SAFETY AND ORIENTATION
AT AIRPORTS

SWARCO | The Better Way. Every Day.

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Road Marking Systems

FROM THE AIR AND ON THE GROUND

ON THE SAFE SIDE - WORLDWIDE

The use of glass beads for airport markings is recommended by several institutions. This increases the visibility of runways, taxiways and aprons significantly. These glass beads are designed to direct the light back to its source. This is a considerable safety improvement as it enables faster orientation, especially in poor lighting or adverse weather conditions.

Studies by the USACE (US Army Corps of Engineers), the FAA's (Federal Aviation Administration) Airport Safety Technology Research and Development team and the IPRF (Innovative Pavement Research Foundation) analyzed the retroreflective performance of markings with different glass beads.* These analyses revealed that type III glass beads have higher retroreflective values than type I glass beads. They have a higher refractive index than low-index beads, reflect more light, thus making markings more visible.

As per US Federal Specification TT-B-1325, there are three types of glass beads suitable for airports. These three types differ in glass composition, size, refractive index and retroreflection.

Specification TT-B-1325

Low-index		High-index
Type I (≥ 1.5)	Type IV (≥ 1.5)	Type III (≥ 1.9)
up to 400 mcd/m²*lx	up to 600 mcd/m²*lx	up to 1500 mcd/m²*lx

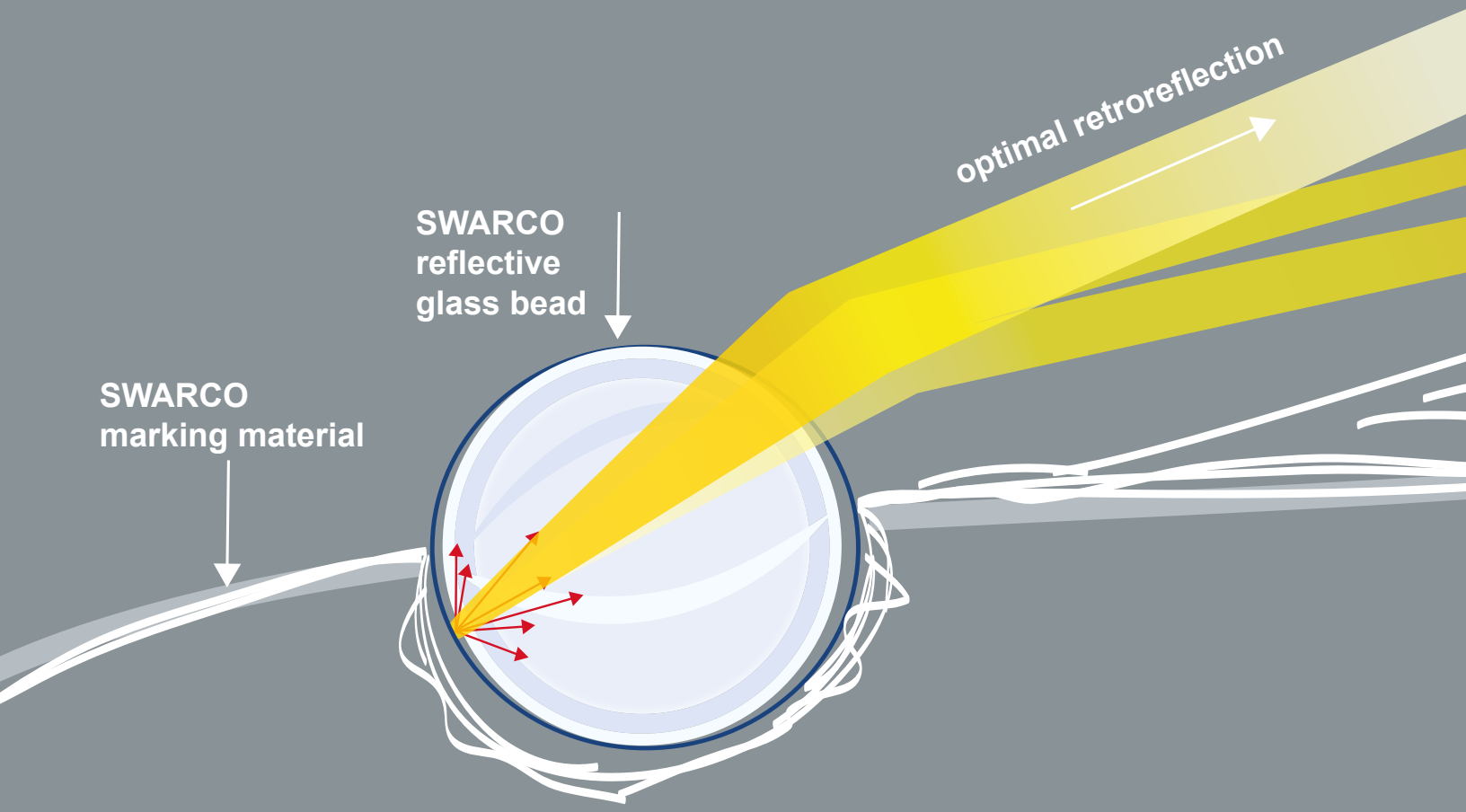
The only difference between type I and IV beads is their size, which also influences their retroreflective values. Type I beads reach up to 400 mcd/m²*lx. Type IV glass beads are larger than type I beads, with retroreflective values reaching up to 600 mcd/m²*lx. Type III glass beads are high-index beads. These have better optical properties and significantly higher retroreflective values of up to 1500 mcd/m²*lx because they are made from special high-grade glass.

* Sources: ERDC/GSL TR-07-20, A Comparative Field Study of Permastripe™ Polymer Concrete and Waterborne Airfield Pavement Markings, June 2007, John K. Newman, Ph.D. DOT/FAA/AR-TN-05/43, Adsil Glass Coating Study, September 2005, Holly M. Cyrus

FEDERAL SPEC BEADS

SWARCO Road Marking Systems are able to supply beads for the Federal Aviation Administration and the International Civil Aviation Organization specifications and standards for airfield markings, including US Federal Spec TT-B-1325D and TT-P-1952F.

Strong in difficult lighting and weather conditions
Used in conjunction with high-grade marking materials, SWARCO Road Marking Systems reflective glass beads achieve optimal retroreflection even in difficult lighting and visibility. They show their strengths particularly at night or in rainy and foggy conditions. This makes our glass beads the first choice for marking tasks on demanding sites like airstrips or helicopter landing pads.



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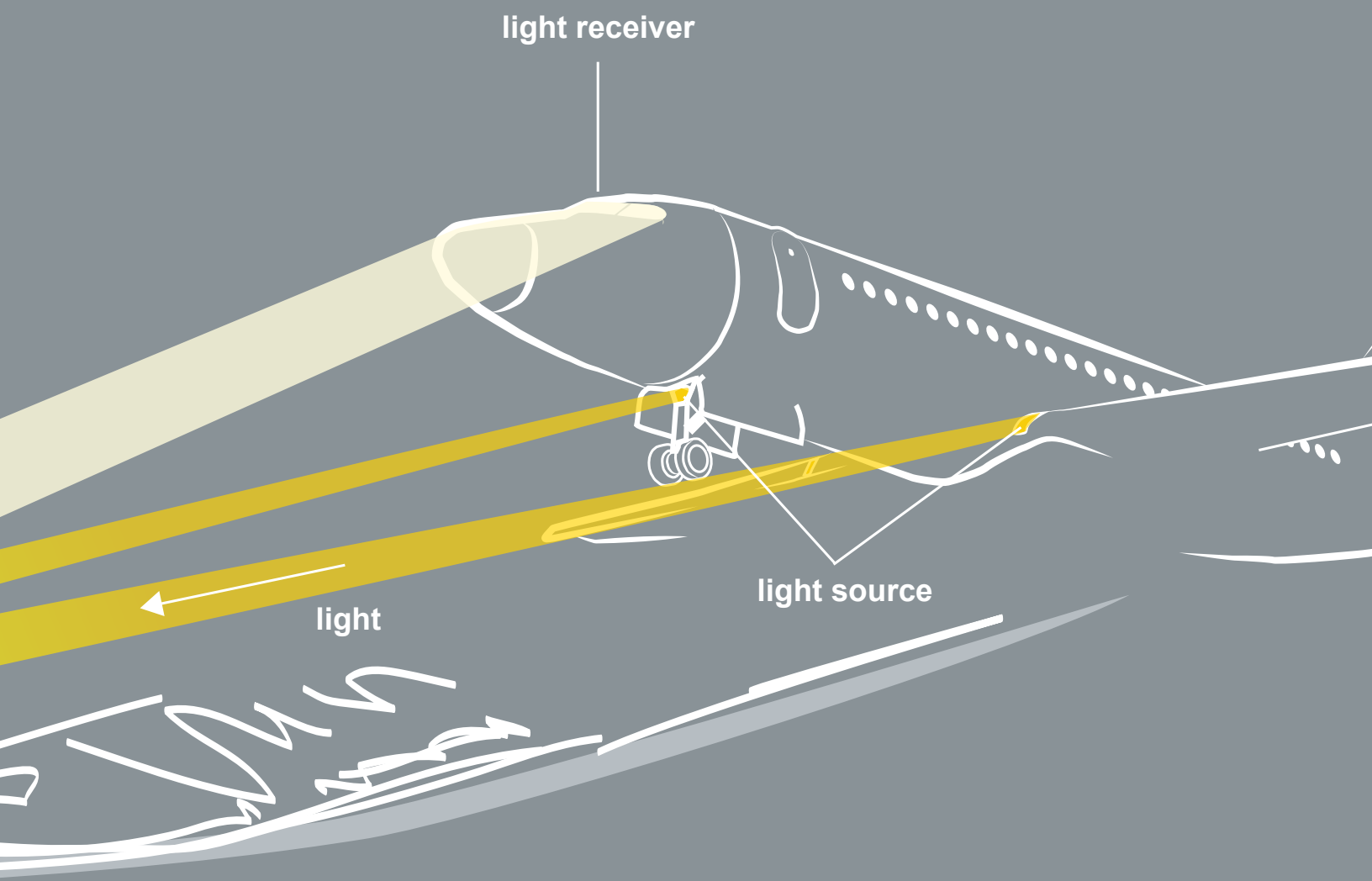
How It Works

A light source (landing light) sends light rays towards the ground. There, the light rays strike the glass beads in the markings. The light gets concentrated in one spot and is reflected back. The light emitted by the aircraft gets retroreflected towards it. The markings can be perceived early on from the cockpit, from far away and in all lighting and weather conditions. Pilots have sufficient time to react, decreasing the risk of accidents.



FOR OPTIMAL SAFETY

Airport markings on runways, taxiways and ramps play an important role in guiding safely between the air, runways and parking gates. All products meet or exceed federal specifications and standards for airfield markings.

	Specifications	Characteristics	Recommendation for use
GLASS BEADS TT-B 1325 Type I, III, IV-A/B	• Meet US Federal Spec TT-B-1325D	• Optimal retroreflection, even in difficult lighting and visibility	• Improve safety and ensure optimal orientation at airports for aircraft and ground traffic vehicles

	Layer Thickness	Characteristics	Recommendation for use
WATERBORNE PAINTS 1140 Series (TT-P-1952F Type I) 1160 Series (TT-P-1952F Type II) 1110 Series (TT-P-1952F Type III)	• 300 linear feet per gallon, 4-inch line at 15 mils wet film thickness (Type I & II) • 240 linear feet per gallon, 4-inch line at 20 mils wet film thickness (Type III)	• Superior durability • Excellent adhesion • Fast drying under a wide range of climatic conditions • Remains flexible over time • Applied with conventional or airless spray equipment • No thinning necessary	• Well suited for runways, taxiways and all airfield markings
MMA 5070 Series 5080 Series 5090 Series	• 80-120 mils (5070 Series) • 50-60 mils (5080 Series) • 18-28 mils (5090 Series)	• High reflective properties • Superior durability • Excellent color retention • Rapid curing at a wide range of temperatures • Outstanding long-term abrasion resistance • Protection against moisture penetration	• Well suited for runway safety area signs and markings: runway holding positions markings, position signs, location signs, critical area position signs, geographical position markings
EPOXY 1180 Series MFUA 10	• 18-22 mils wet film thickness	• Good UV stability • Exceptional adhesion • Low viscosity for smooth application • Outstanding abrasion and corrosion resistance • Excellent bead adhesion for better reflectivity • Excellent moisture resistance	• Well suited for roadways on and off the airfield

AIRPORT MARKINGS

RETROREFLECTION

The systems by SWARCO Road Marking Systems offer excellent retroreflection and night visibility on dry and wet surfaces due to superior optical properties from our glass beads.

INNOVATION – MORE CONTRAST

Innovative formulas to the marking systems provide many varied colors. The resulting marking symbols and lines appear much more vivid and rich in contrast.

DURABILITY

SWARCO Road Marking Systems' products show resistance against aviation fuels, deicers, engine oils and hydraulic fluids.

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High-quality airport markings by SWARCO Road Marking Systems improve safety and ensure optimal orientation at airports for aircraft and ground traffic vehicles.

ABRASION RESISTANCE

By choosing the right solutions from SWARCO Road Marking Systems' wide range of products, excellent functionality and abrasion resistance of marking systems on airfields and runways, taxiways and aprons is assured.

SURFACE BONDING

Apart from their stipulated product-specific characteristics, markings need to have sufficient adherence to the surface to avoid engine ingestion of loose marking material. The right choice of an optimal and cost-efficient marking system for the different areas depends on airport specifications and other prerequisites.

SPECIFICATIONS

The marking systems by SWARCO Road Marking Systems meet or exceed FAA 150-5340 standards for markings used on airport runways, taxiways and aprons.

REFERENCES

USA

Chicago O'Hare

Dallas/Fort Worth

Denver International

Detroit Metro

Jacksonville International

Los Angeles International

Nashville International

San Antonio, Texas

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Phnom Penh
Taschkent
Accra
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SHOWING THE WAY, WORLDWIDE

SWARCO | The Better Way. Every Day.

In 1969 we started out with the manufacture of tiny reflective glass beads. Today we have grown into the world's largest systems provider for road markings, making roads safer and saving lives on a daily basis. Our high quality products and services, safely direct traffic flow from A to B, every day and night. On all roads, in any weather, and all from SWARCO.

We prepare for the future by fusing knowledge with innovation at our Competence Center for Glass Technology and Marking Systems. So, even with smart and autonomous driving, we continue to blaze the trail of premium road markings to the world. Jump in and drive with us; we will be happy to help you find your ideal road marking solutions.

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