



## Plate

### LASEReady™ Plate: Intended for Laser Cutting Applications

ArcelorMittal USA has developed special chemistry and processing for plate steel to meet the exacting requirements for laser-beam cutting applications. Plate steel with this improved capability can be ordered as LASEReady™.

#### Available Grades:

LASEReady™ processing is available for most popular steel grades, such as ASTM A36, A516, A572, A573, A131, A709, A514/T-1®, Hardwear®, and LQ-130. Some grades are inherently easier to cut with lasers, while others may require some additional chemical composition and processing controls. LASEReady™ plate is available from ArcelorMittal USA Plate mills at the Burns Harbor, Ind. and Conshohocken, Pa. locations.

#### Sizes:

LASEReady™ plate is available up to 1 in. thick at this time in plate widths as follows: 3/16 to 1/2 in. widths of 72 in. and wider and over 1/2 in. all widths. Thicker plate is currently being evaluated. Discrete rolled and coil produced plate processed by ArcelorMittal USA is available.

#### Quality Issues:

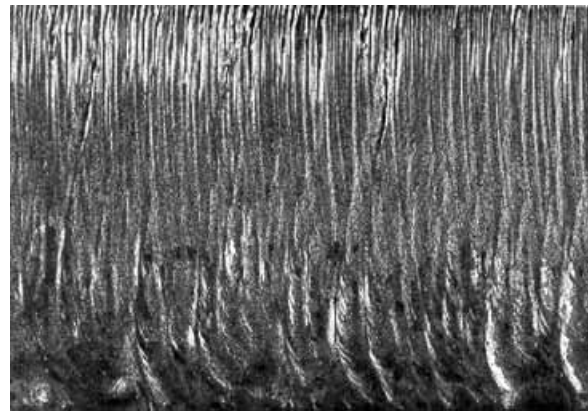
LASEReady™ plate is produced to one-half ASTM A6 flatness standards with special care taken on surface cleanliness and markings. Extraneous markings on plate are minimized. LASEReady™ plates also are processed for minimal “memory” or residual stress effects during cutting and perform best in the unblasted condition. Acceptable performance can also be achieved in shot-blasted plate.

#### Development:

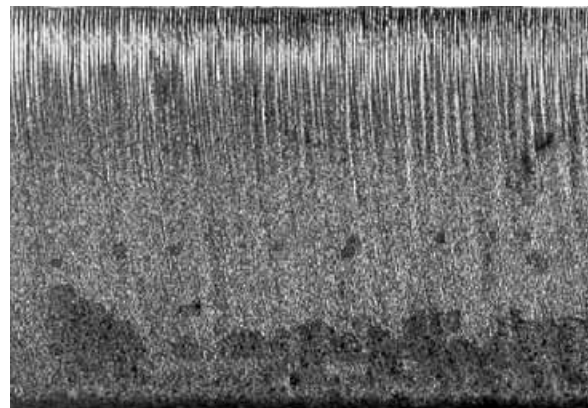
ArcelorMittal USA Plate mills have worked extensively with laser equipment manufacturers and users to develop the special chemistry control and plate processing to produce LASEReady™. If required, sample plates are available.

*LASEReady™ plate provides a more uniform cut edge and allows predictable drop-out of parts at the highest cutting speeds and is more confidently used in automated or “lights-out” LBC than conventional steel.*

#### Comparisons of laser-cut edge quality of 1 in. conventional and LASEReady™ plate



Conventional Plate Edge



LASEReady™ Edge

## Guidelines for Laser-Beam Cutting:

Laser-beam cutting (LBC) is a thermal-cutting process that removes material by locally melting (or vaporizing) with the intense heat from a laser beam, and using a gas jet to blow the molten or vaporized material away. Plain carbon and low alloy steels are most commonly cut using oxygen as the cutting gas and the exothermic reaction of iron with oxygen provides additional energy to enhance the cutting action. Some advantages of LBC include narrow kerf and heat-affected-zone (HAZ); less dross, distortion and edge rounding; improved dimensional accuracy and better cut appearance compared to other thermal cutting processes such as plasma-arc and oxy-fuel cutting.

In the past, use of LBC was limited to steels of thickness 1/4 in. and less using laser power levels of 1.5 kW or less. With recent advances made in laser technology, higher laser powers with improved mode quality are now available and fabricators are beginning to cut 1 in. thick steel in production.

In LBC, cut quality is significantly influenced by process variables and the equipment manufacturers' recommendations should be strictly followed for operation and maintenance of the LBC system. The most common material-related problems found during LBC are in distortion, dross formation and "sidewall burning".

Distortion can be minimized by:

- Ensuring the plate is free from residual stresses.
- Employing a cutting sequence to distribute thermally induced strains evenly and to keep distortion of the cut parts within acceptable limits.

Dross formation is minimized and "sidewall burning" (cut edge quality) is controlled when:

- Surface scale is uniform and tightly adherent, and the surface is free from mechanical indentations (stamping, gouges, deep scratches), thick paint/thermal chalk markings and heavy rust
- A balanced chemical composition is used
- There is no gross segregation or large inclusions in the steel
- Correct cutting assist gas pressure and flow direction are used

In most cases, hot-rolled steels are found to cut better in the as-rolled condition than the shot-blasted condition. However, in some cases, heat-treated (quenched and tempered) steels give more consistent cuts in the shot-blasted condition. When shot blasting has to be carried out, using a smaller shot size provides more consistent cuts. Sand blasting is not recommended on plates to be laser cut.

## Reference:

[CO2 Laser Beam Cutting of Steels: Material Issues – Murali Manohar, Author.](#)

## Information

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