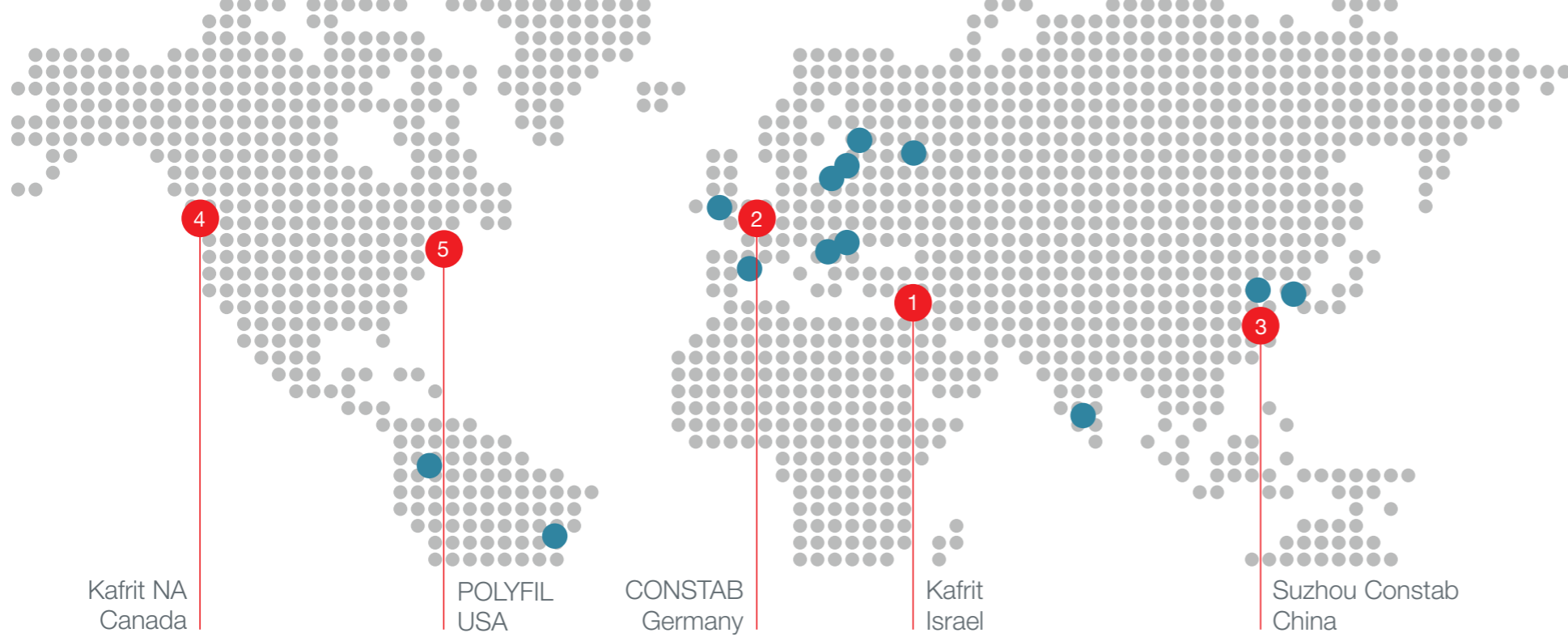


Polycarbonate and PMMA Sheets

for a transparent view with
Kafrit Masterbatches and Compounds



Giving Life to **Plastic**



● Kafrit production sites
● Agencies/Distribution

Defining new production goals: Experience the new high performance products.

Kafrit Group is a leading producer of Masterbatches and Compounds for the plastics industry and currently employs more than 400 people. In 2017, the Group achieved 216 million \$ turnover with an available capacity of more than 82,000 MT. Moreover, the company is active on a global scale and has set up production sites all over the world. All of this began in 1973 when the company was founded in Israel. Since then, the company has grown primarily via acquisition.

Today, the Kafrit Group incorporates **Kafrit Industries (1993) Ltd. in Israel, CONSTAB Polyolefin Additives GmbH in Germany, China's Suzhou Constab Engineering Plastics Co. LTD, Polyfil Inc. in the USA and the Canada-based Kafrit NA Ltd.** With nearly 50 years of experience in the plastics processing industry, the company can draw on high levels of expertise and technical know-how. Kafrit Group places a high value on sustainability and has made it to one of the cornerstones of our corporate strategy. Our unbridled dedication to environmental, social and financial issues makes us to one of the leading business partners in the plastics industry. Our customers value our passion and appreciate our ecological awareness and social commitment. Moreover, they recognize our world leading services and consider our products as among the best within our industry.

We develop and produce cost-efficient solutions which will enhance the completion of high-quality end products in many areas of the plastics industry, such as packaging films (BOPP, BOPE, CPP, PE), PC sheet, agricultural films and derivatives, biopolymers, flame retardant applications, PEX, pipes, fibers and nonwovens. Along with many other products, the Kafrit Group supplies the following Masterbatches and Compounds:

- Acid Scavenger
- Antiblock
- Antidust
- Antifog
- Antiglare
- Antimicrobial Agent
- Antimist
- Antioxidant
- Antislip
- Antistatic
- Barrier MB
- Cavitating Agent
- Color Concentrate
- Ecocell®
- Flame Retardant
- Filler
- Foaming Agent
- IR Absorber
- Light Stabilizer
- Lubricant
- Matting Agent
- Metal Deactivator
- Modifier
- Nucleating Agent
- Optical Brightener
- Paper-like Compound
- Peel Compound
- Processing Aid
- Purge Agent
- Release Agent
- Slip-Antiblock
- Slip-Antistatic
- Slip Agent
- Tracer MB
- UV Absorber
- UV Blocker
- White Masterbatch
- White Cavitated

Research that takes us to the top

Throughout our company history, research and development have always been a key area of our expertise. Kafrit employs a staff of more than 400 people that work on innovative products and make use of our vast pool of knowledge that we developed in nearly 50 years of experience in the plastics industry. Our experts optimize and develop additive concentrates, flame retardants, color concentrates, and compounds for various applications. Kafrit enjoys a close partnership with renowned research institutions at the Shenkar University in Israel and at different universities in Germany. Moreover, we maintain a strong cooperation with well-known suppliers including machine manufacturers that do recommend our products for use in combination with their machines.

Our vision:
We aim to be the preferred technological partner of the plastics industry by continually supplying our global customers with innovative and high quality solutions that are fitted to their specific needs.

Polycarbonate

Kafrit UV compounds are designed and tailored according to the customer's specifications and Kafrit's vast experience in this field. All Kafrit solutions are colored with a bluish tint to hide the UVA yellow shade, and contain optical-brightener to enable layer identification by the sheet producer. Kafrit is offering unique coloring abilities to meet customer demands.

The compound flow properties are a key factor in uniform and stable layer distribution across the sheet's width. The Cap Layer flow is determined by the PC resin type, lubrication system level and, most importantly, the UV absorbers types and level.

Kafrit solutions offer an optimized MVI based on years of experience. Our know-how allows us to offer a variety of MVIs according to the final application and production process. We use different types of UVA compounds and Masterbatches to insure optimal UV protection, process optimization and the best value each and every customer needs for their products.

The UVA types differ in their chemistry, price and plate out level. Kafrit recently developed a new line of products that significantly improves performance in terms of plate out. Our new improved technology allows sheet producers to increase significantly the working interval between cleaning, therefore adding significant value to production efficiencies.

1. UV Cap Layer

Most PC sheets are protected by a thin co-extruded layer (Cap Layer). This layer is based on PC resin, enriched with a high level of UV absorbers. The recommended layer thickness is taking into consideration the layer erosion over the service life and the UV additive optical density, so no harmful UV light will penetrate the Cap Layer to the unprotected Polycarbonate.

Code	Recommended layer thickness	Duration	Geographical area	Remarks
UVA 60J780 PC Bluish	50 µm	10 Years	Europe or Moderate Climate	
UVA 60702 PC Bluish	35 µm	10 Years	Europe or Moderate Climate	
UVA 60K18 PC Bluish	50 µm	10 Years	South East Asia	
UVA 60K20 PC Bluish	50 µm	15 Years	Europe or Moderate Climate	
UVA 60K20 PC Bluish	50 µm	10 Years	Australia, Dubai, Arizona or Severe Climate	
UVA 60K25 PC Bluish	50 µm	10 Years	Europe or Moderate Climate	Improved plate out performance
UVA 60K28 PC Bluish	50 µm	15 Years	Australia, Dubai, Arizona or Severe Climate	Improved plate out performance
UVA 60K28 PC Bluish	50 µm	20 Years	Europe or Moderate Climate	Improved plate out performance

2. Anti-Glare

The purpose of this product group is to eliminate the sheets' glossy surface appearance. As this is a surface phenomena, the AG products are always combined with UVA and applied to the sheets in the same manner as the UV cap layers.

The effect obtained can also be referred to as a "matt-effect". The AG products are based on cross-linked polymeric spheres (similar to the light diffuser additives) that create a kind of micro-structure on the surface and, as such, interfere with the glossy appearance. The AG products contain different types of polymeric spheres, with different diameters. Both parameters are very important factors in the AG's performance, appearance and processability. It is recommended to apply the AG compounds at a layer thickness of 40-50 µm to get the best effect.

Code	Surface effect	Max processing temp	Duration at Moderate Climate, 50 µm layer	Color
UVA 69600 PC Blue and Diffuser	fine	300°	15 Years	Milky/Haze
UVA 6C670 PC Blue and Diffuser	fine	300°	10 Years	Milky/Haze
UVA 60C23 PC Antiglare and Bluish	fine	270°	10 Years	Matt Effect
UVA 60F66 PC Antiglare and Bluish	rough	270°	10 Years	Matt Effect

3. Anti-Scratch

Code	Surface effect	Max processing temp	Duration at Moderate Climate, 50 µm layer	Color
UVA 60J71 PC UV Anti-Scratch NEW!	rough	300°	20 Years	Matt Effect

"Kafrit is very flexible regarding changes in delivery times. We appreciate the great reliability."

4. Heat Management

In today's world energy savings are essential and play an important role in designing the world's future. The major global trends such as climate changes, mobility, growing population and increasing urbanization require by better solutions to insure: zero emissions, low energy building, efficient and lightweight transportation, better housing structure and system and more efficient public infrastructure.

More than 50% of the light is invisible and translates into heat (NIR). This heat is accumulated under covered spaces and requires energy in order to control the temperature under such structures.

Kafrit NIR PC Masterbatches are designed to insure that NIR is reflected and therefore allows architects and other users to insure that covered spaces are efficient and cost effective. With our versatile portfolio while using unique proprietary we offer a wide range of optimized solutions to answer tomorrow's demand.

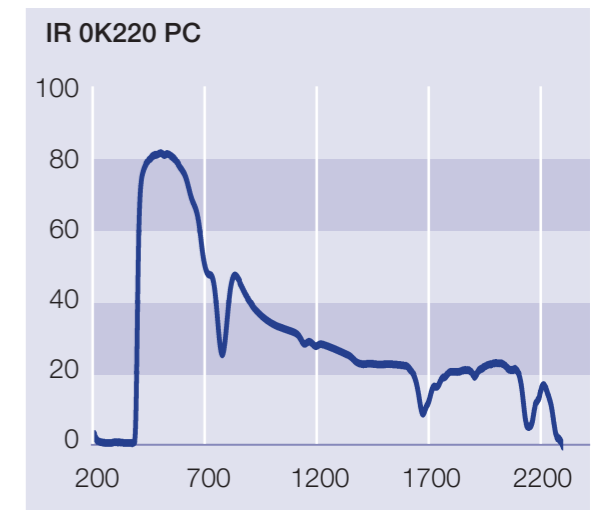
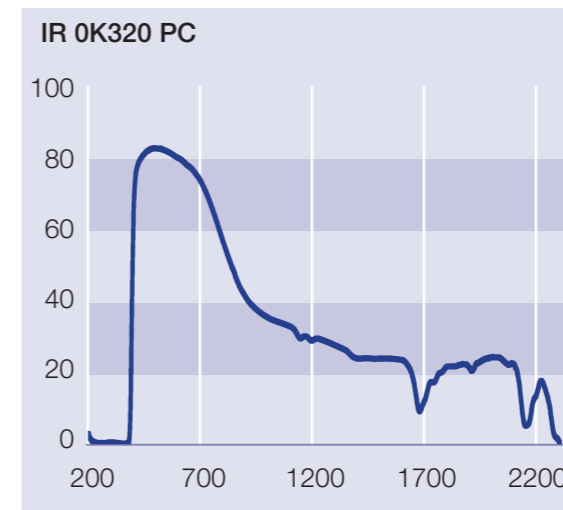
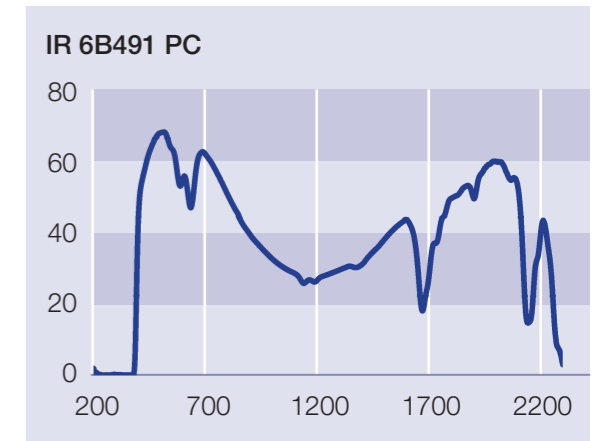
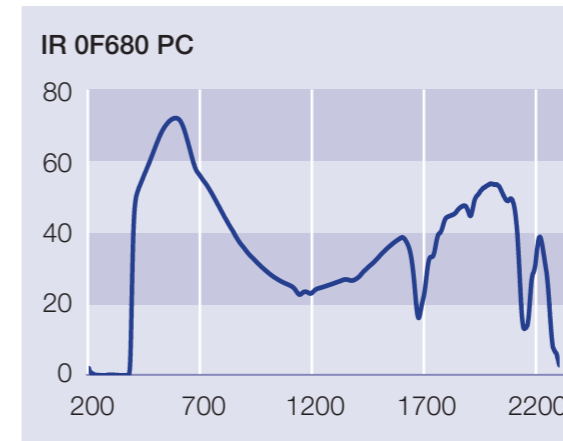
Code	Description	LDR	Solar Performances	LT
IR 0F680 PC	Standard NIR MB; transparent with greenish appearance; based on unique technology. Kafrit proprietary.	3%@1.3mm chip	SHGC = 0.61 SC = 0.70 LSC = 1.08	66%
IR 6B491 PC	Modification of IR 0F680 PC, combined with blue pigment.	3%@1.3mm chip	SHGC = 0.58 SC = 0.67 LSC = 1.01	59%
IR 0K320 PC	NIR based on new chemistry NIR absorber; very transparent with slightly bluish shade.	3%@1.3mm chip	SHGC = 0.67 SC = 0.77 LSC = 1.23	82%
IR 0K220 PC	New combination of NIR additives based on advanced technology; covers large area of the energetic part in the NIR region.	3%@1.3mm chip	SHGC = 0.63 SC = 0.72 LSC = 1.29	81%

SHGC solar heat gain coefficient
 SC shading coefficient
 LT light transmission
 LSG LT/SHGC

Additional IR Products

All products available as compound:

- Designed for a co-extrusion layer of 50μ, under the UV layer.
- Designed for a co-extrusion layer of 50μ combined with UVA for a single-layer implementation



“I greatly appreciate the reliable handling and top quality. The technical support is excellent and the staff are always there to help.”

5. Light Diffuser

5.1 Polycarbonate diffusers

Code	Properties	Application	LDR	LT	H	C
DIF 0J160 PC Diffuser	High efficiency.	MW, Corrugated	3.0%, 3 mm	60	100	5.3
DIF 09540 PC Diffuser	High efficiency.	MW, Corrugated	1.0%, 3 mm	57	100	8
DIF 0K78D PC Diffuser	High thermal stability.	Solid	2.0%, 3 mm	71	100	15
DIF 0K78D PC Diffuser	High thermal stability.	Solid	3.5%, 3 mm	64	100	6
DIF 00R61 PC Diffuser	Excellent LT/Haze ratio (LED).	MW, Solid, Corrugated	3.0%, 3 mm	79	100	3
DIF 00R61 PC Diffuser	Excellent LT/Haze ratio (LED).	MW, Solid, Corrugated	1.5%, 3 mm	88	100	25
DIF 10981 PC Diffused white	High efficiency and white shade (Opal).	MW, Corrugated	2.0%, 3 mm	54	100	4

All measurements were done on 1.2 mm plaque.

5.2 PMMA diffusers

Code	Properties	Application	LDR	LT	H	C
DIF 0R76 MMA Diffuser	High thermal stability.	Solid	3.0%, 3 mm	84	100	3
DIF 00376 MMA Diffuser NEW!	High thermal stability, excellent performance, new developed.	Solid	4.0%, 1.3 mm	94,5	100	4
DIF 00496 MMA Diffuser NEW!	Excellent performance, new developed.	Solid	3.0%, 1.3 mm	89	100	2

All measurements were done on 1.2 mm plaque.

6. Flame Retardant

The Single Burning Item standard (SBI) EN 13823 is the main building standard for PC sheets in Europe. The same goes for the ASTM E84 in North America. In addition to the various required standards in different countries, the PC sheet geometry, type of polycarbonate resin mixed with the FR MB, thickness and weight have an important impact on the FR performances.

The various factors described above are used by our experts and customers alike to offer a suitable solution so as to fulfill the requirements of the standards.

Our lab developed skills and an extrapolation method of Flame Retardants to evaluate the FR performance using UL-94 and LOI tests. Different building standards require different testing methods using the final sheet structure produced by our customers.

Code	Description	LDR	Standard	Comments
FR 01670 PC	Brominated FR	10.0–15.0%	UL-94, 1.6mm, V0.	Transparent
FR 00 I 17 PC NEW!	Brominated FR	Compound	E-84, Class A (Multi Wall Sheet), different thicknesses.	Transparent
FR 00P90 PC	HFFR	15.0–20.0%	UL-94, 1.6mm, V0.	Transparent, solid sheets
FR 04530 PC	HFFR	2.0–4.0%	UL-94, 1.6mm, V0.	Translucent, Injection Molding, sheets

7. Additive

Code	Property	Description	Application	LDR
SL 00002 PC	Mold Release	Especially for PC injection molding but not only. Solves lubrication problems.	IM	1.0–5.0%
PA 00080 PC	Processing Aid	Used to eliminate creation of black specs, pigments and additives accumulation on hot, inner parts and to reduce friction and high-shear rates.	Extrusion	~0.5–1.0% start at 2.0% and reduce to minimum after 30 min.
AB 0G380 PC Antiblock	Antiblock	Has minimal effect on the product transparency or haze.	PC corrugated	0.5–1.0% in the UV Cap Layer
AB 0G386 PC	Antiblock – improved optics	Has minimal effect on the product transparency or haze.	PC corrugated	0.5–1.0% in the UV Cap Layer

8. PMMA Antiglare/Anti Slip

Code	Surface effect	LDR	Application
AG 0K830 PMMA Antiglare	Fine	100% 50 µm co-extrusion layer.	PMMA sheets
AG 0K83B PMMA Antiglare	Medium	100% 50 µm co-extrusion layer.	PMMA sheets
AS 0K83C PMMA Antiglare	Rough	100% 50 µm co-extrusion layer.	PMMA sheets

9. Colors and Special Effects

9.1 Colors

Kafrit specializes in PC and PMMA color matching and can match your color according to MB sample or product sample.

It is also possible to perform a match according to RAL or Pantone, in such case it might be less accurate.

Kafrit offers a wide selection of PC and PMMA colors; a catalogue with standard color samples is available upon request.

- Transparent colors
- Opaque colors
- Opal/diffusing colors

9.2 Special Effects

Pearlescent Effect:

Kafrit developed a special technology for pearlescent MB and compound production.

Metallic Effects:

Based on aluminium pigments are often combined with different shades of pigments in order to reach the requested color (metallic green, for example).

Pearlescent and metallic effect colors can be applied easily as a masterbatch in the bulk. The best performance is achieved, when such color masterbatches are applied into a thin, extruded layer underneath the outer top UV-cap layer, which of course requires double extrusion technology. Kafrit offers a variety of pearlescent and metallic colors and can supply a special effect color catalogue with sample chips upon request.



Global supply, local partnership:
We are where you are.

KafritGroup[®]

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Giving Life to **Plastic**

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Please request for further information:

- **Optimizing BOPP film production**
with CONSTAB Masterbatches and Compounds
- **BOPE – Sustainable solutions for flexible packaging films**
with CONSTAB® CON-X Masterbatches
- **Polyethylene Packaging · Polypropylene Cast and Calender Films**
Rolling to success with Kafrit Group Masterbatches and Compounds
- **Ecocell® – Lighten up!**
A revolutionary foaming agent to reduce material and resin consumption
- **Agricultural Film**
Growing success with Kafrit Group Masterbatches and Compounds
- **Pipes and Sheets**
Customized solutions with Kafrit Group Masterbatches and Compounds
- **Kafrit Group Antioxidants**
Reliable protection for your plastic products
- **Injection Molding · Blow Molding**
Injecting new ideas into your products with Kafrit Group Masterbatches and Compounds
- **Strong protection, easy peeling**
with CONSTAB CONPEEL® Compounds
- **Adding value to Fibers and Nonwovens**
with Kafrit Group Masterbatches
- **Packaging your needs**
PET Masterbatches and Compounds

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