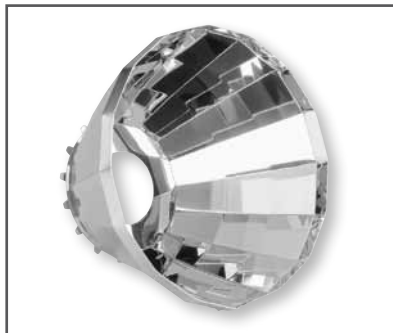
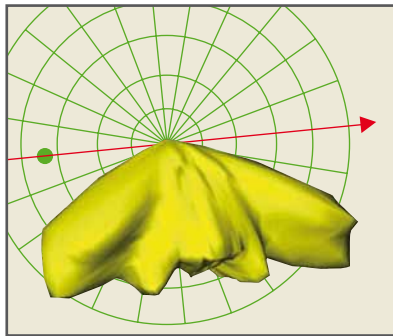


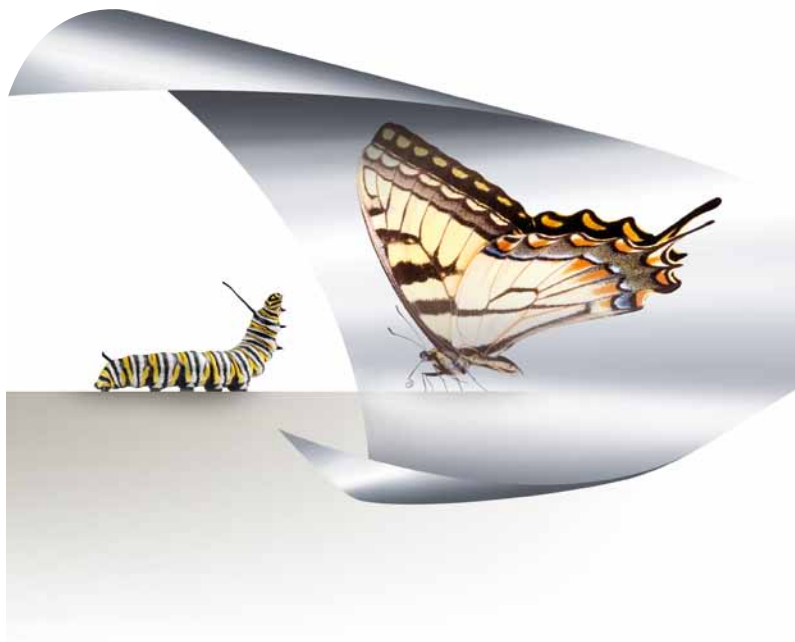
# reflect+A™



Evolving lighting concept







**reflect+A**<sup>™</sup> drives forward the development of the Almeco reflector division and adds to our existing production a new conceptual approach to the market, **reflect+A**<sup>™</sup>, which offers customers, in its first stage, rapid solutions and access to the generation of optics constructed using high reflectance **vega** surfaces for all types of lighting equipment.



# reflect+A™ concept: modular reflectors - custom made



Complete chain from ALMECO surfaces to finished reflectors.

**reflect+A** is an Almecco Group concept dedicated to the design, engineering, production and commercialization of a complete range of modular reflectors for the lighting market.

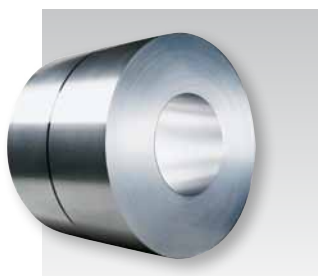
Almecco is the first and only Company to integrate aluminium reflector forming and bright treated aluminium surfaces in one site.

The Company stands out for its wide range of products and the high quality of its finishing processes.

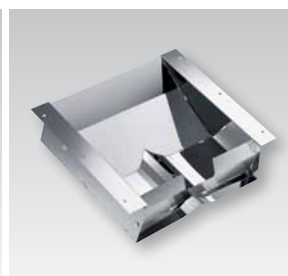
Almecco produces custom made reflectors for the most prestigious brands, on an OEM basis and supplies all the major lighting system producers in the world.

**reflect+A** generates ideas for reflectors which can be supplied in Almecco's **vega** aluminium, and can be made to customers' specifications with a choice of finish, thickness, shape, detailed features and fixings, to give just the right reflection characteristics that clients want for their products.

**reflect+A** exists to provide lighting solutions through Almecco Group's engineers working in partnership with customers at whatever stage required, from concepts and design, through prototyping and tooling to production.



Coil



Reflectors



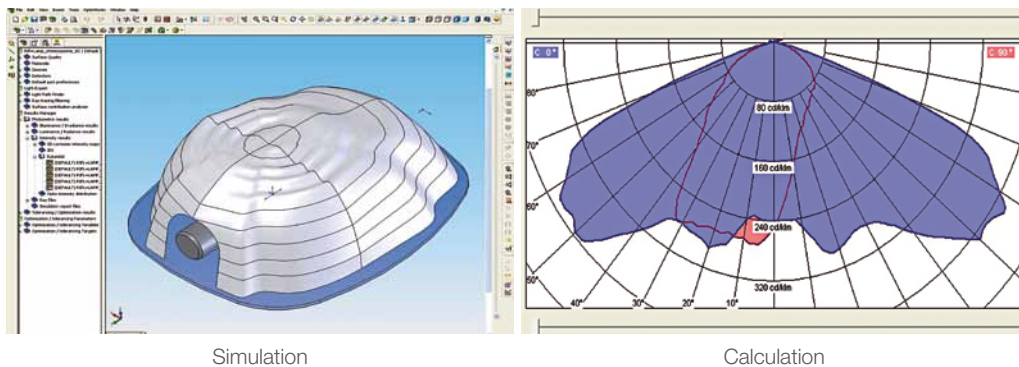
# Design engineering and prototyping

After market analysis to estimate production quantities and the establishment of specifications, the main phases in creating a new reflector are definition of reflective surface requirements, evaluation of manufacturing options and prototype and mass production engineering.

**Reflector surfaces** The reflector concept is developed in combination with a study of the type of surface reflectance characteristics that will best deliver the performance from the desired shape. Al **vega** and other materials from the Almecco range, including 98% reflective **vega98**, can be available depending on the light source and target application of the luminaire.

**Optical Design** The behaviour of the enhanced **vega** aluminium in the reflector under development can be simulated in the lighting calculation software **OPTIS** to maximise the performance of your reflectors. (A complete material database is available for Optis and Photopia).

**Manufacturing Engineering** Almecco studies manufacturing options to evolve the most productive solution. Key factors that are evaluated include planned production volume, manufacturing costs, the economic demands of the market, overall development time and plant requirements including any necessary new investment.



**Prototyping** Fast prototyping is possible without investment in tooling.

**Production** Almecco provides tooling workshops, deep drawing, spinning and blanking production technologies supported by precision roll bending and 2D and 3D laser cutting, all supporting product assembly lines.



**Control and quality** Almecco's control and quality system defines and follows the whole chain of production from the coil to the final reflector.

**Customers advantages** The full process provides:

- ▶ Reduction of design risks
- ▶ Optimisation of investment
- ▶ Confidence in results
- ▶ Rapid prototyping
- ▶ Support of R&D, Engineering and Manufacturing working alongside customers through the project as a whole

# Engineered lighting surfaces

Specialisation and flexibility make the Almeco Group a worthy partner for anyone searching for excellence in finished aluminium.

With **reflect+A** each lighting project is completely integrated, starting from the client's requirements, going through the study of the photometric characteristics combined with various surface finishes, numerous working technologies and processes.

Surface finishes can be grouped into 3 basic types and with 3 different reflectance options:

## Surface finishes

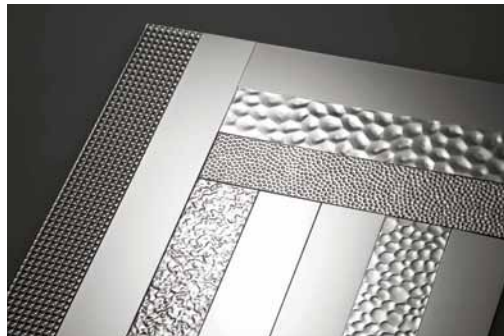
- ▼ **mirror finish** for precise reflection without diffusion or scattering;
- ▼ **micro-textured** or **matt** surfaces which can be used to soften reflection and increase diffusion;
- ▼ **embossed textured materials** that can be used for extensive diffusion of light from integral multi-faceted surfaces.

Pre-anodized aluminium has high reflective qualities and is very well protected against corrosion and deterioration. All Almeco's products benefit from the continuous anodizing process made in three main stages: electro-brightening, anodizing and sealing. **High reflectance pre-anodized surfaces**

To further enhance aluminium's reflective properties and widen its uses, Almeco has developed its **Enhanced vega** range of products. A total reflectance of over 98% can be reached by the application of high **95% and 98% TR vega surfaces** technology vacuum coating processes for the continuous deposition of thin metallic and ceramic films, using the latest **PVD (Physical Vapour Deposition)** technologies.

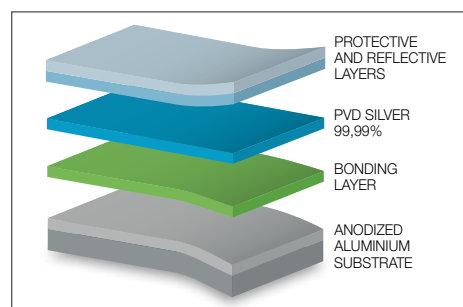


PVD technology vega plant



vega finishings

This PVD treatment is applied to the electro-brightened and anodized surfaces, which provide a high performance hard substrate for the manufacture of the various **vega** products which, depending on their application, are characterized by their exceptional reflective or absorptive properties, and also offer protection against surface damage, humidity, dirt pick-up and static dust attraction.



vega98® layers

The Group's target is always to offer an efficient, personalised response to all clients based on their particular needs, and to create and develop innovative, unique products and solutions, by offering an efficient and exclusive service.

# Applications

The Almeco Group's expertise in the production of surfaces with special finishes and textures, makes it ideally placed to provide leading products that are suited for many uses in the lighting technology sector, including:

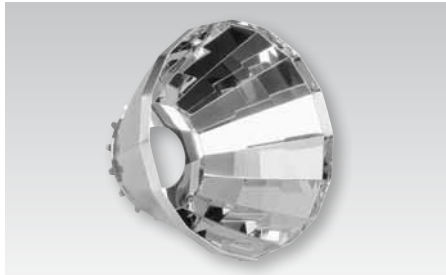
- ▼ reflectors for fluorescent and halogen light sources
- ▼ reflectors for commercial and industrial use
- ▼ reflectors for street lighting and urban design



Street lighting



vegaform reflector



vega segmented downlight



Indoor lighting

- ▼ floodlights, highbay and spotlights
- ▼ daylighting and shading systems
- ▼ retrofit lighting systems

Special surfaces and finishing have been optimised for some particular applications, e.g.

- ▼ reflective venetian blinds



Office lighting



High reflective vega louvres



Square vega recessed reflector



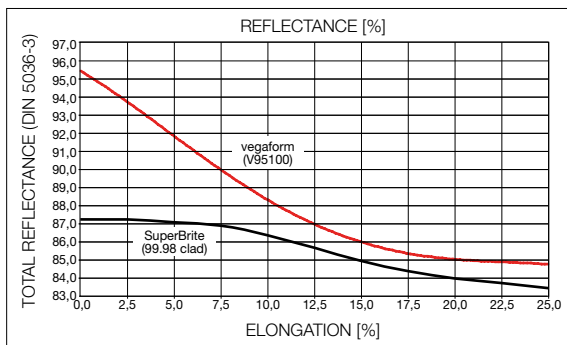
Architectural lighting



# Customised surfaces for special applications

The Almecco Group specializes in the production of pre and post anodised aluminium lighting surfaces which, together with the PVD coated products, make up an ALMECCO materials range with total reflectivities from 80 to over 98% and specular reflectivity from 10 to over 90%. Combining different production methods with various metal surfaces finishing techniques widens reflector options, for example minimising glare while maximising efficiency. To give some examples of customized surfaces for special applications, we can mention **vega form**, **vega green** and **vegaLED**.

The **vega form** range combines the excellent optical performance of our PVD coated finishes with **vegaform evolution** high light output even after deep drawing operations.

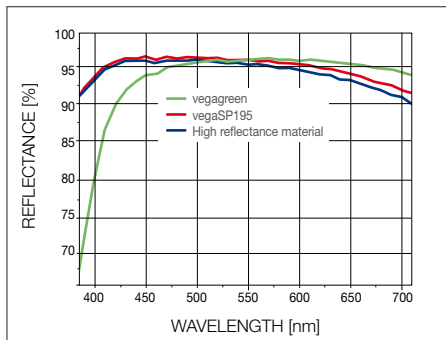


vegaform reflectance with elongation



LED street lighting reflector

**vega green** is a specially developed high reflectance material suitable for **horticultural applications** such as **vegagreen** as lamp reflectors for greenhouse lighting.



vega spectra

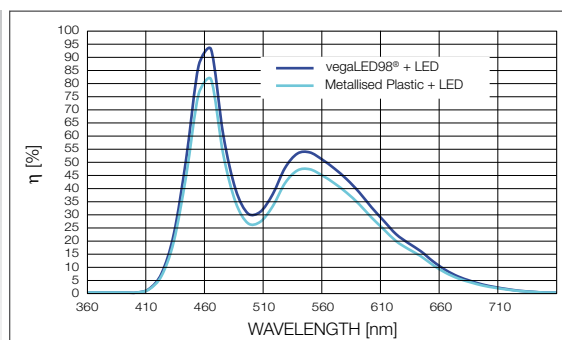


Photosynthesis efficiency

High reflectance **vegaLED** aluminium materials offer the kind of range and performance you will not find with other types of LED reflector product. With over 98% reflectivity across the full luminous spectrum, **vegaLED98** is the ultimate lighting reflector material, giving 15% more light on every reflection compared to metallised reflectors.



Different LED's modules



vegaLED efficiency versus metallised plastic reflector efficiency

**PATENTED**

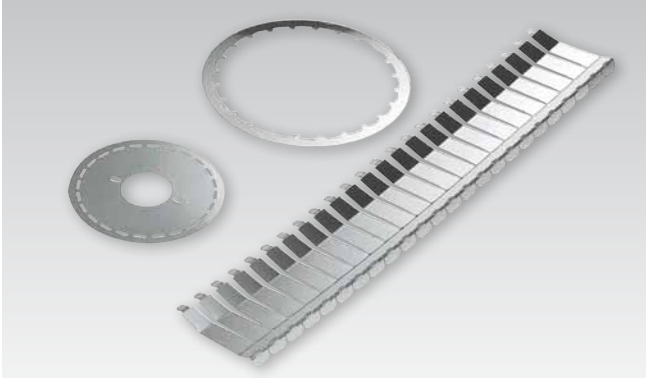
# Segmented reflectors

With **reflect+A** a new concept of reflector manufacture has been created allowing a combination of different materials to be used together in their optimum positions in the luminaire. Thus a **reflect+A** designed reflector typically combines 2 or 3 elements made with different surface qualities that reflect and distribute light in different ways.

Segmented reflectors do not require extreme deformation in shaping, thus maintaining the aluminium's characteristics unchanged.

- Segmented reflectors - main advantages** ▼ Flexibility to adjust modules to set different illumination patterns.
- ▼ Production processes and materials based on customer preferences for each particular lighting component.
- ▼ Modular construction "combo system".
- ▼ Ready-to-use and customised solution.
- ▼ Realisation of complex geometries with high performance surfaces as witnessed by the design and realisation of customised projects with Fortimo LLM, Bridgelux, Luminus, etc.

**WHY NEW**

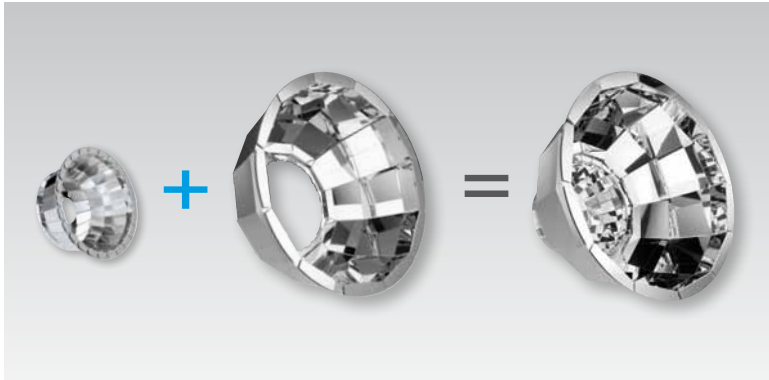


- ▼ Easy assembly
- ▼ Lighting components easier to ship as individual parts
- ▼ **No tooling investment**
- ▼ Cost savings

**PATENTED**

Reflector components

- ▼ **Enhanced efficiency with vega**
- ▼ Interchangeable modules
- ▼ Environmentally friendly



Combo system

# Almeco's core production facilities

With 3D CAD programmes, a full knowledge of the surface characteristics of Almeco's reflector **Reflector materials**, and Optis ray tracing reflector design software, the design team works with customers to **design team** define and refine the reflector shape.



Slitting line

Taking the CAD model of the reflector, the tooling department, **Tooling Department** equipped with a modern computerised machine shop, engineers and manufactures the deep-drawing and cutting punches and dies and the spinning mandrels or "forms" for the reflectors.

Almeco's lines are producing sheets from 150 to 1250 mm **Coil Anodizing slitting and blanking lines** wide and 150 to 4000 mm long, strip from 15 to 1250 mm wide and flat blanks and circles.



Blanking line

Symmetrical shapes from 80 mm up to 1,2 m diameter can **Spinning** be created on special lathes by the process of spinning, which forms a disc of metal onto a machined former at high rotational speed.



Press

With blanking and bending press technology, PVD coated **Precision blanking and bending vega** and pre-anodized aluminium reflector components can be prepared for subsequent assembly by Almeco or by customers.

Deep drawing is a cold forming process which uses a **Deep-drawing** powerful hydraulic press ( up to 250 tonnes) to bring together male and female press tools to deform the metal into the desired hollow shape.



Post-anodization

Once the mechanical processing is over, reflectors are **Bright anodizing** treated by immersion in electrolytic treatment baths by brightening and anodizing processes which make the aluminium more reflective and resistant to corrosion



Laser cutting

A 2D and 3D laser cutting facility allows us to minimise press **Laser cutting** tool investment for small to moderate production runs.

Accurate reflector curves with radii as small as 35 mm on **Roll forming** components up to 1.89 m long can be produced in our modern roll forming machine.

# History

For more than fifty years, the Almeco Group has devoted itself to treating and forming aluminium. This has led it to become one of the world's biggest producers of components for the lighting technology and solar energy industries.

**Evolution** In 1960 Mr. Visigalli and Mr. Fiorentini began a Company specializing in the **working of aluminium sheet metal and the production of reflectors**. Their foresight, intuition and expertise allowed the second generation to become market leaders.

**1965** – The Visigalli & Fiorentini Company incorporates bright anodizing capacity and forms **Citor** srl.

**1982** – **Sacall** Spa is created; a division dedicated to the continuous anodizing of aluminium strip for the lighting technology sector.

**1999** – From the merger between Citor and Sacall, **Almeco** Spa, led by the second generation, is born. Almeco takes full advantage of the pooling of common company operations and activities, consolidating production on a single site.



1965 Citor Srl is created



Coil anodizing



Robotised deep drawing

**2006** – Inauguration in Bernburg, Germany, of the new Almeco site dedicated to **vega** production with **PVD** technology in a continuous vacuum coating line. In the same year the **Engineering dept.** is opened to support customers from reflector design to prototyping, tooling and production with different Almeco finishes.

**2007** – Almeco acquires Satma, a Company specialized in the production of decorative aluminium finishes.

**2008** – Activities in the solar energy sector are augmented by the creation of Almeco-Tinox.

**2010** – Almeco celebrates **50 years of activity** and acquires the shares and assets of the service & processing centre for pretreated metal for the lighting industry located in Atlanta, Georgia with the formation of **Almeco USA**, Inc.



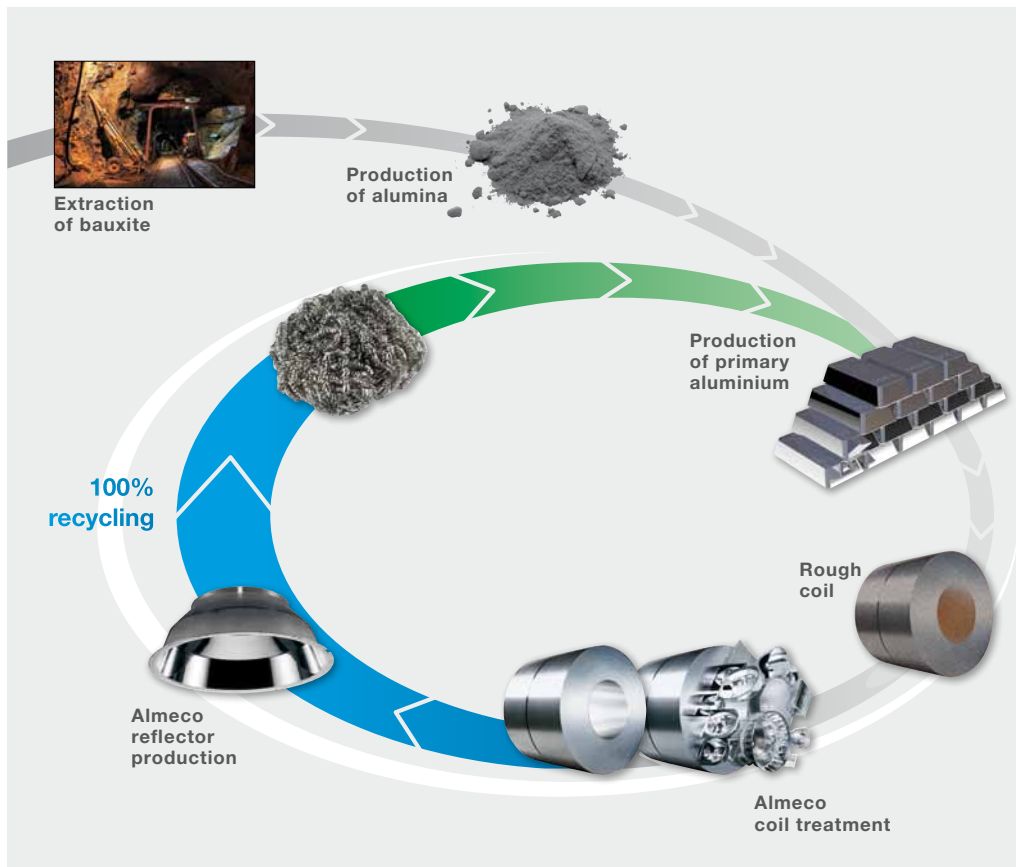
PVD plant



Laser cutting

**2011** – **reflect+A** is created for the engineering, production and commercialisation of a complete range of reflectors for the lighting sector, anticipating the market demand.

# Environment



The Almeco Group operates according to an ethical production system that integrates quality, security and environmental management that has received UNI EN ISO 9001-2008 accreditation.

Respect for the environment has always been a cornerstone of the Almeco Group's business values.

From May 2009 Almeco S.p.A has adopted an **Environmental Management System (EMS)** which conforms to the **UNI EN ISO 14001** international standard on environmental management systems.

To efficiently and effectively reduce the environmental impact of its production processes, the Almeco Group has started practices to achieve **IPPC - Integrated Preventive Pollution Control**.



Almeco is certified  
to ISO 14001



Almeco's Research & Development laboratories



- Warranty ▼ Unlimited maintenance for tools used in Almeco, without extra-costs.
- ▼ 25 years guarantee on pre-anodised, post-anodised and vega materials.



Milan, Italy - Bernburg, Germany  
Goncelin, France - Atlanta, USA - Shenzhen, China



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