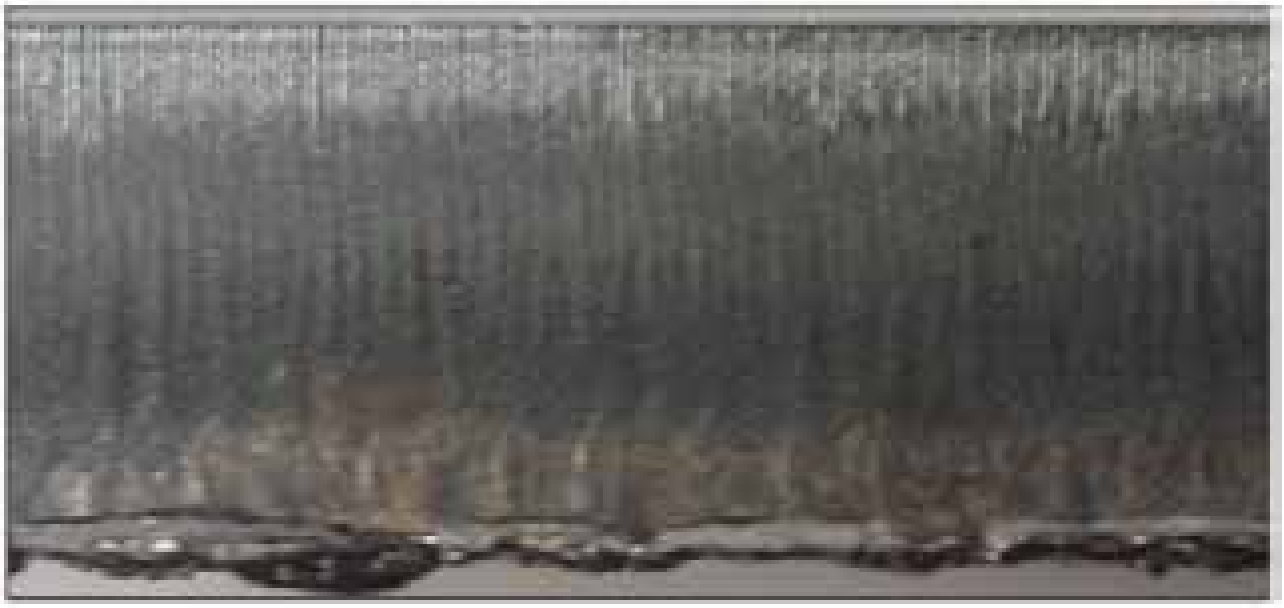


NOZZLE SIZE

IF THE **NOZZLE SIZE IS TOO SMALL** THE **KERF IS TOO NARROW.**

INCORRECT NOZZLE CENTERING
SIDE 1

INCORRECT NOZZLE CENTERING
SIDE 2



THE NOZZLE TYPE IS INCORRECT.

MATE® LASER TECHNOLOGIES

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