inzea®
BIOPOLYMERS

THE SUSTAINABLE CHOICE

BIOPOLYMER SOLUTIONS

NUREL

INTRODUCING INZEA®

With an eye on sustainability and anticipating market trends and future environmental regulations, **NUREL** has developed a new range of renewable and compostable biobased biopolymers: **INZEA®**.

As part of **SAMCA Group**, **NUREL** is a polymer and fibre producer based in Zaragoza, Spain, with over five decades of expertise.

SAMCA Group's corporate engagement towards sustainability is oriented to reduce the greenhouse gasses impact, minimize the dependence on fossil oil derivatives, promote the use of renewable energies and to reduce the plastic waste in the environment.

Following our core values, in **NUREL** we have optimized our production processes in order to reduce the generated waste with a "zero waste" policy and to **minimize our CO_2 footprint impact** from our activities.

NUREL satisfies the applicable legal and regulatory requirements in all areas of the integrated Management System. **NUREL is ISO 9001, ISO 14001 and ISO 50001 certified.**

INZEA® is our response to our customers demands for more sustainable materials. INZEA® is a range of biopolymers that may be processed by injection moudlding or extrusion methods using conventional equipments.

With optimal mechanical properties and similar processing parameters, INZEA® could be the sustainable solution to replace oil based polymers e.g. polyolefins or styrenics with equivalent properties.

- INZEA® is **biodegradable and compostable**, according to EN 13432.*
- INZEA® is **biobased.****
- INZEA® product range is **suitable for Food Contact.****

INZEA® biopolymers are compatible with standard fillers, additives and biopolymer based master-batches.

Thanks to many years of experience and our continuous investment in R&D development, NUREL Biopolymers can develop **tailor made solutions** to match our customer's production requirements.

* Compostability depends on the final applications.
** For further information contact with NUREL Technical Department.

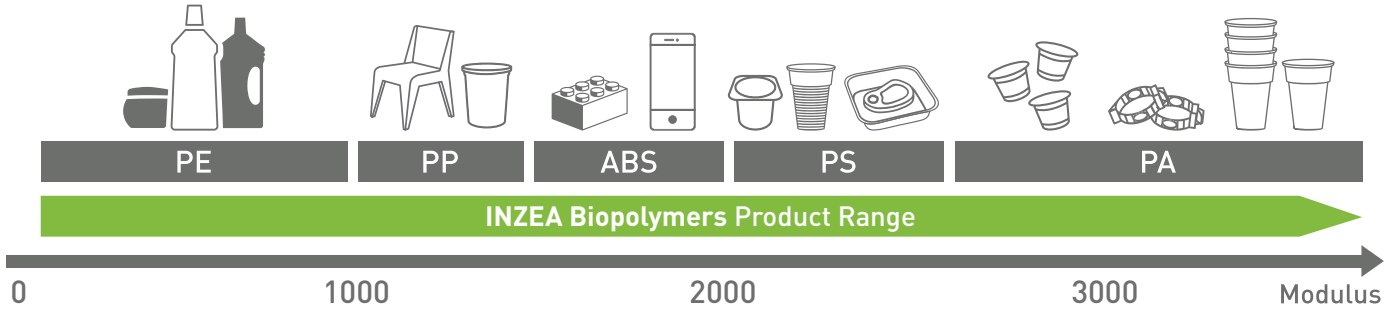

INZEA®
biopolymer
solutions
are biobased
and
biodegradable

SUSTAINABLE MATERIAL **REPLACEMENT**

INZEA® offers sustainable solutions for injection, extrusion, thermoforming, blow moulding and other manufacturing processes.

Can be processed in the **same facilities that standard polymers** with just small process adjustments.

Material replacement with **INZEA® products**:

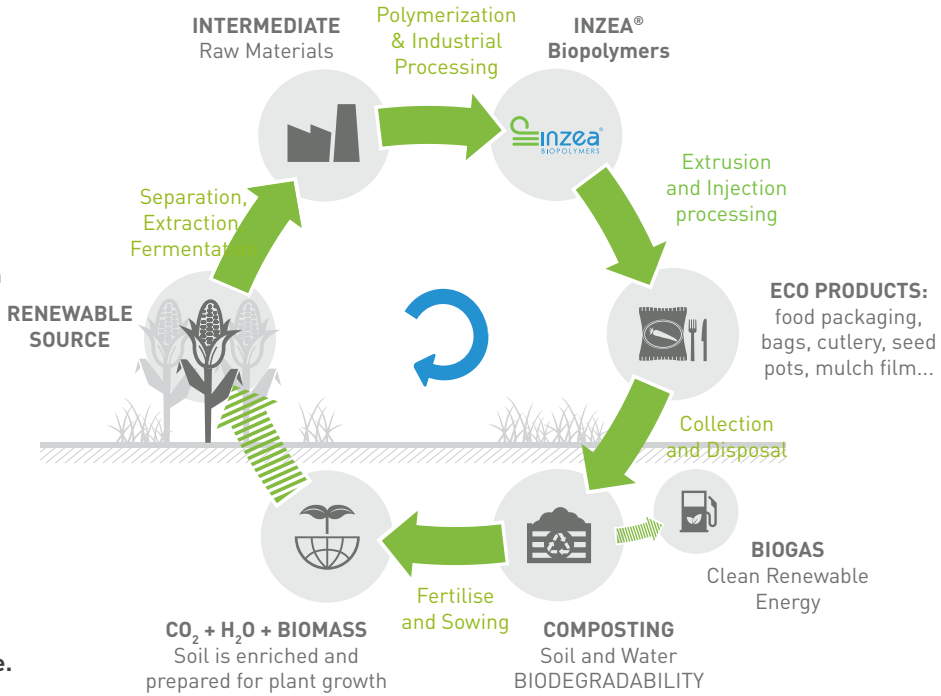


INZEA® PRODUCTS **LIFE CYCLE**

INZEA® is **obtained from renewable sources**. Using NUREL's technology, raw materials and intermediates are converted into our INZEA® biopolymers. Then, eco-designed products, such as single-use items, food packaging and mulch film, can be produced.

INZEA® product range is **designed to return to nature** by different disposal methods like industrial & home composting, or by biodegradation in different environments that may include soil, water or anaerobic digestion.

The action of the temperature and microorganisms transforms the materials into CO_2, H_2O and biomass, nourishing the soil and preparing it for the germination of seeds. **New plants will grow and the lifecycle will reinitiate.**



LAND USE FOR **BIOPLASTICS**

- **Global land area**
  13.4 billion ha= 100%
- **Global agricultural area**
  5 billion ha= 37%
- **Pasture**
  3.3 billion ha= 67%*
- **Arable land****
  1.4 billion ha= 29%*
- **Food & Feed**
  1.24 billion ha= 26%*
- **Material Use**
  106 million ha= 2%*
- **Biofuels**
  53 million ha= 1%*

Bioplastics
2017
0.82 million ha= 0.016%*
2022
1.03 million ha= 0.021%*

INZEA® DOES NOT compete with the food chain.

Source:
European Bioplastics, Institute for Bioplastics and Biocomposites, nova-Institute (2017).

* In relation to global agricultural area.
** Also includes approx. 1% fallow land.

NEW CHALLENGES OF THE **PLASTIC INDUSTRY**

The world is changing and the plastics industry has to adapt to a new situation where sustainability is a priority for governments, companies and consumers.

As a fact, the European Union is **restricting the use of mono-use materials** and there is a European Plastics Strategy, whose objectives for 2030 are to **reduce the amount of plastics** that go to the landfill.

Conventional materials, such as PE, PP or PS, have traditionally been used by the industry to produce containers and other plastic films that are obtained from fossil resources that, in many cases, due to **multi-material mixtures or to food contamination cannot be easily recycled**.

When using the INZEA biopolymers, **plastic waste can be valued as compost**, hence the reduction of the amount of plastics into the environment is guaranteed.

INZEA® Applications

FOOD PACKAGING

Transparency is now possible with INZEA®. Excellent sealability and thermal shrinkage properties.

Blown Film Extrusion
Cast & Thermoforming Extrusion
Bi-oriented Film Extrusion

- Fresh vegetable bags
- Hygienic protections for sausages and meat
- Sealing films
- Fresh bread & pastry bags
- Multipack packaging bags

Suggested Products:
INZEA® F15C, INZEA® F18C and INZEA® F19

PAPER COATING & LAMINATING

INZEA® is the ideal product to be used in combination with other non-plastic materials such as cardboard, as it improves its performance and guarantees its ecological profile.

Blown Film Extrusion

- Coating for cellulose trays and plates
- Cardboard coating
- Paper mould coating
- Paper laminating

Suggested Products:
INZEA® F16C, INZEA® FH11, INZEA® F13C and INZEA® F18C

PAPER LIKE FILMS

INZEA® offers a solution to replace paper and cardboard packaging, with clear advantages for thermoforming and sealing while maintaining its breathability. INZEA® paper like films also have excellent sealing and tearing properties.

Blown Film Extrusion
Cast Extrusion

- Cardboard and paper substitution, clamshells and warps
- Packaging for fresh food and bakery

Suggested Products:
INZEA® F18P

SHRINK FILMS

INZEA® delivers similar properties than polyolefins for shrink wrapping applications.

Blown Film Extrusion

- Packaging shrink film for soft drinks, alcoholic drinks & milk multipacks
- Shrink packaging for solid vegetables and foodstuff
- Overwrap on packaging, including cartons, boxes and pallet loads

Suggested Products:
INZEA® F15C

OTHER PACKAGING APPLICATIONS

Compostable packaging solutions to replace petroleum-based plastics.

Blown Film Extrusion
Filament Extrusion
Extrusion Thermoforming
Injection Blow Moulding

- Packaging for fresh and frozen food, for hygiene products, carrier bags,etc.
- Fruits and vegetable nets
- Labels








BOTTLES AND CONTAINERS

INZEA® is the material of choice for compostable bottles that combines environmental care and good performance in conventional production processes.

Extrusion Blow Moulding
Injection Blow Moulding

- Dairy bottles
- Beverage bottles
- Containers for phytosanitary products or consumer goods

Suggested Products:
INZEA® F38

CATERING MATERIALS

Disposable food service products can be safe for the environment, fully compostable and safe for contact with food when produced with INZEA®.

Injection Moulding
Extrusion Thermoforming
Blown Film Extrusion

- Trays
- Bowls and plates
- Glasses and lids
- Cutlery and straws

Suggested Products:
INZEA® F2 HTS 451, INZEA® F29 HT10 and INZEA® F38

ALL AROUND **COFFEE & TEA**

INZEA® based disposable coffee capsules and tea bags can be composted with organic waste so the container and its content will return to nature.

Injection Moulding
Extrusion Thermoforming
Blown Film Extrusion

- Coffee and tea capsules
- Tea bags
- Coffee packaging solutions

Suggested Products:
INZEA® F2 HTS 451 and INZEA® F29 HT 10









HYGIENE DISPOSABLES

Thanks to its biodegradability properties, INZEA® contributes to the reduction of waste thanks to the valorisation of the disposable products.

Injection Moulding
Extrusion Thermoforming
Blown Film Extrusion

- Sanitary towels
- Diapers
- Non-woven clothing
- Hygiene products packaging

Suggested Products:
INZEA® F10

SHORT LIFESPAN ITEMS

Thanks to INZEA®, these single use items can be manufactured in a sustainable manner and close their lifecircle.

Injection Moulding
Blown Film Extrusion
Extrusion Thermoforming

- Stationary items, pens, clips, tape containers, etc.
- Promotional items
- Make-up packaging
- Candy boxes
- Disposable Health & Beauty items

Suggested Products:
INZEA® F22, INZEA® F25 and INZEA® F38

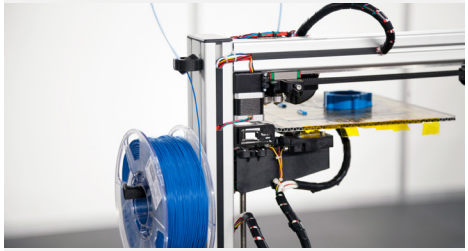
3D PRINTING FILAMENT

INZEA® range of products for 3D printing filaments has an improved thermal stability that multiplies the final applications in which this technology can be used, thus being able to grow the market of this type of materials.

Filament Extrusion

- 3D printing filaments

Suggested Products:
INZEA® HTS series and INZEA® F38



AGRICULTURE

The agricultural films and other products manufactured with INZEA® are biodegradable in soil without any damage to the environment.

Blown Film Extrusion
Extrusion Thermoforming
Injection Moulding

- Mulching film
- Garden waste bags
- Clips, guides, seeding pots, etc.
- Planters
- Stake plants

Suggested Products:
INZEA® F10, INZEA® F09 E, INZEA® F08 and INZEA® F15C

RETAIL BAGS

Local authorities are promoting the replacement of polyolefin-based bags. INZEA® can replace polyolefins and comply with the new sustainable regulations in force in each country.

Blown Film Extrusion

- T-Shirt bags (single use)
- Shopping bags
- Patch handle and Loop handle bags
- Fruits & vegetables bags

Suggested Products:
INZEA® F10, INZEA® F10 BC50, INZEA® FH11, INZEA® F09 E and INZEA® FH08

WASTE MANAGEMENT

Compostable bags made of INZEA® biopolymers are the perfect solution for the collection of organic waste. They can be disposed of as organic waste and valorised in compost.

Blown Film Extrusion

- Organic waste bags
- Garden waste bags
- Food waste bags
- Dog waste bags
- Caddy liners

Suggested Products:
INZEA® F10, INZEA® F10 BC40, INZEA® FH11, INZEA® F09 E and INZEA® FH08

INZEA®

Product Grades

INZEA® BIOPOLYMERS
PRODUCT GRADES

INZEA is a range of biopolymers which can replace traditional plastics in different applications such as bags, mono-use items and packaging, with the advantage of biodegradation or being able to be converted into compost.

Our sustainable polymers have the **same functionality as conventional polymers** and are specially recommended for applications such as single use packaging, disposable articles or items with complex collection processes e.g. mulch films, catering materials and certain packaging. The main advantage is that at the end of its lifetime, INZEA products can be valorized even when containing organic remains. It does not matter if the product is stained with food, everything will be composted.

INZEA's portfolio offers a wide range of **flexible and rigid grades**.

INZEA product range offers a variety of grades, with different flexibility, transparency and other technical properties such as **sealability and thermal shrinkage** that can be processed on standard blown film, cast film, blow moulding, injection moulding, filament and thermoforming extrusion lines.

INZEA flexible grades are suitable for applications such as, flexible and transparent packaging, paper laminating, paper-like, paper coating, mulch film, shrink film and thermoforming.

INZEA rigid grades are bio-based polymers with a **renewable content of 40 to 85%** and they **can be processed in conventional equipment** for polyolefins or styrenics. Its use is recommended in applications with a short lifespan or in applications difficult to collect once they are used. **Disposable items for catering** such as trays, bowls, plates, cups and cutlery, coffee capsules or various products used in agriculture, such as paper clips or gardening pots, are safe bets for a change.

INZEA also offers grades with **thermal resistance up to 156ºC**; microwave food containers, **coffee capsules** or hot food containers are the perfect applications for the INZEA High Temperature grades.

INZEA® BIOPOLYMERS
PRODUCT GRADES

FLEXIBLE GRADES

GENERAL PROPERTIES	METHOD	UNITS	F10*	F13	F10 BC50	F10 BC60	FH11	F11	F09E*	F08*
% Biobased content	ASTMD 6866	%	32	38	54	60	40	-	-	-
% Renewable content		%	40	45	58	65	40	40	25	<10
MVR (190ºC/2, 16 Kg)	ISO 1133	cc/10min	<5	<3	<5	<5	<5	<5	<7	<7
Moisture content	NAPPA-032	%	<0,6	<1	<1	<1	<1	<0.6	<1	<1
MECHANICAL PROPIERTIES										
Thickness	Internal	µm	20	20	12	12	12	20	20	20
Modulus	ISO 527-3	MPa	200	300	100	300	400	200	100	300
Stress at yield MD	ISO 527-3	MPa	7	8	10	10	15	8	8	10
Strain at yield MD	ISO 527-3	%	7	5	10	3	6	10	10	10
Stress at break MD	ISO 527-3	MPa	20	23	20	20	42	19	27	25
Strain at break MD	ISO 527-3	%	200 - 300	150 - 200	100 - 150	60 - 70	150 - 200	200 - 300	350 - 400	250 - 350
Tear Force TD	ISO 6383-1	N	2.2	0.8	1.4	0.4	0.7	2.1	3.3	3.5
Tear Strength TD	ISO 6383-1	N/mm	105	40	120	25	60	100	150	160
Punction Force	ISO 14477	N	0.6	0.5	0.3	0.3	0.3	0.6	0.8	0.6
Punction Elongation	ISO 14477	mm	2.7	2.4	1.5	1.3	0.8	2.7	3.5	2.2
Punction Strength	ISO 14477	mJ	1.0	0.9	0.3	0.3	0.2	1.0	1.7	0.8
Haze	ASTM D1003	%	>80	>80	>80	>80	16	>80	>80	>80
COMPOSTABILITY CERTIFICATIONS										
OK Compost	EN 13432		✓	✓	✓	✓	✓	✓	✓	✓
HOME OK Compost			✓	✓	✓	✓	✓	-	-	-
Biodegradable in Soil	EN 17033		✓	-	-	-	-	-	✓	✓
PROCESSING SUGGESTIONS										
Blown Film Extrusion			✓	✓	✓	✓	✓	✓	✓	✓
Cast & Thermoforming Extrusion			✓	✓	✓	✓	✓	✓	✓	✓
Profiles & Filaments Extrusion			-	-	-	-	-	-	-	-
Extrusion Blow Moulding			-	-	-	-	-	-	-	-
Injection Moulding			-	-	-	-	-	-	-	-
Injection Blow Moulding			-	-	-	-	-	-	-	-

Home compost

* UV grades available.

M20	M23	M28	M35	FH08	FH08 BC50	F15C	F18C	F19	F19C	F15C HT	F19 HT
-	-	-	-	-	45	-	-	-	-	-	-
<20	<20	<20	<20	15	50	50	80	85	90	50	80
<10	<10	<10	<10	<10	<10	<7	<7	<7	<7	<5	<5
<1	<1	<1	<1	<1	<1	<0,3	<1	<0.5	<1	<0.3	<0.3
20	20	20	20	12	12	20	20	250	250	20	50
150	260	120	400	500	300	1500	2100	2200	2200	1600	2700
9	9	9	10	12	8	35	35	-	-	35	-
10	7	13	4	3	4	3	3	-	-	3	-
20	23	27	25	35	35	45	45	35	55	30	40
300 - 400	400 - 500	380 - 480	350 - 450	200 - 250	150 - 200	100 - 150	100 - 200	30	6	100 - 150	20 - 100
3.0	3.5	3.3	2.7	0.8	1.3	0.2	0.2	6.0	7.5	0.2	0.5
140	165	145		50	100	10	10	22	26	9	9
1.0	1.0	1.0	1.0	0.7	0.5	2.2	2.3	10	10	1.2	3.6
3.5	3.5	3.5	3.5	2.7	3.5	2.6	2.6	0.9	0.9	1.9	1.8
2.0	2.0	2.0	2.0	1.2	1.2	3.2	3.5	4.5	4.5	1.4	4.2
>80	>80	>80	>80	10	10	50	3	>80	0.5	35	70
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Full food contact

Transparent

Certification in progress

INZEA® BIOPOLYMERS
PRODUCT GRADES

RIGID GRADES

PHYSICAL PROPERTIES	CONDITIONS	TEST METHOD	UNIT	F58 AL30	F58 AL40	F22	F25	F38
% Renewable content			%	>30	>40	>60	>75	>70
Moisture content		NAPPA-032	%	<0.5	<0.5	<1	<1	<1
Melting Temperature (DSC)	10ºC/min	ISO 3146	ºC	110 - 120	110 - 120	140-155	140-155	140-155
MECHANICAL PROPERTIES (Molded amorphous with 20ºC mould temperature)								
Heat Deflection Temperature (HDT)	0,45 Mpa	ISO 75-1/-2	ºC			60	60	60
Tensile modulus	23ºC, 1mm/min	ISO 527-1/-2	MPa	720	970	1100	1700	2300
Tensile strength	23ºC, 50mm/min	ISO 527-1/-2	MPa	14	13	16	20	46
Elongation at yield	23ºC, 50mm/min	ISO 527-1/-2	%			4	2	2.7
Elongation at break	23ºC, 50mm/min	ISO 527-1/-2	%	100	20	20	3	20
Flexural modulus	23ºC, 2mm/min	ISO 178	MPa	650	900	1100	1600	2200
Flexural strength	23ºC, 2mm/min	ISO 178	MPa	30	30	26	28	55
Charpy notched impact strength	23ºC	ISO 179/1eA	kJ/m²	3.0	2.0	4.0	2.0	5.6
MECHANICAL PROPERTIES (Molded crystalline with 100-120ºC mould or cold injection+ reheating in an oven)								
Heat Deflection Temperature (HDT)	0,45 Mpa	ISO 75-1/-2	ºC	-	-	-	-	-
Tensile modulus	23ºC, 1mm/min	ISO 527-1/-2	MPa	-	-	-	-	-
Tensile strength	23ºC, 50mm/min	ISO 527-1/-2	MPa	-	-	-	-	-
Elongation at yield	23ºC, 50mm/min	ISO 527-1/-2	%	-	-	-	-	-
Elongation at break	23ºC, 50mm/min	ISO 527-1/-2	%	-	-	-	-	-
Flexural modulus	23ºC, 2mm/min	ISO 178	MPa	-	-	-	-	-
Flexural strength	23ºC, 2mm/min	ISO 178	MPa	-	-	-	-	-
Charpy notched impact strength	23ºC	ISO 179/1eA	kJ/m²	-	-	-	-	-
COMPOSTABILITY CERTIFICATIONS								
OK Compost		EN 13432		✓	✓	✓	✓	✓
HOME OK Compost				-	-	-	-	-
Biodegradable in Soil		EN 17033		-	-	-	-	-
PROCESSING SUGGESTIONS								
Blown Film Extrusion				-	-	-	-	-
Cast & Thermoforming Extrusion				✓	✓	✓	✓	✓
Profiles & Filaments Extrusion				✓	✓	✓	✓	✓
Extrusion Blow Moulding				-	-	-	-	✓
Injection Moulding				✓	✓	✓	✓	✓
Injection Blow Moulding				-	-	-	-	✓
				Full food contact				

F29 AL30	F29 TR	F2 HTS 451	F2 HTS 655	F28 HT	F29 HT 10	F29 HT 30	F29 HT G10	F29 HT G30	F29 HT NFC 30
>85	>95	75	65	80	84	80	84	80	90
<1	<1	<0.5	<0.5	<1	<1	<1	<1	<1	<1
140-155	140 - 155	175 - 180	150	175-180	175-180	175-180	175-180	175-180	175-180
60	60	80	75	60	64	62	64	70	60
3100	3300	2800	1550	2600	4200	4700	5300	9900	4600
40	60	44	38	48	51	48	78	87	46
-	-	-	9.5	2.4	2	3	-	-	-
1.8	3.5	3.7	11.5	3.5	4.7	5	1.8	1.1	1.7
2900	3000	2450	1450	2500	4100	5000	4600	9000	4300
55	100	55	50	62	64	68	84	109	65
2.0	3.0	3.7	7.5	4.0	3.7	6.5	7.5	9.0	4.0
-	-	-	-	110	110	135	147	156	135
-	-	-	-	2900	4400	4700	5800	10300	4150
-	-	-	-	47	52	41	73	73	46
-	-	-	-	-	2.2	1.4	-	-	-
-	-	-	-	2.1	3.1	2.2	1.6	0.9	1.7
-	-	-	-	2950	4100	5200	5000	9400	4700
-	-	-	-	40	75	56	86	98	70
-	-	-	-	3.2	3.0	5.7	8.2	7.4	4.0
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
✓	-	✓	✓	✓	✓	✓	-	-	✓
-	-	✓	✓	✓	✓	-	-	-	-
-	-	-	✓	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	✓	-	-	-	-	-	-	-	-

Full food contact

Direct HT

HT post process

INZEA® BIOPOLYMERS
PRODUCT GRADES

SPECIAL PAPER GRADES

GENERAL PROPERTIES	METHOD	UNITS	FH11	F13C	F18C	F16C	F18P
% Renewable content		%	40	50	80	60	40
MVR (190ºC/2, 16 Kg)	ISO 1133	cc/10min	<5	<5	<7	15-20	<10
MVR (260ºC/2, 16 Kg)	ISO 1133	cc/10min	-	-	-	95-105	-
Moisture content	NAPPA-032	%	<1	< 0.3	<1	<0.3	<1
MECHANICAL PROPIERTIES							
Thickness	Internal	µm	12	50	20	20	60
Modulus	ISO 527-3	MPa	400	1000	2100	1800	900
Stress at yield MD	ISO 527-3	MPa	15	25	35	35	10
Strain at yield MD	ISO 527-3	%	6	4	3	3	2
Stress at break MD	ISO 527-3	MPa	42	35	45	30	10
Strain at break MD	ISO 527-3	%	150 - 200	350 - 450	100 - 200	100 - 200	10 - 20
Tear Force TD	ISO 527-3	N	0.7	0.3	0.2	0.3	0.5
Tear Strength TD	ISO 6383-1	N/mm	60	6	10	11	8
Punction Force	ISO 14477	N	0.3	1.7	2.3	1.3	2.0
Punction Elongation	ISO 14477	mm	0.8	1.2	2.6	1.9	1.4
Punction Strength	ISO 14477	mJ	0.2	1.2	3.5	1.7	1.8
Haze	ASTM D1003	%	16	>80	3	50	>80
COMPOSTABILITY CERTIFICATIONS							
OK Compost	EN 13432		✓	✓	✓	✓	✓
HOME OK Compost			✓	-	-	-	-
Biodegradable in Soil	EN 17033		-	-	-	-	-
PROCESSING SUGGESTIONS							
Paper Laminating			✓	✓	✓	-	-
Paper Coating			-	-	-	✓	-
Paper Like			-	-	-	-	✓

Certification in progress

MADE TO MEASURE SOLUTIONS

The requirements of the vast INZEA applications are just as diverse as the industries from which they come. **INZEA offers customized solutions for your applications**. Each application is unique. We work together with our customers to adapt existing product grades and to develop tailor-made products.

Thanks to many years of experience and our continuous investment in R&D development, NUREL Biopolymers can develop the most adequate INZEA solution to **match all production conditions, product requirements and biodegradability legislations**.

A **new product development** starts from a **customer request**, our technical team will analyse the end-use of the product, the processing method and its end-use requirements. We start working on the product definition, and propose a new formulations thanks to our polymer chemistry know-how.

We **design the process from lab scale to industrial scale always taking in consideration the biodegradability and the bio-based content requirements**. Once we confirm that the material is approved at the customer, we run an industrial production.

For any special requirement, either for injection moulding or extrusion applications, please contact us.


INZEA® is our answer to customers' demand for more sustainable plastic materials.

INZEA®

Tests and Certifications

INZEA® BIOPOLYMERS
CERTIFICATIONS

TÜV Biobased content ASTM D6866

According to the American Society for Testing and Materials (ASTM), a biobased material is an organic material in which carbon is derived from a renewable resource via biological processes.

ASTM has set a standard method to calculate the level of biobased carbon included in a resin. INZEA® product range is partially biobased and complies with USDA Certified Biobased Product Certification based on **ASTM D6866** Standard.

TÜV OK compost EN 13432: 2000 & ASTM D6400-12

This label guarantees compliance with **EN 13432** and **ASTM D6400-12**, international standards for compostability in industrial composting facilities. The product has to comply with the following requirements:

- 90% of biodegradation max 6 months at 50±2°C with a 50-55% RH.
- Material with a size greater than 2mm must be <10% after 3 months.
- Chemical analysis of final compost and tests of eco-toxicological effects.

TÜV HOME compost

To guarantee complete biodegradability in a garden compost heap. It refers to products that compost at lower temperatures. The product has to comply with the following requirements:

- 90% of biodegradation max 12 months at 20-30°C.
- Material with a size greater than 2mm must be <10% after 6 months.
- Study and tests of eco-toxicological effects in higher plants.

Mulch Film Biodegradability in Soil EN 17033

EN 17033 is the first European standard on the characteristics that biodegradable mulch films must have to comply with the requirements of soil biodegradability, ecotoxicity and mechanical and optical properties.

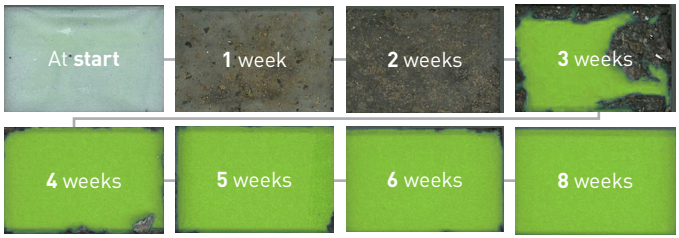
INZEA® products conform with the international standards for composting and biobased content.

INZEA® BIOPOLYMERS
TESTS

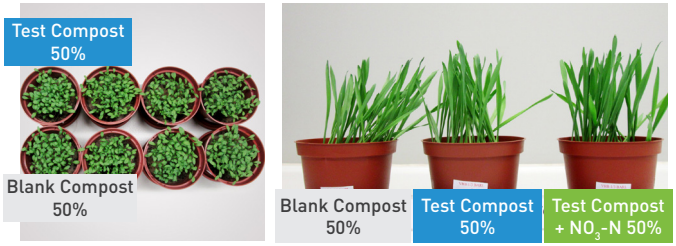
The European Norm on packaging compostability (EN 13432) requires that biodegradable/compostable products completely decompose in a composting setting in a specific time frame, leaving no harmful residues behind. In order to ensure this, the norm requires the following tests:

- **Test on biodegradation.**
  Chemical breakdown of materials into CO_2, water and minerals. Pursuant to the standard at least 90% of the material has to be broken down by biological action within 6 months.
- **Test on heavy metals content.**
  Volatile matter >50%, heavy metals (Cu, Zn, Ni, Cd, Pb, Hg, Cr, Mo, Se, As) and fluorine below limit.
- **Test on disintegration.**
  Physical falling apart of the product in small fragments.
- **Test on ecotoxicity.**
  Measures if the composted product does not exert any negative effect on plants.

Test on disintegration of INZEA®



Test on ecotoxicity of INZEA®



FOOD CONTACT

All our INZEA® product range complies with regulation 10/2011, so it is **suitable for Food Contact** taking under consideration some restrictions on use conditions and type of food. For more information, contact NUREL's Technical Department.

GMO FREE

Genetically Modified free self declaration grades are **available upon request.** Please contact our Technical Department for further information.

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