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**CAN LIGHT BE ETERNAL?**

Simplifying Identification – Laser marking with Iriotec® 8000:
the light may only be visible for seconds, the mark will be eternal.
They say that nothing lasts forever. Dreams change, trends come and go, but love and laser markings never die. Eternity is also symbolized by monumental architecture around the world.

Follow the light beam from the Brandenburg Gate in the center of Berlin to the Taj Mahal in India, past the Tokyo Sky Tree, Lady Liberty, the Great Wall of China to St. Basil’s Cathedral in Moscow and then to the pyramids in the Valley of the Kings. Around the world, man has immortalized himself by building monumental structures that have lasted to this very day.

Simplifying Identification – there is more to explore

“More to explore” is our brand promise. That’s because there is far more to discover behind the people, materials and methods than anyone thinks. We are the creative possibility developer. With inventiveness, expertise and specialty chemicals, we develop valuable, functional future-oriented solutions. From durable and razor-sharp lasermarking to steadfast brand protection, our Iriotec® 8000 series provides the perfect solution for your needs.

More to explore about our Iriotec 8000 pigments:

* Heavy metals as defined in RoHS and CONEG (USA)
The art of writing with light is about invisibly incorporating the pigment into the polymer. And in a way that allows the special properties of the pigment to unfold when exposed to the laser. With Iriotec® 8825, those properties are very low color impact and high effectiveness.

Thanks to its transparency and low application concentration of just 0.1% to 0.3%, Iriotec® 8825 is our most color-neutral pigment, making it the product of first choice for transparent polymers. Yet this product is also ideally suited for both light and colored polymers, where the color impact must be kept low.

The application possibilities are innumerable, and Iriotec® 8825 can be used wherever it’s essential to have clean and hygienic products that must be both highly durable and easily readable. For instance in pharmaceuticals, where it is essential for patients to receive precisely the right dose of the prescribed medicine. In addition, Iriotec® 8825 is also used in other application areas such as in kitchen gadgets as measuring cups or in cars as filling gauges for brake fluid and coolant tanks.

When it comes to hospital and medical equipment, plastic has almost completely replaced glass. It is a durable and shatterproof alternative – whether it is disposable or reusable.

Normally, screen or pad printing is used for the scale lines, which can wear off or be removed by an autoclave and become difficult or impossible to read. Laser marking really proves its worth by permitting durable, sharp and high contrast marking of formed, curved or uneven surfaces as it works absolutely contact-free.

The best part, however, is that no additional chemicals such as printing inks or solvents are needed. This technology has been successfully applied to the food industry and there is no indication that it cannot be just as applicable to the medical device market. Though our product is not specifically manufactured for the medical device market, it has been successfully used in medical device applications. We will help you work this out and can assist you, based on our data, to get your final laser marked product approved.

Iriotec® 8825

**Gateway to Transparency**

**The Most Color-Neutral Pigment for Transparent Polymers**

- First choice for cost-in-use as it works in various polymers
- High temperature resistance (800°C)
- Suitable for transparent, light and dark colors
- Suitable for all polymers, even for fluoropolymers
Iriotec® 8208
GRANULES FOR OUTSTANDING FAST AND DARK MARKING

- Main application area: Animal ear tags
- Incorporated directly into the injection molding or extrusion step
- Consistent marking results
- Razor-sharp, dark marking

In-ear monitoring

What does laser technology have to do with farming? Its contribution is an important one: Without ear tags, it would be virtually impossible to identify grazing animals. The laser tag in the sheep’s ear serves as their identity card, making it possible to identify each animal at any time thanks to its number and barcode.

People usually carry their IDs in a safe place. But sheep wander around meadows in the rain, mud and cold with a plastic mark in their ears for everyone to see. Statutory hygiene regulations as well as increasing consumer demands mean that the origin and husbandry of farm animals are thoroughly documented. Counterfeit-proof and easily readable, the ear tags contain information lasered deeply into them. At the end of the day, comprehensive documentation of an animal’s life lets consumers know where the piece of meat on their plate originated.

FEATURES AND BENEFITS

Iriotec® 8208 is based on encapsulation technology and therefore, we supply it in form of granules. When added to polymers, this allows you to achieve dark laser markings on a light background. In addition, Iriotec® 8208 offers an extremely durable form of marking. Our technologies transform your ideas into a suitable solution that suits all types of weather.

Whether for animals grazing on meadows day and night for years or technical cables and hoses that need to be reliable for use in transportation and communication industries – the applications always involve the toughest requirements and demand superb results.

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IRIOTEC® 8208

We’ve got everything covered. Unlike the more common method, where the polymer itself is colored by means of the laser beam and heat, Iriotec® 8208 already contains everything needed for the reaction. This yields a consistent marking independent of the polymer.

Iriotec® 8208 is based on encapsulation technology and therefore, we supply it in form of granules. When added to polymers, this allows you to achieve dark laser markings on a light background. In addition, Iriotec® 8208 offers an extremely durable form of marking. Our technologies transform your ideas into a suitable solution that suits all types of weather.

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LAser marked chip
If you’re curious, then get ready for some more excitement. One of the most demanding fields of application for laser marking is the food industry. Iriotec® 8210 pigment granules were specifically developed for the marking of plastics used in food applications. And in low concentrations.

Once again, Merck has solved a challenge facing users. Since Iriotec® 8210 laser pigments are classified as being safe in Europe, they pose absolutely no risk when used to laser mark caps, closures and food containers. The suitability for food contact in the United States is currently under review.

Even medical components can be marked cleanly and reliably using this method. Although most of the products in the Iriotec® 8000 series are suitable for use in food packaging, Iriotec® 8210 is even safer. It is the first additive for high-speed and high-contrast markings, that is nearly transparent and free from intentionally added heavy metal compounds.*

**AT the height of safety**

* If heavy metals as defined in RoHS and CONEG (USA)
If you’re driven by untiring curiosity, passion and perseverance, you’ll always look at the application of laser-sensitive pigments from new angles. The spirit of discovery has encouraged us to explore new horizons with Iriotec® 8855. The result? The first pigment that does not contain any antimony and that is free from intentionally added heavy metal compounds.*

An unstoppable urge to explore brings us closer to the secrets of everyday life and constantly creates new possibilities for us to combine or process materials. Yet scientific discovery and advances can also involve challenges for safety and environmental protection.

As a leading science and technology company, we are fully aware of our global responsibility for the environment and as a pioneer in laser markings, Merck stands behind its pigments. We want to help people around the world to lead healthier lives. With Iriotec® 8855, we demonstrate this. The new pigment is free from intentionally added heavy metal compounds* and delivers high-performance dark markings on light-colored polymers.

**Taking up the challenge**

Polymers can make parts lighter and stronger, but that is only the tip of the iceberg. Today more and more metal parts in machines and vessels are being replaced by polymers. Over several decades polymers made their way from toys and jewelry to serious aerospace, automotive, electronics and energy applications. Especially in critical areas and under challenging conditions where metal seemed to be the only option high performance polymers conquer more and more territory. These conditions do not only challenge the polymers themselves, but also the technology they are marked with. Where labels fall off, ink-jet printing is wiped off and embossing is too static, laser marking is the technology of choice. With its high temperature stability, the high light fastness and the low addition rate Iriotec® 8855 meets the demand for a laser pigment that supports the capture of new territories.

**FEATURES AND BENEFITS**

**Iriotec® 8855**

**PIGMENT, FREE FROM INTENTIONALLY ADDED HEAVY METAL COMPOUNDS**

**FOR FAST AND DARK MARKING**

- Main application area: Plastic components subjected to high demands with regard to temperature resistance, weather resistance and purity
- High speed
- Bluish-white pigment with little color influence
- High temperature resistance (750°C)
- Suitable for dark markings on polymers with a tendency towards light markings, e.g. POM, PA and PMMA

Product will be available in Q4/2019. Samples available now.

* Heavy metals as defined in RoHS and CONEG (USA)
Our curiosity and passion for research are what drive us to reach higher, go further and move faster. With Iriotec® 8850, we’re breaking new ground once again. Used to dependably laser mark thin-layer applications such as films or powder-coated materials, this product creates fast and precise dark markings, not only in polymers and powder coatings, but also in silicones.

Laser beams can become very hot. Usually this isn’t a problem, but there are times when thermal influences must be ruled out, especially when it’s essential to avoid immediately adjacent areas. Some examples include safety components in the transportation industry, delicate films and powder-coated metallic materials. With Iriotec® 8850, not only is it possible to laser-mark plastics, you can also add markings to powder-coated metal parts without attaching labels or printing. The process takes place at lightning speed, and the laser is used for only a fraction of a second. The surface of the material remains virtually untouched and the marking is so fine that it is even undetectable to the touch.
When writing with light, you have the feeling that markings are coming out of thin air. However, they actually arise from pure energy and the willingness to create something new. This is where Iriotec® 8815 comes in. It produces razor-sharp, light markings that create good contrasts, particularly on colored plastics.

Easy, quick and economical – these are only some of the advantages of laser-sensitive Iriotec® 8815 for marking cables. Previously unimaginable, the pigment powder can be used to make high-contrast, high-definition marks on various dark colors of plastics such as red, blue and green. And that’s true even for difficult-to-reach places, on curved surfaces, without further preparation of the part. In addition to cables, Iriotec® 8815 is suitable for marking seals, lids, ballpoint pens, tubes, technical containers as well as any other objects that require a light-colored, high-contrast marking.

FEATURES AND BENEFITS

Iriotec® 8815
THE PIGMENT FOR LIGHT, HIGH-CONTRAST MARKING OF COLORED POLYMERS

• General solution for bright markings in colored polymers
• Low color influence

This religious monument to military victory has become a symbol of Moscow and one of the world’s most famous churches. Since 1990, St. Basil’s Cathedral has even been included on the UNESCO World Heritage list. Ivan the Terrible consecrated the church in 1561 and allegedly had its architects blinded so that they could never again build something similar.
Challenges pique our curiosity. And black formulations pose a particular challenge for laser marking. Sometimes, the absorption is so strong that the laser light generates excessive heat and the polymer decomposes. Iriotec® 8835 is a black pigment that absorbs light superbly without destroying the polymer completely.

The most frequent cause is the carbon black content in the polymer. Consequently, the result is more like an engraving than a marking by means of a color change. The contrast is too low to easily read it, either visually or mechanically. Experience shows that the higher the carbon black content, the worse the contrast. Our answer to this challenge is Iriotec® 8835, specially developed for laser marking thermoplastics.

**Markings for regulated products**

A functional pigment such as Iriotec® 8835 does more than just endow surfaces with new properties. From buttons and panels inside vehicles to valves and pumps in machines, there are many good reasons to mark polymers. For medical devices such as tubes, disposable syringes and insulin injectors, however, the requirements are even more stringent than in other industries.

Medical device markings must be permanent and traceable, clear and legible, high-contrast, counterfeit-proof, resistant to sterilization and purification procedures, as well as hygienic and clean. A tremendous challenge. For this reason, sensitive products such as pain control pumps and insulin injectors, which deliver preparations into the human body, are especially good candidates for laser marking. One advantage is that the delicate and brilliant markings are permanently and perfectly legible. Though our product is not specifically manufactured for the medical device market, it has been successfully used in medical device applications. Our aim is to support you in finding the perfect solution for your requirements. We will help you work this out and can assist you, based on our data, to get your final laser marked product approved.
Laser marking is the modern way to individually label your products. A contact-free process. All you need is the right pigment and a pulsed IR laser.

The laser sensitive pigments are easy to incorporate into plastic formulations. If you decide to use a pigment, we generally recommend that it is incorporated into a masterbatch or compound before adding it to the final product. If you still need more detailed information or would like to receive advice on a technical issue, simply get in touch with our laser specialists.

For more information have a look at our website: www.iriotec.com

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**Inorganic; mica and SnSb-oxide < 15 µm**

**DPSS/fibre laser**

**Most transparent pigment powder**

**Light and dark marking**

**Polyolefins, Polystyrenes, Technical polymers, Resins, Fluoropolymers**

**Inorganic/organic; components encapsulated; Sb2O3; PE-carrier**

**DPSS/fibre laser**

**Pigment granule**

**Dark marking**

**Process temperature < 280°C**

**Polyolefins, TPU, Technical polymers**

**Inorganic/organic; components encapsulated; Sn-free PE-carrier**

**DPSS/fibre laser**

**Pigment granule**

**Dark marking**

**Process temperature < 250°C**

**Polyolefins, TPU**

**Inorganic; Sb-free < 10 µm**

**DPSS/fibre laser**

**Free from intentionally added heavy metal compounds**

**Dark marking**

**Process temperature < 750°C**

**Polyolefins, Polyamides, Transparent silicones, Technical polymers**

**Inorganic; TiO₂, SnSb-oxide < 1 µm**

**DPSS/fibre laser**

**Light grey pigment powder**

**Dark marking**

**Polyolefins, Technical polymers, Resins, Silicones, Powder coatings**

**Inorganic; SnSb-oxide < 10 µm**

**DPSS/fibre laser**

**Light colored pigment powder**

**Light colored marking**

**Polyolefins, TPU, Technical polymers**

**Inorganic; Mica; Fe₃O₄; < 15 µm**

**DPSS/fibre laser**

**Black pigment powder**

**Possible substitution for carbon black**

**Nearly white marking**

**Polyolefins, Polyamides, Technical polymers, Resins**

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**Iriotec® 8855 – product will be available in Q4/2019. Samples available now.**

**Heavy metal as defined in RoHS and CONEG (USA)**

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For more information have a look at our website: www.iriotec.com