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# ABOUT US

## Who we are

Since 1975, Condensia manufactures and sells, from its facility in Barcelona, special esters for niche applications and custom products created for our clients, with which we aim to build solid and long-lasting collaborations, based on mutual cooperation and trust, through a relationship always direct and communicative, honest, quick-response and flexible.

Condensia exports 70% of its products outside of Spain in highly competitive markets. This implies a high level of quality in all the aspects of the company and requires continuous improvement, approach that we have adopted as distinctive element in our path towards personal and corporate growth.

## What we do

Condensia produces esters, polyesters and polyester-polyols used primarily in the PVC, rubber, lubricant, polyurethane, adhesive, varnish and paint, cosmetics and personal care markets.

In the last years, we designed and developed a new range of biosustainable additives to use in biodegradable polymer applications, primarily PLA (polylactic acid).



## Research & Sustainability

Condensia allocates a significant part of its resources to R&D activities, area in which we are very active through a network of international collaborations that includes private research institutes, universities, customers and external collaborators.

As an acknowledgment of our interest in this field, we obtained several Spanish and European grants as well as special credit lines that have allowed us to patent environmentally friendly products, planting our seed in the field of sustainable markets. We hope our efforts contribute to creating a better future for all of us.

## Values & Objectives

These are our objectives, growing in an environmentally-conscious way, providing added value to our customers through special and tailor-made products, maintaining our spirit of constant improvement, optimizing our financial results and never forgetting that the people who work at Condensia make this reality possible thanks to a business culture based on values such as respect, professionalism, integrity and teamwork.

# PLASTICIZERS FOR PVC & RUBBER



Plasticizers are inert organic substances with low vapor pressure, predominantly esters or polyesters, which interact physically with high polymers (PVC, NR, NBR, PVA, etc.) to form a homogeneous material and modifying its mechanical and thermal properties.

A plasticizer may reduce the melt viscosity, lower the glass transition or lower the elastic modulus of the final product.



# Polymeric plasticizers

Low molecular weight polymers that incorporated into a polymeric matrix offer outstanding properties such as migration and extraction resistance, weather stability, high temperature performance, high mechanical properties, negligible toxicity

and good environmental compatibility. Due to these remarkable properties, polymeric plasticizers are generally adapted to undergo the stricter legislation norm for food contact materials (EU and FDA).

PRODUCT NAME	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s (25°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast 1070 C (polyadipate ester)	>99	1.11	15000	max 2.5	max 0.1	Films, labels, canvas, technical parts, conveyor belts, safety footwear, tubes for oil and greases.
Glyplast 206/3 NL (polyadipate ester)	>99	1.08	900	max 1.5	max 0.1	Compounds, stretch films, tapes, adhesives, surface coatings, upholstery, technical parts. Food contact approved.
Glyplast 206/5 NL (polyadipate ester)	>99	1.10	2200	max 1.5	max 0.1	Compounds, cling films, tapes, adhesives, surface coatings, upholstery, technical parts, waterproofing solutions. Food contact approved.
Glyplast 206/6 NL (polyadipate ester)	>99	1.10	2700	max 1.5	max 0.1	Compounds, cling films, tapes, adhesives, surface coatings, upholstery, technical parts, waterproofing solutions. Food contact approved.
Glyplast 206/7 NL (polyadipate ester)	>99	1.11	4000	max 1.5	max 0.1	Tapes, labels, conveyor belts, food contact films, wrap films, coatings, cables, technical parts, footwear, leather clothing, high extraction applications. Food contact approved.
Glyplast 206/8 NL (polyadipate ester)	>99	1.12	7000	max 1.5	max 0.1	Tapes, labels, conveyor belts, food contact films, wrap films, coatings, technical parts, footwear, leather clothing, high extraction applications. Food contact approved.
Glyplast 206/9 NL (polyadipate ester)	>99	1.1	10000	max 1.5	max 0.1	Printing rollers, elastic films, tubes, hoses, elastic, films, coatings, gas-kets, technical articles. Food contact approved.
Glyplast 2106/7 (polyadipate ester)	>99	1.11	4000	max 1.5	max 0.1	Compounds, films, tapes, adhesives, surface coatings, upholstery, technical parts.
Glyplast 392 (polyphthalate ester)	>99	1.05	850	max 1.5	max 0.1	Tablecloths, curtains, films, pipes, tubing, technical articles, adhesive sheets.
Glyplast 201/6 NL (polyadipate ester)	>99	1.11	2750	max 1.5	max 0.1	Tablecloths, curtains, films, pipes, tubing, technical articles, adhesive sheets. Food contact approved.
Glyplast 201/8 NL (polyadipate ester)	>99	1.12	7000	max 1.5	max 0.1	Tablecloths, curtains, films, pipes, tubing, technical articles, adhesive sheets, high extraction resistance. Food contact approved.



# Adipates

Plasticizers designed to offer outstanding mechanical properties in a large range of temperature retaining good flexibility, workability, and with a plus due to their negligible toxicity.

They are rapidly incorporated into the polymer matrix and can be mixed with polymeric plasticizers improving the working time.

PRODUCT NAME	COLOUR Hazen	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast DOA bis(2-ethylhexyl adipate)	20	>99.9	0.92	max 0.1	max 0.1	Gaskets, footwear, cables, technical articles, toys, surfaces, canvas, films. Food contact approved.
Glyplast DIDA di(isodecyl adipate)	20	>99.9	0.92	max 0.1	max 0.1	Artificial leather, dryblend, films, surface coatings, inks, technical articles, toys, hoses, conveyor belts, vibration deadeners, sound absorbers.
Glyplast 801 (ether-ester adipate)	4 (Gardner)	>99.9	1.02	max 1	max 0.1	Highly polar rubber formulations and rubber technical articles. Gasket for gearbox, oil and gasoline hoses.
Glyplast 803 (ether-ester adipate)	6 (Gardner)	>99.9	1.04	max 0.5	max 0.1	Highly polar rubber formulations and rubber technical articles. Gasket for gearbox, oil and gasoline hoses.

# Sebacates

Plasticizers designed to offer outstanding mechanical properties at very low temperature maintaining an excellent extraction resistance. They are rapidly incorporated

into the polymer matrix and can be mixed with polymeric plasticizers improving the working time.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast DOS bis(2-ethylhexyl sebacate)	70	>99.9	0.91	max 0.2	max 0.1	Rubber and PVC technical articles, belts, tubes, gaskets. Very low temperature cables and hoses.
Glyplast DIDS di(isodecyl sebacate)	80	>99.9	0.92	max 0.25	max 0.1	Dashboards, electrical wires, technical articles, gaskets, pipes.



# Trimellitates

Plasticizers designed particularly for high temperature performance retaining good characteristics of migration resistance and volatility, workability, flexibility and gelling

power, also at low temperature. They are a good compromise at low and high temperature for demanding electrical application, specially automotive cables.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast TMO (2-ethylhexyl trimellitate)	85	>99.9	0.98	max 0.2	max 0.1	Power cables (ISO 6722 Class B) , dashboards, sheets, profiles, gaskets.
Glyplast TML-810 (C8-C10 trimellitate)	125	>99.9	0.97	max 0.2	max 0.1	ISO 6722 Class C high temperature electrical cables, car dashboards, technical articles, gaskets, profiles.
Glyplast TML-9 (C9 trimellitate)	100	>99.9	0.97	max 0.15	max 0.1	ISO 6722 Class C high temperature electrical cables, car dashboards, technical articles, gaskets, profiles.
Glyplast TML-911 (linear-branched C9-C11 trimellitate)	100	>99.9	0.96	max 0.15	max 0.1	ISO 6722 Class C electrical cables and wires, technical articles, gaskets, profiles.

# Benzoates

Excellent alternative to phthalates, benzoic plasticizers have peculiar properties such as high solvating power and low gelation temperature, above all in vinyl sheets. Benzoates are

specially indicated when anti staining properties are required in floor coverings and wallpapers. They are partially soluble in water thus permitting to avoid organic solvent in their manipulation.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast DEPG (diethylene/dipropylenglycol benzoate)	50	1.16	max 1.5	max 0.1	Caulks, profiles, PVC flooring, roofing, films, anti-staining application.
Glyplast TEPG (triethylene/dipropylenglycol benzoate)	85	1.16	max 1.5	max 0.1	Caulks, profiles, PVC flooring, roofing, films, anti-staining application.
Glyplast DPPG (dipropylenglycol benzoate)	80	1.12	max 1.5	max 0.1	Caulks, profiles, PVC flooring, roofing, films, anti-staining application.

# ADDITIVES FOR LUBRICANTS



Ester additives are used in various applications such as automotive and marine engine oils, compressor oils, hydraulic fluids, gear oils and grease formulations. They offer an ample range of viscosities and are characterized by high solvating property, thermal capacity, low volatility, high flash point and good thermal stability. Low toxicity and high biodegradability are a plus for this class of additives.





# Adipates

Adipates offer high flash point and resistance to oxidation thus improving hydrolytic stability and volatility. They are designed mainly for low temperature performances. Obtained

from adipic acid and linear or branched alcohol are particularly designed for 2/4 stroke engine lubricants and hydraulic fluids.

PRODUCT NAME	VISCOSITY mm <sup>2</sup> /s (40°C) ASTM D 445	VISCOSITY mm <sup>2</sup> /s (100°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	POUR POINT °C ASTM D 97	FLASH POINT °C ASTM D 92	WATER CONTENT % ASTM E 203	APPLICATIONS
Glylub 20 di(isodecyl adipate)	15	3.8	max 0.1	-55	min 210	max 0.1	Biodegradable hydraulic fluid, greases, chain oil, metal working.
Glylub 30 di(isotridecyl adipate)	29	5.2	max 0.1	-45	min 230	max 0.1	Biodegradable hydraulic fluid, compressor oil, metalworking, chain oil.
Glylub 50 bis(2-ethylhexyl adipate)	8	2.5	max 0.1	-60	min 200	max 0.1	Biodegradable and hydrolytically stable base ester, suitable for use in high temperature chain oil applications.

# Trimellitates

Additives designed particularly for high temperature performance. They improve thermal resistance and volatility offering high viscosity, flash point and extremely low vapor pressure.

Obtained from trimellitic anhydride and linear or branched alcohol. They retain the principal characteristics of phthalate additives but improving thermal properties.

PRODUCT NAME	VISCOSITY mm <sup>2</sup> /s (40°C) ASTM D 445	VISCOSITY mm <sup>2</sup> /s (100°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	POUR POINT °C ASTM D 97	FLASH POINT °C ASTM D 92	WATER CONTENT % ASTM E 203	APPLICATIONS
Glylub 13 (C8-C10 trimellitate)	52	8.5	max 0.1	-45	min 270	max 0.1	Air compressor oil, high temperature chain oil, greases, water soluble metalworking fluids.
Glylub 23 (isodecyl trimellitate)	140	14	max 0.1	-28	min 265	max 0.1	High performance compressor oil, turbine and steam rotors, hydraulic fluids, engine oil additives, dielectric fluids.
Glylub 33 (isotridecyl trimellitate)	300	24	max 0.1	-21	min 250	max 0.1	Viscosity modifier, high performance compressor oil, turbine, hydraulic fluids, engine oil additives, dielectric fluids.
Glylub 43 (C9-C11 trimellitate)	72	9	max 0.1	-47	min 275	max 0.1	Air compressor oil, high temperature chain oil, greases, water soluble metalworking fluids.
Glylub 53 (2-ethylhexyl trimellitate)	90	10.5	max 0.1	-30	min 240	max 0.1	Air compressor oil, chain oil, greases, water soluble metalworking fluids.



# Sebacates

Additives specially designed to offer excellent performance at very low temperature with a high lubricity activity above all in two stroke engines. They are formulated particularly for

low temperature performances. Obtained from sebacic acid and linear or branched alcohol are designed for 2/4 stroke engine lubricants and hydraulic fluids.

PRODUCT NAME	VISCOSITY mm <sup>2</sup> /s (40°C) ASTM D 445	VISCOSITY mm <sup>2</sup> /s (100°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	POUR POINT °C ASTM D 97	FLASH POINT °C ASTM D 92	WATER CONTENT % ASTM E 203	APPLICATIONS
Glylub 24 di(isodecyl sebacate)	23	5.7	max 0.2	-71	min 230	max 0.1	Base fluid and additive for low temperature applications.
Glylub 34 di(isotridecyl sebacate)	37	7.5	max 0.1	-47	min 224	max 0.1	Base fluid and additive for low temperature applications.
Glylub 54 bis(2-ethylhexyl sebacate)	13	3.6	max 0.1	-57	min 220	max 0.1	Highly biodegradable, low temperature fluid, suitable for hydraulic applications.

# Phthalates

Special additives obtained from phthalic anhydride and branched alcohols. Specially designed for high profile applications are a good compromise among cost, performance

and toxicity concerns. They can offer low pour point and good viscosity index.

PRODUCT NAME	VISCOSITY mm <sup>2</sup> /s (40°C) ASTM D 445	VISCOSITY mm <sup>2</sup> /s (100°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	POUR POINT °C ASTM D 97	FLASH POINT °C ASTM D 92	WATER CONTENT % ASTM E 203	APPLICATIONS
Glylub 29 di(isodecyl phthalate)	41	5.8	max 0.1	-48	min 230	max 0.1	General use fluid for compressor, turbine engine.
Glylub 39 di(isotridecyl phthalate)	87	8.8	max 0.1	-42	min 247	max 0.1	General use fluid for compressor, turbine engine.



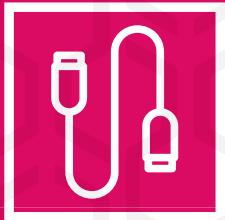
# Complex esters

Low molecular weight polymers used in special applications. Polymeric additives are characterized by outstanding properties such as migration and extraction resistance,

wearing stability, high temperature performance, high flash point, broad range of viscosity, negligible toxicity and good environmental compatibility.

PRODUCT NAME	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s (25°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glylub 206/8 NL (complex polyadipate ester)	>99	1.12	7000	max 1.5	max 0.1	Viscosity modifier for aliphatic and aromatic lubricant fluids.
Glylub 1070 C (complex polyadipate ester)	>99	1.11	15000	max 2.5	max 0.1	Viscosity modifier for aliphatic and aromatic lubricant fluids.

# POLYESTER- POLYOLS FOR PU



Polyester-polyols are low molecular weight polymers characterized by hydroxyl terminal groups useful for the preparation of flexible and rigid polyurethanes (PUs). Normally, these polyesters are highly crystalline compared with their polyether equivalents. For this reason, they impart peculiar characteristics to PUs such as the resistance to solvents, hydrolysis, weather condition, fire etc. The polyester-polyols are used for the production of elastomers, flexible foams, coatings, adhesives, rigid foams, synthetic leather, sealants, etc. They are rapidly biodegradable and can proceed from renewable source so lowering the carbon footprint of PUs.



# Polyadipates

Linear or lightly branched polyester-polyols based on aliphatic acids and polyalcohols ideal for thermoplastic PUs (TPUs), coatings and adhesives. They are specially designed for flexible foams where their high resistance to solvents and

flames, apart their excellent elongation and tensile properties, make these aliphatic polyesters the product of choice. Moreover, they impart an improved resistance to the abrasion in PUs for coating and footwear applications.

PRODUCT NAME	FUNCTIONALITY	VISCOSITY mPa.s ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	OH VALUE mg KOH/g ASTM E 1899	APPLICATIONS
Glypol 1025 (polyadipate ester)	2	3000 (60°C)	max 0.5	40	Thermoplastic PUs , adhesives, elastomers.
Glypol 1027 (polyadipate ester)	2	1500 (60°C)	max 1.5	55	Thermoplastic PUs , adhesives, elastomers.
Glypol 2035 (polyadipate ester)	2.5	9000 (60°C)	max 1.5	38	Flexible foams, microcellular elastomers, coating.
Glypol 3020 (polyadipate ester)	2	450 (30°C)	max 1.5	180	Pigment carrier, soft elastomers, coating adhesives.
Glypol 3035 (polyadipate ester)	2.3	25000 (25°C)	max 1.5	60	Flexible foams, coating.
Glypol 4027 (polyadipate ester)	2	8500 (25°C)	max 1.5	55	Thermoplastic PUs, adhesives, elastomers.
Glypol 4029 (polyadipate ester)	2	4500 (25°C)	max 1.5	56	Thermoplastic PUs, adhesives, elastomers.
Glypol 4035 (polyadipate ester)	2.2	1600 (60°C)	max 1.5	56	Flexible foams, microcellular elastomers, coating.
Glypol 5029 (polyadipate ester)	2	10000 (25°C)	max 1.5	46	Adhesives, coatings, TPUs, elastomers.



# Polysebacates

Linear or lightly branched polyester-polyols based on renewable raw materials ideal for thermoplastic PUs (TPUs), coating and adhesives. They are characterized by a low en-

vironmental profile and are ideal for partially biodegradable PUs. Polysebacates are solid polyols at room temperature but can be easily manipulated at 60°C.

PRODUCT NAME	FUNCTIONALITY	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	OH VALUE mg KOH/g ASTM E 1899	APPLICATIONS
Glypol 470/2 (polysebacate ester)	2	1.08	150 (100°C)	max 0.5	50	Biodegradable thermoplastic PUs , adhesives, elastomers.
Glypol 470/5 (polysebacate ester)	2	1.09	2000 (100°C)	max 1.5	25	Biodegradable thermoplastic PUs , adhesives, elastomers.
Glypol 170/2 (polysebacate ester)	2	1.08	850 (60°C)	max 1.5	60	Biodegradable flexible foams, microcellular elastomers, coating.

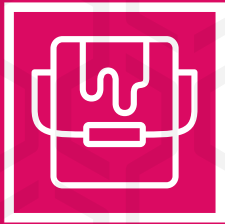
# Polyphthalates

Aromatic polyester-polyols specially designed for building insulation, polyisocyanurate foams and in combination with polyether-polyols for spraying applications.

They are a good compromise among cost and performance above all for fire resistance applications.

PRODUCT NAME	FUNCTIONALITY	VISCOSITY mPa.s ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	OH VALUE mg KOH/g ASTM E 1899	APPLICATIONS
Glypol 3920 (polyphthalate ester)	2	2200 (25°)	max 2.5	315	Flexible foam for spraying applications.
Glypol 3921 (polyphthalate ester)	2	1000 (25°)	max 1.5	190	Rigid foams for thermal and sound isolation.

# ADDITIVES FOR ADHESIVES & VARNISHES



Esters and polyesters are frequently utilized such as additives for adhesives and paint due to their unique physical-chemical properties and the compatibility with a high number of formulations used in paint, coating, adhesives, lacquer etc. They can be used as pigment carrier, mechanical properties modifier, compatibilizers, emulsion stabilizer etc.



# Benzoates

Benzoates are high performance additives excellent alternative to phthalates, their low toxicity and aqueous dispersibility render these products particularly suitable in vinyl-acrylic emulsions for paper and wood waterborne adhesives. They increase viscosity and open-time, and thanks

to their hydrophilic characteristics work such as emulsifiers, providing homogeneity between water and organic phases so increasing viscosity, flexibility and adhesion. Moreover, they comply the FDA legislation CFR 21:175 Adhesives.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	OH NUMBER mg KOH/g ASTM E 1899	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast DEPG (diethylene/dipropylenglycol benzoate)	50	50	1.16	max 1.5	max 0.1	Acrylic- vinyl water dispersions, adhesives, paints, varnishes, caulks.
Glyplast TEPG (triethylene/dipropylenglycol benzoate)	85	45	1.16	max 1.5	max 0.1	Acrylic- vinyl water dispersions, adhesives, paints, varnishes, caulks.
Glyplast DPPG (dipropylenglycol benzoate)	80	15	1.12	max 1.5	max 0.1	Acrylic- vinyl water dispersions, adhesives, paints, varnishes, caulks.

# Polyadipates

Water dispersible aliphatic polyester, highly polar, specially designed for aqueous resin systems based on polyvinyl acetate (PVA) and its co-polymers. They are recommended

for use in adhesives, coatings, bindings etc. They permit to improve the dispersibility of vinyl-acrylic resin in adhesive waterbone systems.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	OH NUMBER mg KOH/g ASTM E 1899	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	VISCOSITY mPa.s (25°C) ASTM D 445	APPLICATIONS
Glyplast 7024 (complex polyadipate)	250	20	1.17	15	7500	Acrylic- vinyl water dispersions, adhesives, paints, varnishes, caulks, inks.



# SPECIAL ESTERS



Condensia offers a wide range of esters for special applications tailor made for our customers, through a process of adapting and responding to their specific needs, always open to study potential new products or new applications for existing ones.



# Antistatic plasticizers

Highly polar polymeric plasticizers with enhanced antistatic properties by adsorbing atmospheric moisture and reducing the electrical surface resistance of the end artefacts. Glyplast AS1, Glyplast AS3 y Glyplast AS809 impart resistivity of the

order of  $10^6$  ohm exhibiting low volatility and obtaining excellent mechanical properties at low temperatures. Glyplast AS3 is suitable for food contact application following the 10/2011EC legislation.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	REFRACTION INDEX (25°C) ASTM D 1045	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast AS1 (poly(ethyleneglycol 2-ethylhexanoate))	90	1.11	1.45	max 3	max 1	Sole shoes, hose, sheets, rubber and PVC articles.
Glyplast AS3 (poly(ethyleneglycol) laurate)	90	1.11	1.45	max 3	max 1	Sole shoes, hose, sheets, rubber and PVC articles.
Glyplast AS809 (butyldiglycol adipate derivated)	2 (Gardner)	1.02	1.45	max 3	max 0.1	Sole shoes, hose, sheets, rubber and PVC articles.

# Demolding agent

Highly polar low molecular weight polymer suitable as demolding agent. It is characterized by a high water solubility that

permits a rapid removing from barrels and molds. It can be also used as a secondary plasticizer in vinyl acrylic emulsions.

PRODUCT NAME	COLOUR Hazen ASTM D 1209	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s (25°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast 706/5 (polyether ester)	3 (Gardner)	>99	1.13	2000	max 2.5	max 0.1	Barrel demolding, hose, rubber.

# Plasticizers for PU

Non reactive plasticizers specially designed for polyurethanes and highly reactive polymers specially to hydroxyl groups. They exhibit low volatility and excellent mechanical proper-

ties at low temperatures. They permit to improve the dispersibility of vinyl-acrylic resin in adhesive waterborne systems.

PRODUCT NAME	COLOUR Hazen <i>ASTM D 1209</i>	DENSITY g/cm <sup>3</sup> (25°C) <i>ASTM D 1045</i>	ACID NUMBER mg KOH/g <i>ASTM D 974</i>	OH VALUE mg KOH/g <i>ASTM E 1899 (08)</i>	WATER CONTENT % <i>ASTM E 203</i>	APPLICATIONS
Glyplast DEPG-SG (diethylene/dipropylenglycol benzoate)	100	1.16	max 1.5	<2	max 0.1	Epoxy, PUs, varnishes, film, paint adhesives.
Glyplast DPPG-SG (dipropylenglycol benzoate)	100	1.12	max 1.5	<2	max 0.1	Epoxy, PUs, varnishes, film, paint adhesives.

# Esters from fatty acids

Condensia offers, limitedly for some countries, a wide range of esters derivative from fatty acids that complements our range, and also fatty acids and ethoxylated fatty alcohols, surfactants and amines, all manufactured by the company

Temix Oleo SrL, whose main applications are in the markets of lubricants, cosmetics, detergents, leather tanning, ceramics and plastics.

# ADDITIVES FOR BIO- PLASTICS



Condensia offers a range of additives specially designed for using in combination with biopolymers, mainly PLA (poly(lactic acid)) PHA, (poly(hydroxy alcanoates)), starch based polymers etc. They can be used as plasticizers, chain extenders, nucleating agents and nanofiller compatibilizers; showing low volatility, low migration, good thermal stability and total biodegradability.



# Lactic acid oligomers

Obtained from bio-renewable raw materials and fully biodegradable and compostable (UN 20200:2006). When used in mixture with PLA, they allow to obtain stretch films with excellent mechanical properties without loss of transparency.

Furthermore, they can be used such as impact strength modifiers, chain extender, nucleating agents, etc. GLYPLAST® OLAs are internationally patented.

PRODUCT NAME	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s (25°C) ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast OLA 2 (complex lactic acid polyester)	>99	1.10	90 (40°C)	max 2.5	max 0.1	Completely biodegradable PLA impact modifier.
Glyplast OLA 8 (complex lactic acid polyester)	>99	1.11	22.5 (100°C)	max 1.5	max 0.1	Completely biodegradable PLA, PHA, starch based material plasticizers. Cling films, calendered object, ropes, cables, tissues.
Glyplast OLA 9 (complex lactic acid polyester)	>99	1.12	40 (100°C)	max 1.5	max 0.1	Completely biodegradable nucleating agent for PLA.
Glyplast OLA 10 (complex lactic acid polyester)	>99	1.14	3000 (100°C)	max 30	max 0.1	Completely biodegradable chain extender for PLA.
Glyplast OLA 11 (complex lactic acid polyester)	>99	1.13	100 (40°C)	max 1.5	max 0.1	Completely biodegradable compatibilizer for grafting of nanocellulose, montmorillonite, nano filler etc.

# Polyadipates

Low viscosity saturated polyester that gives excellent results used such as plasticizer in PLA. It permits easy handling and processing and it is particularly resistant to extraction

thus exhibiting good flexibility at low temperatures. It is highly biodegradable and listed in the EU 10/2011 and FDA food contact lists.

PRODUCT NAME	ESTER CONTENT %	DENSITY g/cm <sup>3</sup> (25°C) ASTM D 1045	VISCOSITY mPa.s ASTM D 445	ACID NUMBER mg KOH/g ASTM D 974	WATER CONTENT % ASTM E 203	APPLICATIONS
Glyplast 206/3 NL (polyadipate ester)	>99	1.08	900 (25°C)	max 1.5	max 0.1	Partially biodegradable, high compatible plasticizer for PLA, Food contact approved.





