



Laser Marking Additives

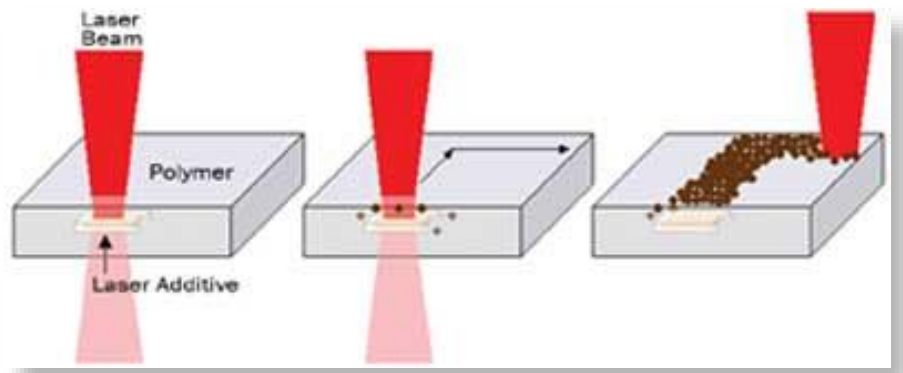
Superior speed, definition, and high contrast for plastic parts

Laser Marking Additives

Summary

Ampacet has a wide range of additives that can improve absorption properties for nearly any plastic.

Laser marking of polymers relies on carbonization (char formation) or foaming processes caused by beam absorption. The char formation results in dark marks on a plastic part. Foaming creates gas-bubbles in the plastic, which scatters the light and produces light marks.



Ampacet Laser Marking additives provide high levels of contrast and shading. These formulations achieve line detail at impressive speeds on plastics that have historically been difficult to laser mark and are ideal for fiber, YAG, and vanadate lasers operating at a wavelength of 1060-1070 nm. Ampacet uses additives, fillers, pigments, and dyes to enhance the absorption of laser energy for localized color changes. Different formulation chemistries and setup parameters depend upon the plastic being marked, as well as the desired marking contrast and functionality.

Advantages of Laser Marking

- Lasers are flexible in terms of surface and package design
- Economical
- Very high speed and without contact
- Inkless process (without solvents)
- Helps prevent counterfeiting
- No pre-treatment of surface required
- Marking can be miniaturized
- Eliminating labels enhances recyclability



Benefits of Ampacet Laser Marking Products

- Compatible with all laser types
- Indelible, consistent high-speed marking
- Compatible with most polymers
- Non-heavy metal formulations available
- Marks dark on most plastics/colors
- Delivers a light mark on certain dark parts
- FDA-compliant formulations available



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Product Applications

- Barcoding
- Expiration dates
- Serial numbers
- Identification tags
- Security straps
- Traceability
- Aesthetic designs



Laser Marking Systems

- **Nd:YAG** – Solid-state Nd:YAG lasers give higher resolution due to their shorter wavelengths. The shorter the wavelength, the less heating is induced in the plastic substrate.
- **Fiber** – Newer technology and less common, these lasers are capable of high marking resolutions on plastic, with extremely small font sizes possible.
- **Vanadate** – Often used for ablation marking; a top coating is removed to expose a lower surface without damaging it.
- **CO₂** – A CO₂ laser etches the plastic surface, removing material by evaporation. The result is a contrasting mark with little or no true color change. Plastics that mark well with CO₂ lasers include PVC, ABS, and most polyesters.



Typical Values of Laser Marking Systems

Category	YAG	Vanadate	Ytterbium (fiber)
Pulse duration (ns)	10–150	5–30	10–200
Beam quality (M^2)	<1.2	<1.2	<2
Peak power (kW)	High, 100 kW range	Medium, 80 kW range	Low, 10 kW range
Average power (W)	5–30	5–40	10–50
Pulse repetition frequency range	5–80 kHz	20–120 kHz	20 kHz–1 MHz

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Laser Marking Products

Product Code	LDR	Carrier Resin	Laser Type	Application Notes
I000581-N	1-2%	LLDPE	Nd:YAG	Non-heavy metal
I000582-N	1-2%	EMA	Nd:YAG, Fiber, Vanadate 1060nm	High Resolution
I000583-N	4-12%	EMA	Nd: YAG, UV	Excellent for TPU polymers
I000614-N	1-2%	EMA	Nd:YAG, Fiber	Lower Cost
I000591-N	2%	EMA	Nd:YAG, Fiber, Vanadate 1060nm	Delivers light markings
I000966-N	1-2%	EVA	Nd:YAG, Fiber	For EVA polymers
I100531-NQ	4-6%	LLDPE	Nd:YAG, Fiber	White substrate produces dark marking



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The Ampacet commitment to a greener planet: Sustainable products, processes and practices

R³ Sustainable Solutions represent Ampacet's commitment to the global circular economy with a growing portfolio of innovative masterbatches benefiting customers, the industry and the planet. With these solutions, Ampacet helps customers **reduce** waste and energy in manufacturing, **reuse** more post-consumer resins in finished products and **recycle** a higher percentage of their products.

Ampacet continues to reduce the environmental impact of its global manufacturing and distribution operations. The company also works with industry partners and organizations around the world to highlight the positive impact of plastics and develop processes and systems that improve sustainability.



For more information on **Laser Marking**, its uses, and complete Regulatory Status, contact your Ampacet Account Executive or visit **www.ampacet.com**.

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