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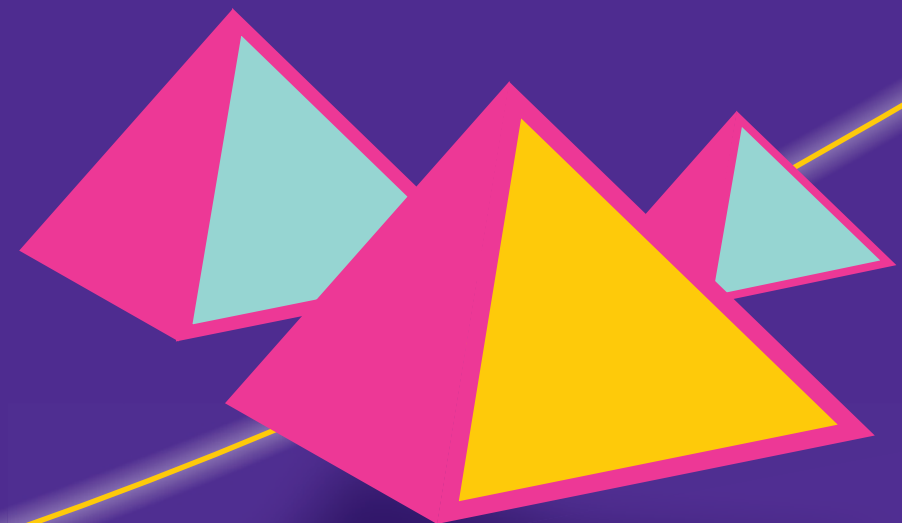
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CAN LIGHT BE ETERNAL?

Simplifying Identification – Laser marking with **Iriotec® 8000**:
the light may only be visible for seconds, the mark will be eternal



let the light flow

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:



OVERVIEW BY COLOR INFLUENCE

GATEWAY TO TRANSPARENCY IRIOTEC® 8825

The most color-neutral pigment for transparent polymers

4



OUTDOORS LEGEND IRIOTEC® 8208

Granules for outstanding fast and dark markings

6



AT THE HEIGHT OF SAFETY IRIOTEC® 8210

Granules providing dark markings even in sensitive food packaging applications

8



MONOLITH MARKING IRIOTEC® 8855

Pigment, free from intentionally added heavy metal compounds* for dark markings

10



AT THE SPEED OF LIGHT IRIOTEC® 8850

The fastest pigment for several materials

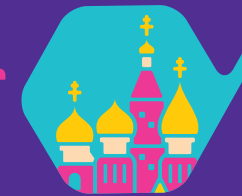
12



CATHEDRAL OF BRIGHTNESS IRIOTEC® 8815

The pigment for light markings of colored polymers

14



KING OF LIGHT MARKS IRIOTEC® 8835

The black pigment for light markings

16



TECHNICAL AND ORDERING INFORMATION

Find everything you need to know about the Iriotec® 8000 series in our compact overview

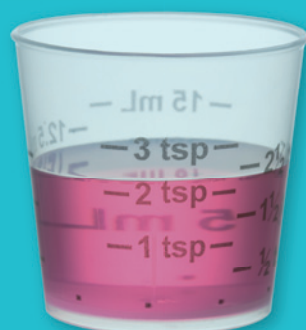
18



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



On its journey, the laser beam passes one of the most popular sightseeing attractions. Over 200 years old and once a monument marking separation, the Brandenburg Gate has become a symbol of German unity.



Inscription with great potential

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 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.

FEATURES AND BENEFITS

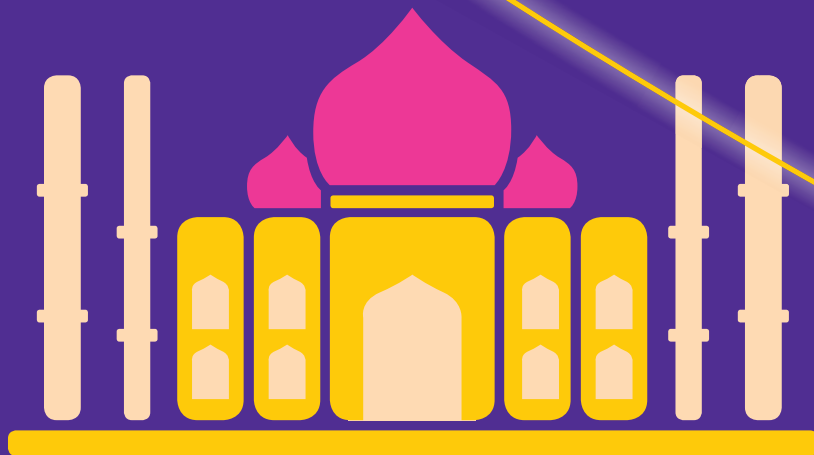
Iriotec® 8825

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



LASER MARKED CHIP



People say that there is no such thing as everlasting love. But the monumental structure known as the Taj Mahal is testimony that it does exist. Constructed back in 1631, the Taj Mahal symbolizes the eternal love of Emperor Shah Jahaan for his wife Mumtaz Mahal. It took more than 20,000 workers 22 years to build this architectural wonder, which has become an icon of Indian culture. And a "monument of eternal love".

IRIOTEC® 8208

outdoors LEGEND

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.

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.

FEATURES AND BENEFITS

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



LASER MARKED CHIP

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.



IRIOTEC® 8210

AT the height of safety

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.*

FEATURES AND BENEFITS

Iriotec® 8210

GRANULES PROVIDING DARK MARKINGS EVEN IN SENSITIVE FOOD PACKAGING APPLICATIONS

- Main application area: Food packaging, films, beverage caps and children's toys
- Minimal color impact
- Low application concentration
- Consistent marking results
- Incorporated directly into the injection molding or extrusion step



LASER MARKED CHIP

It is believed to be able to withstand earthquakes, typhoons and snow. What is certain is that at 634 meters, Tokyo Skytree is the world's tallest broadcasting and observation tower. The city boasts more than four centuries of history, and its first 21st century landmark is considered a memory of the past, as well as a constant source of inspiration to all of Japan.

IMMORTALIZED in plastic

It's probably happened to you before: You take some delicious food out of your fridge and on closer inspection can no longer read the best-before date on the packaging. This is because moisture and oils or other factors have made the printed date illegible.

Due to shaking, bending and abrasion, food packaging is subject to high mechanical stress and is often defenseless against external factors. It is therefore highly possible that the required information such as the sell-by date, weight and lot number are no longer legible. The only way to avoid this problem is by using a completely safe method of applying the information. Writing the data onto products using a laser and Iriotec® 8210 functional granules leaves markings that in comparison with other technologies are highly durable, razor-sharp and thus permanently legible.



More to explore:
Laser portal with detailed explanation for laser marking

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

IRIOTEC® 8855

statue of liberty

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.



LASER MARKED CHIP

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)



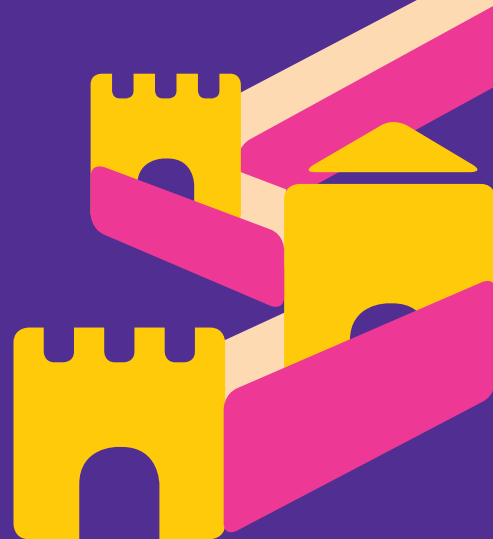
Her full name is "The Statue of Liberty Enlightening the World". For more than 130 years, Lady Liberty has been welcoming guests in New York Harbor. She is symbolic of freedom and the promise of a better future. In 1984, the Statue of Liberty was designated a UNESCO World Heritage Site.

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.





Originally built as a fortification, this monument has become a symbol enshrouded in myth. The Great Wall of China is not only incredibly long, but also incredibly old. The first fortifications were built back in the 7th century B.C. Guess what? The Great Wall of China isn't one great wall at all. Instead, it is a series of individual walls that often aren't even connected together.

IRIOTEC® 8850

At the speed OF LIGHT

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 it is 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.



LASER MARKED CHIP

FEATURES AND BENEFITS

Iriotec® 8850

THE FASTEST PIGMENT FOR DIVERSE MATERIALS

- **Main application area: automotive industry, wire and cable, silicones and thin materials like film, fibre and powder coating**
- **High marking speed**
- **High contrast**
- **High temperature resistance (750°C)**



Magic number

Laser markings are fast, programmable, contact-free and durable, something that should make car companies in particular quite happy. Just think of the possibilities for precise markings for order numbers and information data requirements for labels in the transportation industries. Mechanics working in car repair shops or in their garages at home stand to gain a lot from our products as well.

Anyone who has ever checked the level of brake fluid, coolant or oil in their vehicle in poor lighting conditions knows what we're talking about. When it comes to laser marking on the fly, Iriotec® 8850 delivers highly precise and unique high-contrast results. Another application field is the reliable, permanent marking of OEM parts. Counterfeit automotive parts are a nightmare for every automobile manufacturer. By marking powder-coated safety parts during the production process, you can accurately identify counterfeits and literally keep them off the streets. The beauty of Iriotec® 8850 is that the marking is non perceptible. As a result, zero surface damage occurs despite absolutely durable marking. And the list of applications certainly doesn't end there. With Iriotec® 8850, architects and designers can look forward to creating new, fascinating finishes and furniture with unique decorative elements.

IRIOTEC® 8815

cathedral of brightness

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

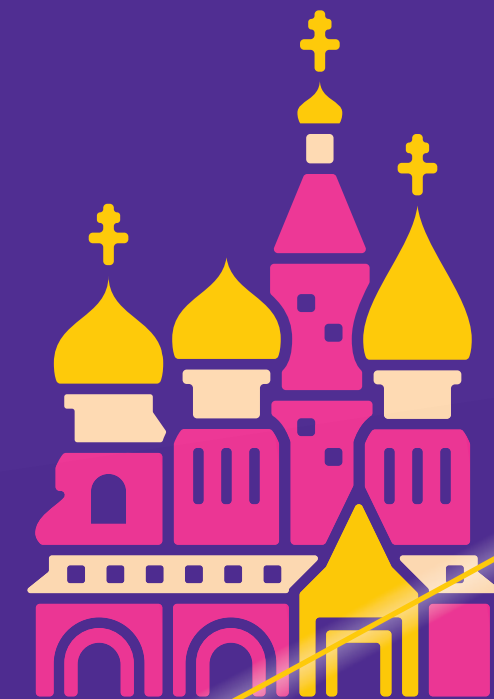
Iriotec® 8815

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

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



LASER MARKED CHIP



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.

we connect the world



Life without the internet? Unimaginable. However, this means of communication relies on various conditions.

One of these conditions is thick submarine cables that connect continents. These cables allow the transfer of far greater amounts of data than would ever be possible with the best satellite. Thanks to Iriotec® 8815, lasers can write on cables. The benefit is that for sudden connection problems, any engineer can quickly find the right cable and repair it to reconnect people with each other. As a cable manufacturer, you can thus create high-quality markings that are resistant to wear, chemicals and other harsh conditions. This is a clear advantage over conventional markings using inkjet printers.

IRIOTEC® 8835

KING of light Marks

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.

FEATURES AND BENEFITS

Iriotec® 8835

THE BLACK PIGMENT FOR WHITE MARKINGS

- **Main application area:** electronics and automotive industries
- **Meeting regulations for food contact**
- **High temperature resistance (800°C)**
- **Suitable for all black polymers with a carbon black content < 0.2%**



LASER MARKED CHIP

Built more than 4,500 years ago, the monumental tombs are one of the seven wonders of the ancient world. Today they are one of the most famous travel destinations. The incredible dimensions of the Pyramids of Giza can even be easily recognized from space. That's not even the case for the Great Wall of China.



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.

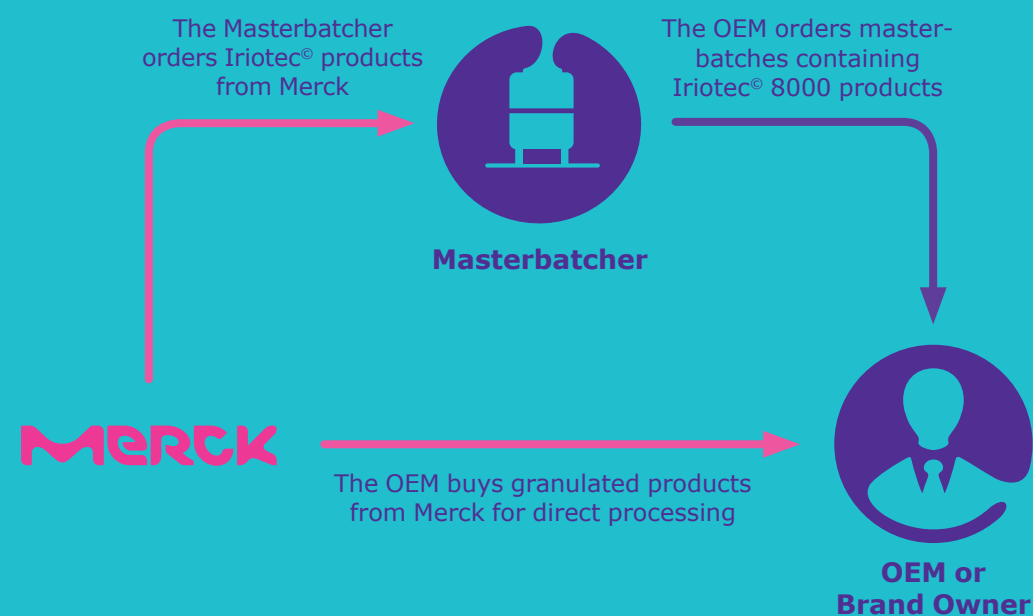


More to explore:
Laser portal with detailed explanation for laser marking

add value and boost per formance

**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.



ordering information

Cat.No.	Name	Product Details	Laser	Comments	Application
104783	Iriotec® 8825	Inorganic; mica and SnSb-oxide < 15 µm	DPSS/ fibre laser	Most transparent pigment powder Light and dark marking	Polyolefins, Polystyrenes, Technical polymers, Resins, Fluoropolymers
141083	Iriotec® 8208	Inorganic/organic; components encapsulated; Sb ₂ O ₃ ; PE-carrier	DPSS/ fibre laser	Pigment granule Dark marking Process temperature < 280°C	Polyolefins, TPU, Technical polymers
141412	Iriotec® 8210	Inorganic/organic; components encapsulated; Sb-free PE-carrier	DPSS/ fibre laser	Pigment granule Dark marking Process temperature < 250°C	Polyolefins, TPU
141467	Iriotec® 8855*	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
141414	Iriotec® 8850	Inorganic; TiO ₂ , SnSb-oxide < 1 µm	DPSS/ fibre laser	Light grey pigment powder Dark marking	Polyolefins, Technical polymers, Resins, Silicones, Powder coatings
141428	Iriotec® 8815	Inorganic; SnSb-oxide < 10 µm	DPSS/ fibre laser	Light colored pigment powder Light colored marking	Polyolefins, TPU, Technical polymers
104786	Iriotec® 8835	Inorganic; Mica; Fe ₃ O ₄ ; < 15 µm	DPSS/ fibre laser	Black pigment powder Possible substitution for carbon black Nearly white marking	Polyolefins, Polystyrenes, Technical polymers, Resins

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

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

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