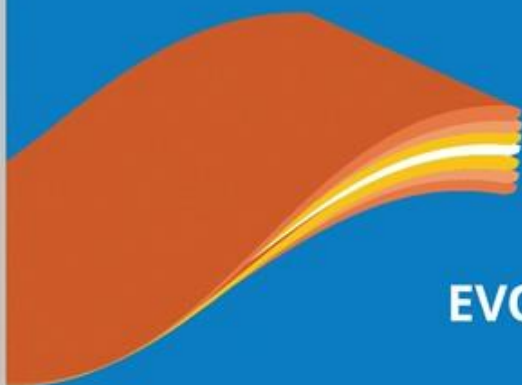


 **PLASTIKA KRITIS S.A.**



KRITIFIL® SPECIAL AGRICULTURAL FILMS



EVO® 7-layer films





Company Profile

Established in 1970, **PLASTIKA KRITIS** is today one of the leading international producers of agricultural films. It has a strong international orientation with plants in France, Romania, Poland, Russia, Turkey and China and exports to more than 60 countries around the world. The company was listed on the Athens Stock Exchange in 1999.

PLASTIKA KRITIS manufactures agricultural films since its start-up in 1970. Commitment to quality, technological innovation, cost competitiveness, flexibility and responsiveness to customers' requirements, have enabled the company to become one of the most well known agricultural film producers at international level.

PLASTIKA KRITIS' affiliate in China, **Shanghai HiTeC Plastics**, manufactures since 2003 greenhouse films, silage films, silage & grain bags, flexitank liners and geomembranes at a modern production facility in Shanghai, with an annual capacity of 30,000 MT.

In 2006 **PLASTIKA KRITIS** acquired two historic French producers of agricultural films and united them into a new company, **AGRIPOLYANE S.A.**, the leading manufacturer of greenhouse films in France.

An important milestone for the further development of the company is its 12 million Euro investment in the creation of a new production unit with **7-layer technology**. The new unit started up in 2015 and will be dedicated to the production of specialty products which are being developed by the company's R&D Department.

Apart from agricultural films, the company is the 7th largest European producer of masterbatches (raw materials for the plastics industry). It also manufactures geomembranes and polyethylene pipes.



Our competitive advantages

PLASTIKA KRITIS' success as a major international producer of agricultural films is based on unique and sustainable competitive advantages:

- Experience in agricultural films production since 1970.
- Modern, highly productive and fully automated equipment. It is designed by the company's Engineering Department based on its specific needs.
- Continuous and extensive R&D for new products that bring value to customers.
- Uncompromised quality of products.
- Vertical integration with in-house production of all additive concentrates that provide to the films their special properties, enhancing the company's competitiveness and ensuring the consistent quality of the products.
- Technological leadership in the field of multi-layer agricultural films, especially with its wide 7-layer line.
- A very wide product range for agricultural applications with capability to produce films in widths from 0,5 m to 20 m and thickness from 10 mic. to 2500 mic.
- Unique flexibility in tailoring the products to requirements of each customer and area of use.
- Production sites in Europe and China, ensuring security of supply, optimized transportation cost to the various areas of the world and cost competitiveness independently from currency movements or raw material price variations.
- Competitive cost of energy by wind-power.
- Strong financial structure.
- Economies of scale in production and raw materials sourcing.
- Distribution network in numerous countries around the world.
- Fast & flexible decision making.

Shanghai HITEC Plastics, China



Agripolyane, France



7-layer technology

PLASTIKA KRITIS is one of the first companies worldwide that have invested in 7-layer technology for wide agricultural films, having foreseen the advantages that this technology can provide for the development and production of specialized films.

The new line started up in 2015 and manufactures agricultural films at widths up to 20 m, as well as geomembranes and special liners for buildings insulation.

Very remarkable is the perfect thickness uniformity of the films as well as the possibility to fold and wind the products in different configurations, depending on the requirements of each application.

The line is equipped with entirely new systems that permit the production of innovative products, such as greenhouse films with permanent anti-drip & anti-mist and films impermeable to gases for various applications.





Plant & Equipment

The company's manufacturing facility in Iraklion-Crete is among the most modern worldwide in its field.

Production equipment is of the latest technology, with a very high degree of automation, on-line computer monitoring and control. Many of these systems have been developed in-house by the company's Engineering Department. Computerised logistic systems have been established to facilitate handling of raw materials and finished products.

The production system is highly flexible, permitting to manufacture economically even small lots of a variety of products in order to satisfy specific customer demands.

All production lines have been designed to process metallocenes, the latest generation of ultra-strong polyethylene resins, that provide to the films unsurpassed mechanical properties. They are equipped with gravimetric feeders directly linked to the computerized control system of the line and special systems that measure the thickness of the film in thousands of points around its circumference causing the necessary adjustments to correct it. These systems yield films with excellent thickness uniformity, and no weak points that could lead to an easy tear during their utilization.

Each line has different folding systems and fully automated winders capable of producing jumbo rolls as well as pre-cut rolls, on-line, according to customer requirements.



Quality Assurance

PLASTIKA KRITIS operates on the basis of Total Quality Management principles. All production units are certified according to **ISO 9001** Quality Assurance System which covers all the company's activities from product conception to after-sales service.

Research and Development

Research and development is of prime importance for creating innovative products that bring "value" to customers.

The company's laboratory is equipped with a variety of sophisticated instruments, including testing equipment for all mechanical properties, FTIR, UV, VIS, NIR & AA spectrophotometers, HPLC, DSC, Xenotest and QUV artificial ageing apparatus, anti-drip testing chambers, testing instruments for raw materials and a 7-layer laboratory blown-film line.

Actual field experiments to test the properties of new films and their effects on various crops are conducted in its own agricultural research station in Crete. Several projects are also carried jointly with universities and well-known suppliers of polymers and additives.



PLASTIKA KRITIS' Agronomic Research Station





Vertical integration

PLASTIKA KRITIS is the only agricultural films producer who manufactures in-house all additive concentrates (UV, IR, anti-drip, anti-fog, etc.) that provide to the films their special properties. This offers to **PLASTIKA KRITIS** a unique flexibility in producing, at lower cost, a wide range of films adapted to the specific requirements of each area or crop. In-house production of these concentrates ensures the optimum selection of additives as well as the control of quality from A to Z, providing to the company a unique ability to combine competitive cost with outstanding quality.



Green Energy

PLASTIKA KRITIS owns and operates a 12 MW wind farm in Crete that produces approx. 40.000.000 KWH of green energy per year.

The company also owns and operates 4 photovoltaic stations with a capacity of 340 KW.

Apart from demonstrating the company's environmental consciousness, these projects contribute to reducing the island's cost of electricity as well as its dependence on oil. At the same time, it is a profitable investment for **PLASTIKA KRITIS** and a hedging towards any future increase of energy cost.



Care for the environment

Many of **PLASTIKA KRITIS'** activities contribute to protection of the environment and prove the company's social sensitivity and its awareness that industry has responsibility towards society:

- The modern **plastics recycling** plant that the company operates and the collection mechanism it has created in Greece for used greenhouse films.
- The use of recycled materials in certain of its products.
- The **green energy** it produces with its Wind Farm and Photovoltaic Stations.
- Its **geomembrane** products for environmental and water management projects.





Products & Applications

PLASTIKA KRITIS manufactures specialised multi-layer films for a variety of agricultural applications, including:

- Greenhouses
- Low-tunnels
- Mulching
- Soil-disinfection
- Energy-screening
- Silage
- Silage and grain bags
- Farm and animal buildings
- Pond-lining

KRITIFIL® multi-layer films are manufactured at widths up to 20 m and at thickness down to 10 mic. A wide range of specialised films is available for every application, aiming at offering better crop protection and higher farm revenue.

PLASTIKA KRITIS has the knowledge to tailor the films to the particular requirements of every area and crop.



Greenhouse films

KRITIFIL® greenhouse films combine **long life time**, **superior strength** and high **light transmission** with other, optional, characteristics that transform the film to an active contributor to plant protection, growth and productivity.

Such useful features are:

- **The thermic effect**
- **The light diffusion**
- **The anti-drip effect**
- **The anti-mist effect**
- **The cooling effect**
- **The disease control effect**
- **The photosensitive effects**

PLASTIKA KRITIS has a unique flexibility in combining the above effects according to the climate of an area, the kinds of crop grown, the type of greenhouse and other specific factors, to form tailor-made films that are best suited to each customer's requirements. In addition, the minimum lot size per product for each dimension (thickness/width) in order to produce a tailor-made film is the smallest among large international agri-film producers, making it possible for our customers to minimize stock keeping and reduce their operating cost.





New greenhouse films with 7-layer technology

7-layer technology has opened up to **PLASTIKA KRITIS** the possibility to develop greenhouse films with totally new characteristics that make a real difference.



EVO AC films with very long-lasting anti-drip & anti-mist

Combining **7-layer technology** with a new system for avoiding the formation of droplets on the surface of a greenhouse film and at the same time preventing the mist which is sometimes formed in greenhouses covered with anti-dripping films, **PLASTIKA KRITIS** has developed **EVO AC**, a range of films with very long-lasting anti-drip and anti-mist activity!

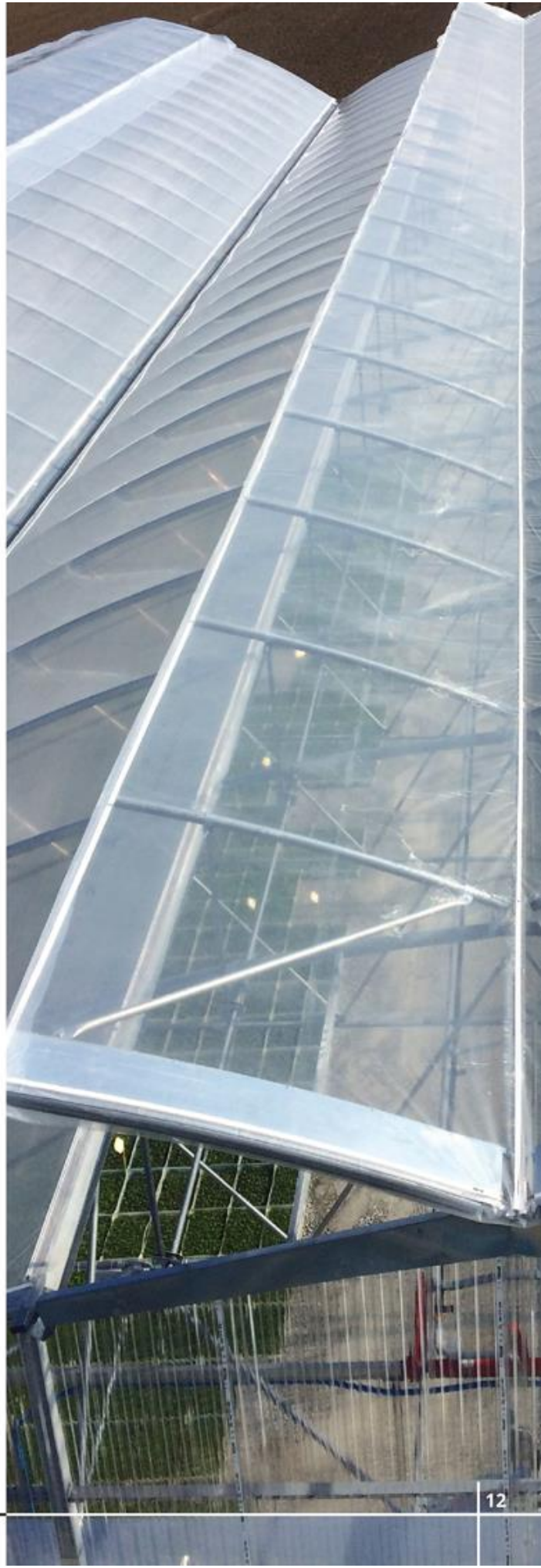
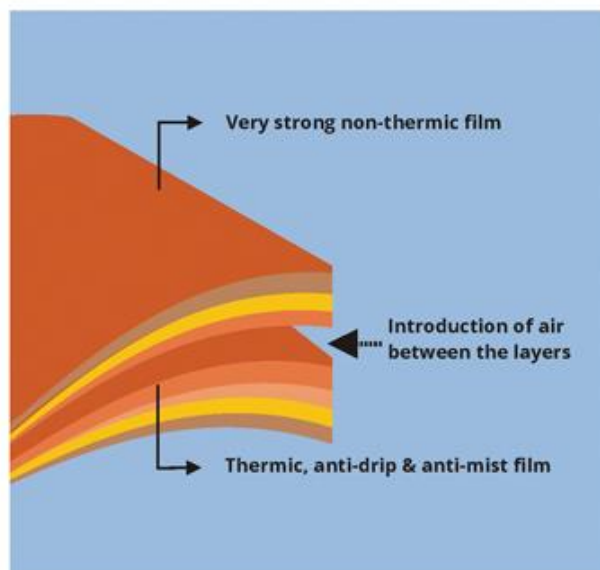
Unlike traditional anti-dripping films, where the gradual migration of additives from the mass of the film results into the loss of the anti-drip property within 1,5-2 years, the additives of **EVO AC** films don't migrate, and remain active for a much longer period.



EVO² delaminatable films for double inflated greenhouses

EVO² delaminatable films are 7-layer films which are separated into 2 films by introduction of air between the layers, after the film has been placed and securely fastened on the roof of the greenhouse. This new method permits a serious gain of installation time and cost, while being safer for the installation crew. It also makes it possible to cover a double inflated greenhouse even in days with a certain level of wind.

The product and the principle of delamination of a single film to form 2 films for covering double inflated greenhouses has been developed and patented by **PLASTIKA KRITIS**.



Lifetime

The lifetime of a film depends on the quality and technical characteristics of the film and on the conditions of use (area, greenhouse type, installation, use of agrochemicals).

PLASTIKA KRITIS' range of greenhouse films includes products with a lifetime of up to 5 seasons, containing special combinations of UV-stabilisers and antioxidants that protect them from the harmful effect of UV light and heat for very long periods. All additive concentrates are manufactured in-house, to ensure absolute consistency in quality. UV-stabilizer formulations are based on the company's 45 years of experience and know-how in this field, that's why **KRITIFIL®** greenhouse films are known to always last longer than they are prescribed for.

Superior strength

PLASTIKA KRITIS' experience and careful selection of raw materials, processing conditions and quality control procedures provide to the films excellent mechanical strength.

A new generation of super-tough films has been introduced by **PLASTIKA KRITIS** using special high-strength polymers. These films offer additional safety in areas with very strong winds, or significant economy as they can be produced at a lower thickness than regular films while maintaining the same or still higher strength.



Light transmission

High light transmission is absolutely essential to plant growth. Experience in production, quality of equipment and selection of materials, ensure that **PLASTIKA KRITIS'** films have the maximum light transmission.

For areas with serious dust problem or carbon particles from industrial pollution in the air, **PLASTIKA KRITIS** avails films with **anti-dust** properties.

Light diffusion

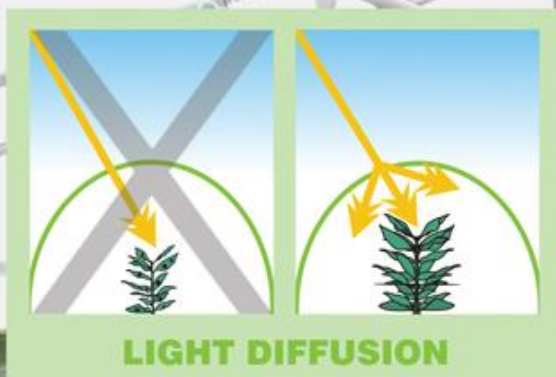
Light from the sun passing through a greenhouse film and entering a greenhouse is split into direct and diffused. Light diffusion causes a film to look hazy to the human eye; this doesn't mean, however, that the film is less transparent. The PAR (photosynthetic active radiation) received by plants is practically the same.

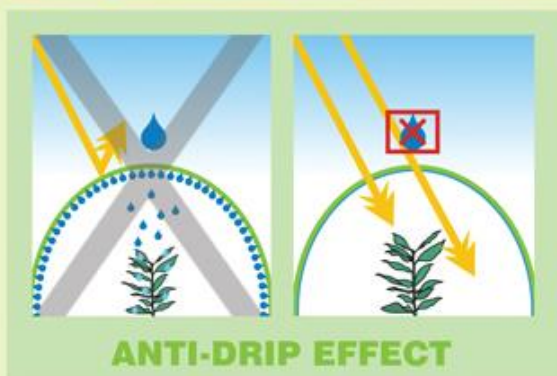
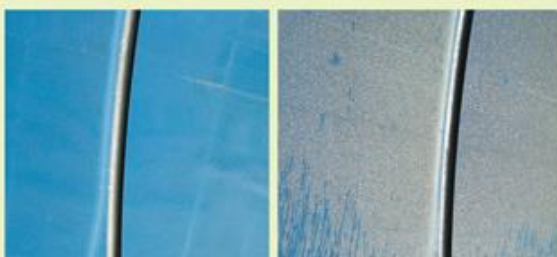
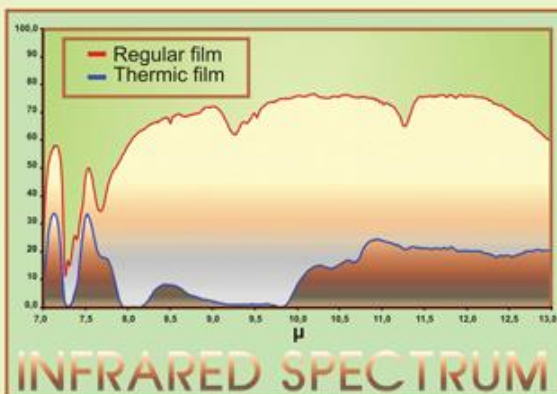
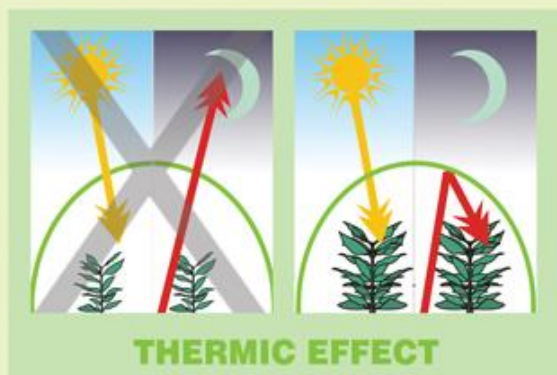
It is now generally accepted that diffused light has a positive effect on plant growth, especially for spring and summer crops and in areas with strong sunlight. Light diffusion reduces shadows, ensures more uniform distribution of light in the greenhouse so that it reaches even the lower parts of the plants, prevents burnings and offers a moderate cooling effect.

PLASTIKA KRITIS has the know-how and produces films with different levels of diffusion, according to the specific requirements of each area and crop:

- Crystal clear films (maximum direct light)
- Films with medium diffusion (35-50%)
- Films with very high diffusion (60-75%)

The choice of the most appropriate level of diffusion depends on the climate of the area, the crop and the season(s) of growing. **PLASTIKA KRITIS'** experts are at the disposal of our customers to consult on the most suitable level for every particular case.





Important note: Anti-dripping films are mainly recommended for well ventilated and/or heated greenhouses, with adequate inclination of the roof. The "anti-dripping" effect lasts for up to 2 years, as the additives function by migrating to the surface of the film and are slowly washed out by water. Under certain circumstances there is mist (fog) formation in greenhouses covered with anti-dripping films. Such mist usually occurs at sun-set and dawn and is undesirable as it could cause damages to the plants. It is strongly advisable to ventilate and/or heat the greenhouse immediately, to remove this mist. Due to the complex mechanism of its activity and to the variety of parameters affecting its function, PLASTIKA KRITIS does not provide a warranty nor assumes any liability on the effectiveness and duration of the anti-dripping effect.

Thermic effect

PLASTIKA KRITIS offers special thermic films, containing a combination of EVA and Infra-Red additives skilfully structured in the layers of the films, which absorb the Infra-Red radiation and reduce heat losses during the night.

The advantages of thermic films are:

- Protection from frost and low temperature
- Smoother temperature drop and higher night temperatures overall
- Reduced energy consumption for heating
- Higher crop yield
- Earlier harvesting
- Better quality of crops

Anti-drip effect

Droplets formed at the inside surface of greenhouse films due to water-condensation have negative consequences on plant quality and growth, as they reduce light-transmission by 15-30% and increase the incidence of certain diseases.

PLASTIKA KRITIS is manufacturing "anti-dripping" films that contain special additives which eliminate droplets and form instead a continuous thin layer of water running down the sides.

Anti-dripping films, when used properly, offer the following benefits:

- More light in the greenhouse
- Higher crop yield
- Earlier harvesting
- Better quality of crop, higher commercial value
- Fewer diseases
- Reduced need for pesticides

Anti-mist effect

To allow the use of anti-dripping films, with all their benefits, without fear of the mist that is sometimes formed during sun-set and dawn in greenhouses covered with such films, **PLASTIKA KRITIS** has developed anti-dripping films with a special anti-mist function that reduces or prevents the formation of mist.

Note: Due to the complex mechanism of its activity and to the variety of parameters affecting its performance, **PLASTIKA KRITIS** does not provide a warranty nor assumes any liability on the effectiveness and duration of the anti-mist effect.

Cooling effect

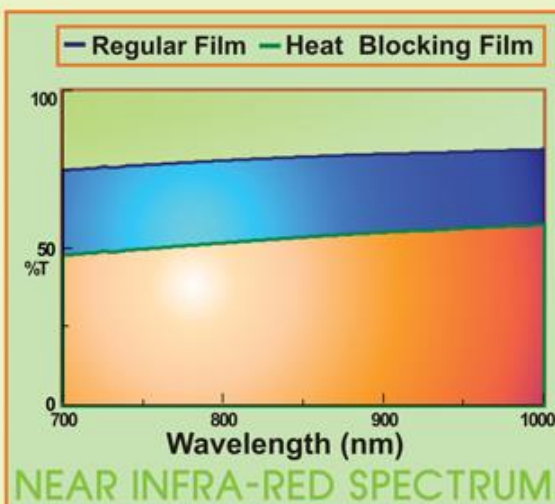
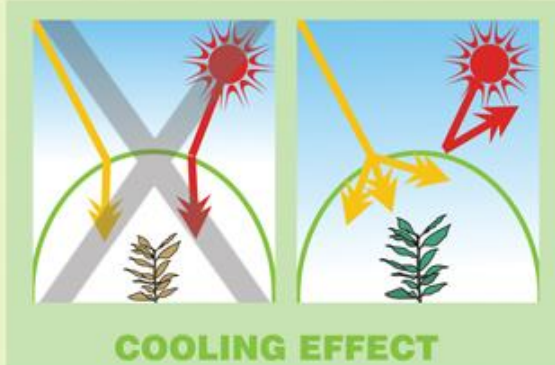
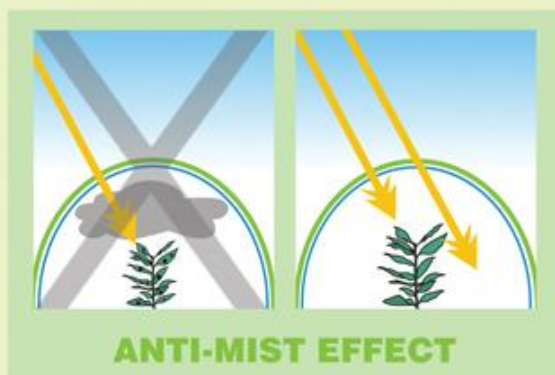
In many areas of the world there is growing requirement for films that cut-down excessive heat during day-time and maintain a cooler environment in the greenhouse. Particularly in the "tropics", in areas with strong sunlight and hot weather as well as in nurseries and for shadow-loving ornamental plants, the "cooling effect" is becoming more and more a requirement.

PLASTIKA KRITIS offers special types of films, which reflect and/or absorb the Near Infra-Red (NIR) Radiation, the part of solar spectrum carrying most of the heat entering a greenhouse in day-time and which is otherwise useless for plants growth, thus reducing the heat inside the greenhouse during the day. It has been demonstrated that the higher the outside temperature, the larger is the temperature difference achieved by use of "cooling" films.

PLASTIKA KRITIS' range of "cooling" films includes:

- High diffusion films
- **PLASTIKA KRITIS'** special double-effect "silver" film (cooling during day, more thermic during night)
- "Selective interference" films

Note: after cold winter nights, temperature rise in the morning may be a little slower under "cooling" films than under conventional PE films





Disease control effect

PLASTIKA KRITIS has developed a range of special disease control films, which contribute efficiently in "Integrated Pest Management" and help to reduce the usage of pesticides.

An important type of disease and insects control films is "UV-blocking" films, which absorb UV-radiation up to 380 nm, thus achieving:

- Reduction of the population of whiteflies, thrips, miners, aphids and other insects in greenhouses, thereby also reducing the viruses which are vectored by these insects.
- Control of the spread of certain diseases (such as botrytis), by reducing the sporulation of the relevant pathogenic fungi.
- Reduction of "blackening" of red rose petals, thereby increasing their commercial value.

***Note:** "UV-blocking" films should be used after prior testing when bumble-bees are used as pollinators or when growing eggplants or other purple flowers or crops. A number of other parameters, such as temperature and humidity, enhance the development of diseases. The plastic film alone may not control diseases, it can, however, contribute to their control, when used in conjunction with other suitable methods.*

Photoselective effect

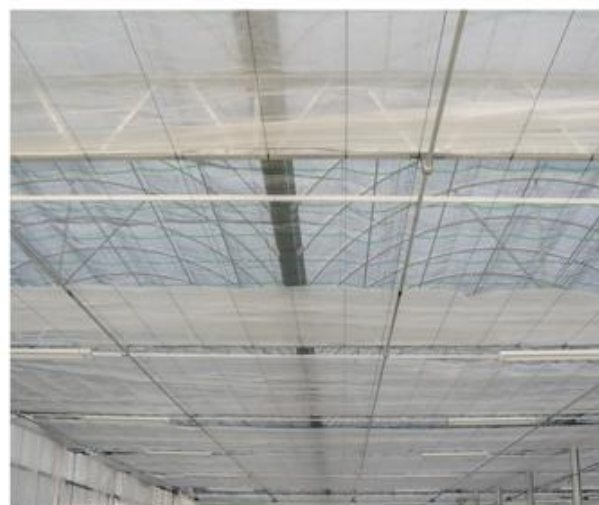
PLASTIKA KRITIS offers a range of special films incorporating selected additives and pigments to modify the light spectrum entering the greenhouse, thus changing the growth behavior of plants (photosynthesis and photomorphogenesis). By using such films it is possible to increase the yield, to promote or retard the growth and to cause elongation or dwarfing of the stems.



Energy Screens

Special 30-60 mic. films used as internal screens in greenhouses and glasshouses to limit losses of heat during night and reduce heating costs.

The films can be thermic with EVA resin or non-thermic. They have very high transparency and can be produced upon request with anti-dripping effect. It is also possible to have the films with holes, to allow ventilation and prevent the creation of a high humidity environment, especially when the films are placed horizontally.





Soil disinfection films

For soil disinfection with chemical products, as well as for solarisation, **PLASTIKA KRITIS** proposes the following alternative solutions:

- **KRITIFIL® TIF**, a 30 mic. totally impermeable 7-layer film with EVOH, certified for use with a broad array of chemical fumigants (1,3-D, chloropicrin, MITC, DMDS).
- **ORGASUN®**, a 32 mic. Virtually Impermeable Film (VIF), which greatly reduces losses of chemical fumigants during soil fumigation. Its permeability to gases is 100-200 times lower than of a regular PE film of the same thickness. Practical experience in numerous countries since 1994 as well as official laboratory and field experiments have shown that, by using **ORGASUN®**, it is possible to reduce by 50% the dosage of chemicals relative to the dosage used when fumigating with regular PE film, with the same results, making fumigation safer and more economic. In sunny areas it has been shown that **ORGASUN®** can reduce the time needed for an effective solarisation from 6-8 weeks to 4-5 weeks! This is because the biogases formed during solarisation are trapped in the soil and help "suffocate" the remaining pathogens. **ORGASUN®** is the ideal choice in case of combining solarisation and chemical fumigation.
- **Regular LLDPE film** (usually 25-35 mic.) for fumigation and solarisation. In most of the cases the film is UV-stabilized for a duration of 2 months. In the case of solarisation the film may contain anti-dripping additives which prevent formation of droplets on its surface and increase the transmission of heat into the soil.

Upon request solarisation films can be provided with higher UV-stabilization so that they are maintained as mulching films after the period of solarisation.



Mulching films

Mulching films are used to prevent weed growth, to increase temperature of the soil, to prevent irrigation water from evaporating and to stabilise the soil. Special mulching films can provide additional benefits such as protection from insects and enhancement of growth.

PLASTIKA KRITIS' range of mulching films includes:

- **Very strong thin films** (15-25 mic.), made of selected LLDPE or metallocene resins, transparent, black or "fumed".
- **Long-life black films** (50-100 mic.), containing very fine particle size carbon-black and special antioxidants, for multi-season mulching of strawberries, vineyards etc.
- **Special effect films** (usually 20-30 mic.), made of selected LLDPE resins and containing functional pigments and additives:
 - **Brown film:** allows the heat to pass and warm-up the soil during daytime, reduces heat losses during night, has adequate opacity to prevent weed growth.
 - **Yellow film:** attracts certain insects (such as the whitefly) on its surface and prevents them from damaging the plants.
 - **Yellow/Brown co-extruded film:** combines the benefits of yellow and brown films.
 - **Green translucent film:** offers adequate weed control and at the same time permits heating up of the soil.
 - **Black/White film:** ensures perfect weed control while reflectance by the white side increases the useful light received by plants.
 - **Silver/Black film:** prevents weed growth, while reflection by the silver repels insects and protects the plants from viruses.
- **Biodegradable films** (12-14 mic.), made of proven biodegradable materials which are gradually but totally decomposed after use. A solution to the serious environmental problem caused by mulching films that remain in the soil.
- **Reflection films** (35-70 mic.): highly reflective Black/White or White films that are laid on the soil of greenhouses or glasshouses with the purpose of reflecting the sun and increasing light during winter months. These films are widely used in hydroponic cultivations.

PLASTIKA KRITIS can offer mulching films with macro-perforation to allow easier, faster and more economic planting after laying of the film. It is also possible the film to be micro-perforated.





Low tunnel films

Low-tunnel films are used to cover crops such as melons, watermelons, strawberries etc. for a relatively short period.

PLASTIKA KRITIS' range of low-tunnel films includes:

- **Very strong LLDPE films** (15-25 mic.), which should be preferred for relatively late crops when it is not necessary to maintain the heat in the tunnel during night.
- **Special thermic films** (30-80 mic.) for 1 or 2 seasons use, which ensure a smoother fall of temperature during night and result in higher night temperatures by 2-4°C relative to common PE films. They should be preferred for early crops to protect them from frost and obtain earlier harvest and improved yields.
- **"Cooling" films** (20-50 mic.), which reflect the NIR radiation and prevent overheating of the tunnel, resulting in better plant growth and higher quality of crops in spring/summer cultivations.
- **Perforated films** with 2 bands of holes that allow ventilation of the plants from the sides and less condensation of droplets, allowing more light to reach the plants.



Pond lining

PLASTIKA KRITIS manufactures strong and flexible polyethylene and polypropylene films for pond lining in agriculture and gardening. These liners are, usually, 0,3-0,5 mm thick and can be produced at large widths (up to 13 m at 0,3 mm and up to 10 m at 0,5 mm). They are fully recyclable, environment friendly, aquatic safe and offer a reliable and inexpensive solution for water storage or decoration purposes.

Our pond liners can be supplied in various forms:

- In jumbo-rolls of up to 1.000 kgs.
- In rolls of predetermined length.
- In pre-welded pieces of up to 2.000 m², ready-to-install in a pond.

They are made in black color or in color combinations (e.g. blue/black) and have a lifetime of 5-10 years depending on thickness and area of use.



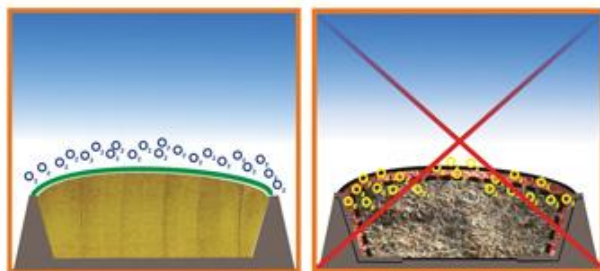


Silage films

PLASTIKA KRITIS has become a synonym for quality and innovation in silage films. The company has developed new solutions that offer more safety, better preservation of the forage and higher profit to the farmer.

SilO₂Block®

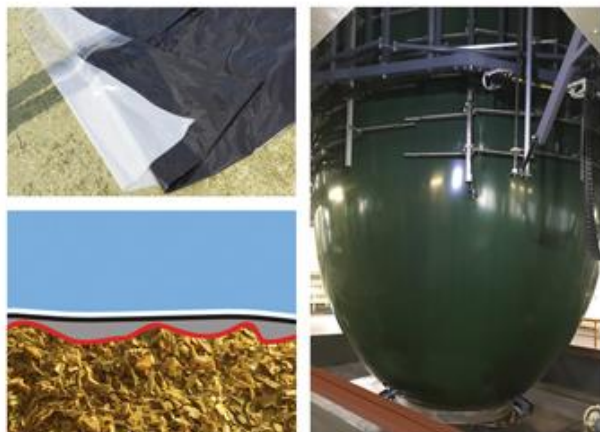
Our newest development is **SilO₂Block**, a 7-layer barrier film which limits oxygen permeation by more than 10 times relative to a standard silage film. It ensures a better fermentation and helps reduce spoilage, thus improving significantly the quality of the stored product. **SilO₂Block** is just **90 mic.**, nevertheless, it is stronger than a standard 150 mic. film. It is lighter, very flexible, easy to install and fully recyclable.



Combi-Silo®

A strong 115 mic. silage film wound together on the same roll with a 35 mic. flexible underlay!

Combi-Silo® allows for faster, easier and safer covering of the silo.



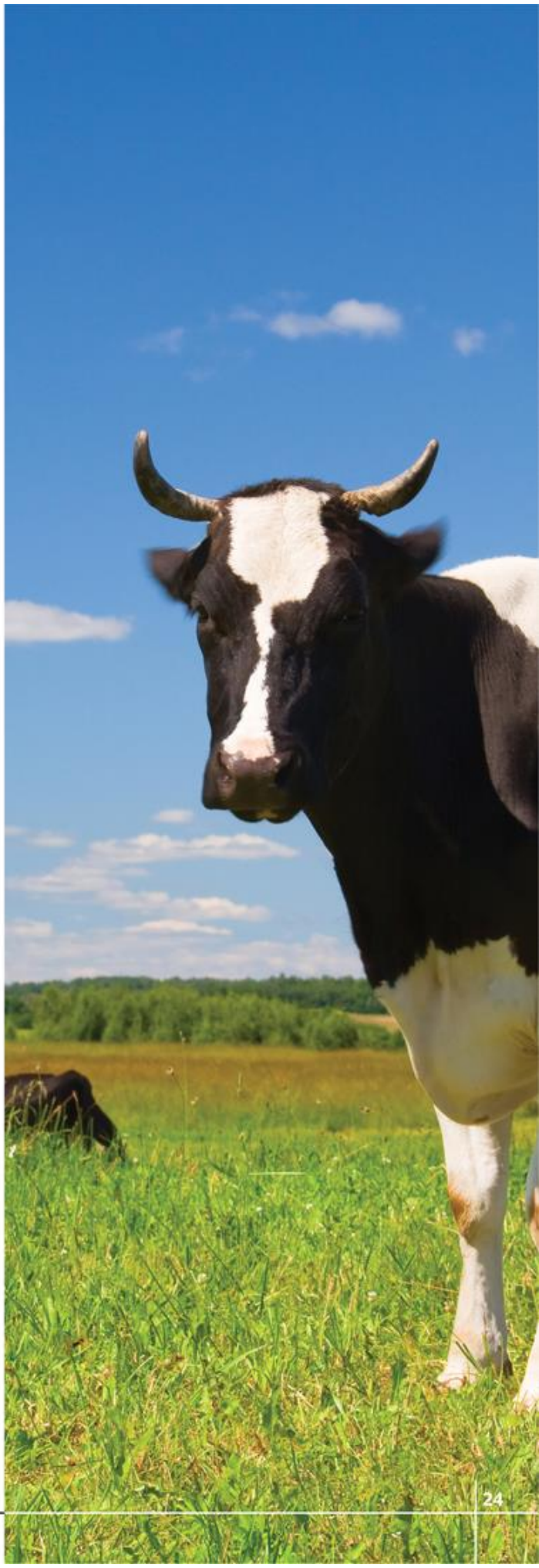
Metallocene silage films

Very strong multi-layer 110-120 mic. silage films, made with metallocene polyethylene resins. They offer more safety and are easier to handle and to dispose for recycling.

Standard silage films

PLASTIKA KRITIS also manufactures standard silage films with a thickness of 125-200 mic.

Silage films can be offered with different colors, black/white, black/green and white/green being the most popular. They are UV-stabilized for 1 year or more and can be produced at widths up to 20 m.



HITEC-BAG for silage & grain storage

Silage bags offer an easy, safe and economic way for temporary storage of maize, grass, grain and other products, allowing for optimal fermentation conditions and preservation of their nutrient value due to the tightness and lack of air inside them, even when the stored product contains up to a certain level of humidity. **PLASTIKA KRITIS** can offer along with the bags the whole technology and machinery needed for filling the bags.

The HITEC BAG is made with a unique combination of advanced polyolefins, offering strength, softness, UV-resistance and low creep. The outer layers are white, in order to reflect the sun radiation and prevent overheating of the stored product, while the inner layer is black to provide complete opacity and keep the contents in a cool and dark environment. The bag is guaranteed against UV degradation for 18-24 months, depending on the country of usage. HITEC BAGS are 100% recyclable.

HITEC BAGS are manufactured in a variety of sizes, from 5.2' to 14' in diameter and from 15 m to 150 m (50' to 500') in length. The thickness of the film varies according to the diameter and the application. HITEC BAGS come folded in a way that ensures easy and quick mounting on the bagging equipment and packed in boxes that offer excellent protection during transport and handling. Every box includes tying rope, ruler for measuring the stretch and repair tape.



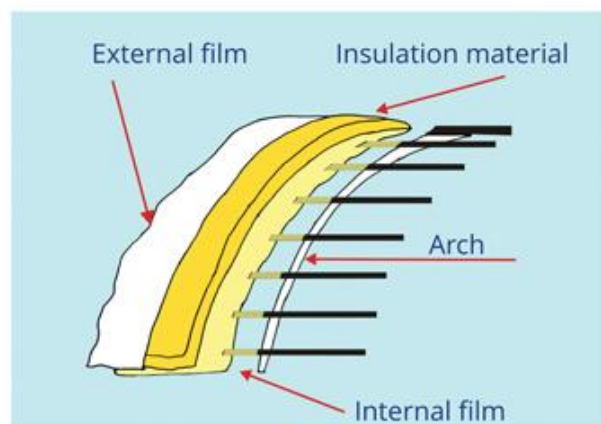
Films for animal buildings

Polyethylene films offer an efficient and inexpensive solution for covering farm buildings & animal shelters.

A typical animal shelter is composed of 3 materials: an external animal shelter film (200-250 mic.), an insulation material, and a thinner film (150 mic.) inside as a support of the insulation material.

PLASTIKA KRITIS offers for this application a range of wide 3-layer co-extruded films at a thickness of 200-250 mic., UV-stabilized for 3-5 years depending on product type and area of use. Most usual colors are Black/White and White/Green.

Recently, a new product has been added in this range: a 450 mic. flexible film, that ensures very high strength, elasticity and long lifetime (up to 10 years).





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