FERRO-PLAST

Graftapor

POROUS POLYMER CARRIER

The porous polymers act like sponges. Loading of additives into a porous polymer is solely a physical absorption process.

Due to capillary forces, the accessible porous structure will be saturated with additive

Porous polymers are most suitable for liquid, low melting, thermally sensitive and otherwise difficult to handle additives that cannot be processed by conventional extrusion compounding or masterbatching techniques.

We convert polymer liquid additives to Super concentrate pellets. Any polymer carrier can be modified.

Toll manufacturing arrangements & Customer specific product developments available.

Advantages of Our Proprietary Technologies

- CLEAN CELL STRUCTURE FORMATION WITHOUT INTRUSIVE CHEMICALS
- POROSITY UP TO 70%
- POLYMER MATRIX AVAILABLE:
  - LLDPE (SUITABLE TO USE WITH; PE)
  - PP
  - EVA (SUITABLE FOR ANY POLYOLEFINS, PVC)
  - EBA (SUITABLE TO USE WITH; PET,PA)
  - PS (SUITABLE TO USE WITH; ABS,SAN,HIPS)
  - SEBS
- IMPROVED DISPERSION
- NO CHEMICAL OR PHYSICAL BLOWING AGENTS USED

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GRAFTAPOR™

Markets &Applications

Wire & Cable

Packaging Films

PE-Pipes

Nonwovens

Foams

Molded Products

Masterbatches

Compounds

GRAFTAPOR™

Can be loaded up to 70%

Antioxidants

Coupling agents

Stabilizers

lubricants

Enzymes

Performance additives

Flame retardants

Silanes

Peroxides

PRODUCT INFORMATION

GRAFTAPOR ™

Is a porous polymer carrier for additives.
It's mainly designed to act as a carrier for additives that are harder to dose during polymer compounding.

Is used to make polymer compounding easier, by absorbing liquid, powder, low melting or thermally sensitive additives.

Can absorb solid or paste additives.

GRAFTAPOR™

LLDPE 02070

PP 02070

EVA 00270

EBA 15070

PS 01070

SEBS 02070

IN SHORT TIME

80-90 % POROSITY

WILL BE RELEASED

Special Applications

GRAFTAPOR™ EVA 00270

Suitable for all polymers - POLAR UNIVERSAL MATRIX
(if in compound) / up to 250°C

GRAFTAPOR™ EBA 15070

Can withstand the temperature of 320°C without problems
the most universal matrix of engineering plastics and even polyolefins

Processing

- For the loading of additives into GRAFTAPOR™, mix at low rpm (5-30 rpm) and at loading time from 30 min up to 72 h.
- Absorption time depends on the viscosity of additive.
- At higher loading temperatures and faster mixing, the porous structure may collapse.
- Up to 70% of additive content can be loaded onto the polymer carrier.

GRAFTAPOR™

Do it by yorself - requirements

- If the additive is liquid at room temperature, loading can be done at room temperature.
- If the additive is a solid or a paste with a melting point at slightly elevated temperatures, the additive can be melted and loaded at temperatures slightly above the melting point of the additive. However, the loading temperature has to be approx. 40°C below the melting or softening point of the polymer, otherwise the porous structure might collapse.
- If the additive is liquid but highly viscous at room temperature, the viscosity can be reduced in many cases by increasing the loading temperature. Again, the loading temperature should be 40°C below the polymer melting or softening point.
- The additive can be dissolved in an organic solvent (ethanol, acetone, IPA).
- The viscosity of the additive should not exceed 30.000 cSt.
- Both hydrophilic/hydrophobic and polar/nonpolar additives can be loaded. In some cases the addition of surfactants is required.

GRAFTAPOR™

Additive Loading and Equipment

Low speed and low shear mixers are recommended to use for the loading of additives onto *GRAFTAPOR™*.

The purpose of mixing is to get a homogeneous distribution of porous pellets and liquid additive in the mixer and consequently equal additive loading on every porous pellet.

High speed and high shear forces could damage the porous structure of the carrier and do not increase the absorption rate of the additive.

The absorption rate is mainly determined by the viscosity of the additive. Depending on the viscosity the max amount of additive loading may be achieved in 30 min or in 72 h in the worst case.

Please contact with our technical department laboratory@graftpolymer.com

to get full technical procedures and explanation.

GRAFTAPOR™ general materials applications

Polypropylene - (BOPP/CPP-Films, Sheets, Molding)

Loading material	*Dosage*	*Remarks*
65% Antistatic/Slip combibatch in PPHP	0.5-0.8%	BOPP films
75% Antistatic combibatch in PPHP, veg. based	0.2-0.9%	BOPP films
65% Antistatic/Slip combibatch in PPHP	0.8-1.2%	Print lamination films
65% Antistatic/Slip combibatch in PPHP	0.8-1.5%	Heat sealable films, cigarette films
30% Silicone oil in PPCP	1.5-3.0%	Cigarette films
65% Silicone oil in PPHP	0.8-1.5%	Cigarette films
50% Silicone oil in PPHP	0.2-1.0%	Lubricant, mold release
50% Silicone oil in PPHP	0.2-0.4%	Mold release agent for complex parts
50% UHM50% UHMW Silicone gum in PPHP	1.0-2.0%	Cigarette films
50% UHMW Silicone gum in PPCP	1.0-2.0%	Cigarette films
40% Slip agent in PPHP	0.5-0.7%	Standard packaging films
40% Slip/release agent in PPCP	0.5-1.0%	Standard packaging films, transparent sheets
75% Antistatic agent in PPHP	0.2-0.5%	White/opaque films
75% Antistatic agent in PPHP	0.2-0.5%	Standard packaging films
75% Antistatic agent in PPHP, veg. based	0.2-0.4%	BOPP/CPP films
60% Antistatic agent in PPHP	0.5-0.7%	Standard packaging films, release agent in molding
60% Antifog in PPHP	1.5-2.0%	Cold/hot fog food packaging films
75% Antifog combibatch in PPHP	0.8-2.0%	Cold/hot fog food packaging BOPP fim
60% Antifog in PPCP	1.5-3.5%	Cold fog food packaging films
20% Organic antiblock in PPCP	1.0-2.0%	Metallizable films, cigarette films
20% Organic antiblock in PPCP	1.0-2.0%	Metallizable films, cigarette films
65% Water based foaming 1.0-3.0% TPV's, density reduction agent in PPCP	1.0-3.0%	TPV's, density reduction agent

Polypropylene - (Fibers, Nonwovens)

Loading material	*Dosage*	*Remarks*
60% Softening agent in PPHP	1.0-2.0%	Fiber softener and gloss improvement
60% Softening agent in PPHP	0.3-0.5%	Fiber softener

Polyethylene - Films, Foam, Molding)

Loading material	*Dosage*	*Remarks*
50% GMS in LDPE	0.5-1.0%	Fast migration, mold release, antistatic agent
70% Cell stabilizer in EVA	1.0-2.0%	PE foam
50% Cell stabilizer in LDPE	1.5-2.5%	PE foam
60% Amine/Amide free antistatic agent in LLDPE	0.4-0.8%	Electronics packaging
60% Antistatic combibatch in LDPE	0.3-0.5%	Films, molded parts
75% Antistatic agent in HDPE	0.3-0.5%	PE-films, bubble films
50% Stearamide in EVA	0.4-0.8%	Antislip/antiblock for films
20% Mold release agent in LDPE	1.5-2.0%	Complex molded parts, TPO's
40% Slip agent in LDPE	0.2-0.3%	PE-films
50% Silicone gum in HDPE	1.0-2.0%	Pipes, molded parts
50% Silicone gum in LDPE	1.0-2.0%	Wire&Cables, compounds
65% Antifog agent in LDPE	0.7-0.9%	Cold fog food packaging films
60% Antifog agent in EVA	2.0-3.0%	Agricultural films
40% SMS in LDPE	2.0-5.0%	Anti-fogging, agricultural films
25% SML in LDPE	2.0-5.0%	PE food wrap films
70% Antifog agent in LDPE	1.0-1.5%	Cold/hot fog PE-films
50% UV-Stabilizer in LDPE	0.5-1.0%	PE-raffia, tarpaulines
60% Antioxidant in LLDPE	0.2-0.4%	Active food packaging Active food packaging

Polystyrene (Films, Foam, Sheets, Molding)

Loading material	*Dosage*	*Remarks*
40% Antistatic agent in GPPS	2.0-3.0%	Films, foam, molded parts
50% Antistatic agent in GPPS	4.0-5.0%	Amine/amine free
50% Antistatic agent in GPPS	2.0-3.0%	Non food applications
50% Silicone oil in GPPS	0.3-0.5%	Mold release, lubricant
40% Slip additive in GPPS	0.5-0.7%	Films, sheets
40% Stearamide in GPPS	0.5-0.7%	Films, sheets, mold release
60% Antifog agent in GPPS	3.0%	Cold fog, food approved
50% Antifog agent in SBC	3.0-5.0%	Cold/hot fog
50% Flame retardant in HIPS	15-25%	Halogen free

Polyamide 6 (Molding, Compounding, Fibers)

Loading material	*Dosage*	*Remarks*
50% Silicone oil in PA6	0.5-2.0%	Lubricant, release agent
50% Permanent antistatic agent in PA6	3.0-5.0%	Food approved
50% Permanent antistatic agent in PA6	3.0-5.0%	Carpet fibers

Polycarbonate (Molding, Compounding, Fibers)

Loading material	*Dosage*	*Remarks*
50% Silicone oil in PC	0.2-1.5%	Lubricant, release agent for molded parts and compounds
50% Lubricant in PC	1.0-1.5%	Antiblock, release agent for transparent parts
50% Flame retardant in PC	10.0-20.0%	Transparent PC sheets, halogen free
61% Flame retardant plus antidripping agent in PC	13.0-15.0%	Bromine free

Polyethyleneterephthalat (Sheets, Fibers)

Loading material	*Dosage*	*Remarks*
60% Lubricant in PET	0.5-1.0%	Antiblock, release agent for transparent parts
50% Silicone oil in PET	0.5-2.0%	Release agent, lubricant for molded parts and compounds
60% Permanent antistatic agent in PET	2.0-5.0%	PET fibers