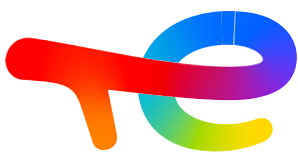


# Artificial Grass



Yarn  
chemistry  
is our  
field



**TotalEnergies**

# TotalEnergies Polymers Europe, technological leader

## A cutting-edge expertise in polymers

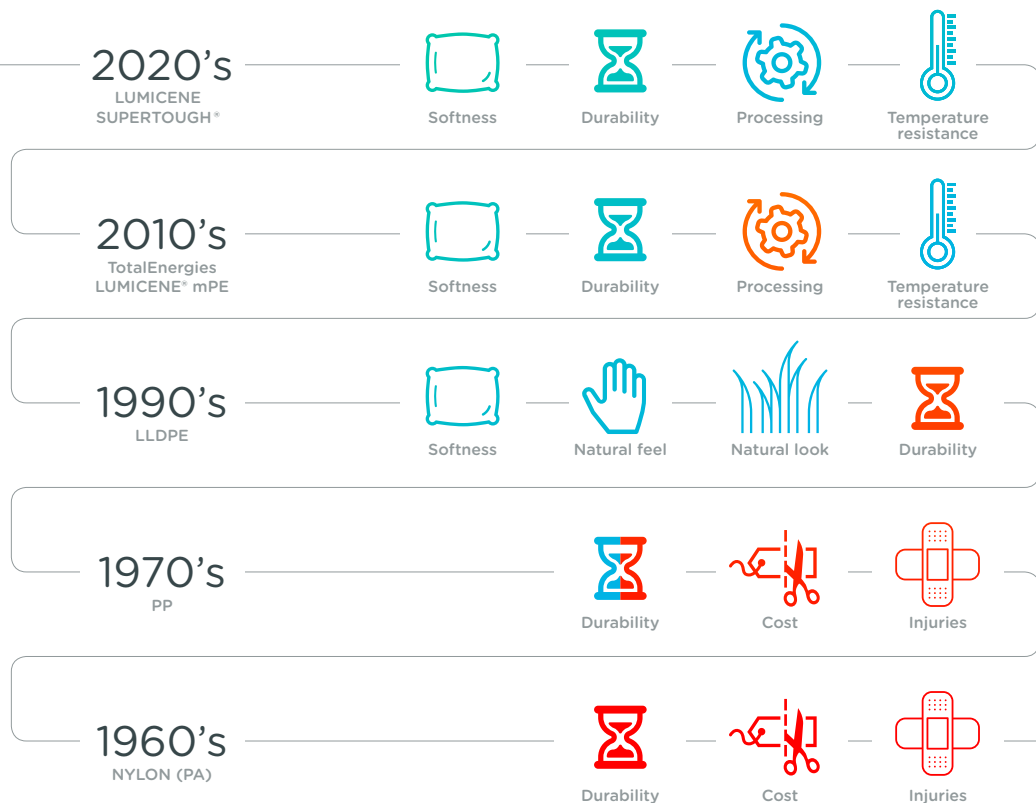
Polymers are used in a variety of products that enhance our daily lives. At TotalEnergies, we have been working for more than half a century with our customers to develop **innovative, high-performance polymers**. The key focus was always on sustainability, with products that enable lighter end products, a longer lifespan or a lower Product Environmental Footprint (PEF) through the use of **recyclate-based feedstock or bio-sourced raw materials**.

## Polyethylene Technology development for artificial grass

Polyethylene monofilaments revolutionized artificial turf pitches by providing **higher softness and a more natural look**.

Combined with TotalEnergies' Lumicene® and Lumicene Supertough® technologies, it also provides fields with **fibers of excellent resilience and unrivaled durability**.

## From Nylon to Lumicene®



# Pioneer in technology for linear polyethylene

## Our resins achievements

Excellent  
**durability**

Unrivalled  
**resilience**  
performances

Low  
**pressure**  
build up

High  
**speed**  
processing

## Our expertise in yarn design and performance

Developing the best yarn for a given application means finding the **optimal balance between durability, haptics, and resilience**. Let us partner with you to create a yarn formulation to achieve this in perfect harmony with your machinery and shape design.



**Durability**  
resistance to degradation  
under heavy use



**Resilience**  
to prevent premature  
flattening of the field



**The haptics**  
provide a pleasant touch  
and prevent injuries

# Our contribution to the market



## ESTC membership

For many years TotalEnergies has been a full member of ESTC, the trade association for the synthetic turf industry in the EMEA region, and participating actively in various of its task forces.



## Morton Extrusionstechnik Tarkett

TotalEnergies and Plastic Energy announced in September 2020 a joint venture to build France's first advanced recycling plant on TotalEnergies' zero-crude platform in Grandpuits. With a capacity of 15,000 per year, the plant will process end-of-life plastic waste that would otherwise be destined for landfill or incineration, and convert them into a recycled feedstock called TACOIL through a pyrolysis process. The TACOIL produced will be used for the manufacturing of high-quality recycled polymers in TotalEnergies' European production units.

This technology has already been demonstrated by the development of chemically recycled polyethylene grades for fibre production and pilot pitch installation for our long-standing client Morton Extrusionstechnik Tarkett. With identical properties to virgin grades, our recycled grades offer a lower product environmental footprint without compromises on performance or processability.

# A complete portfolio

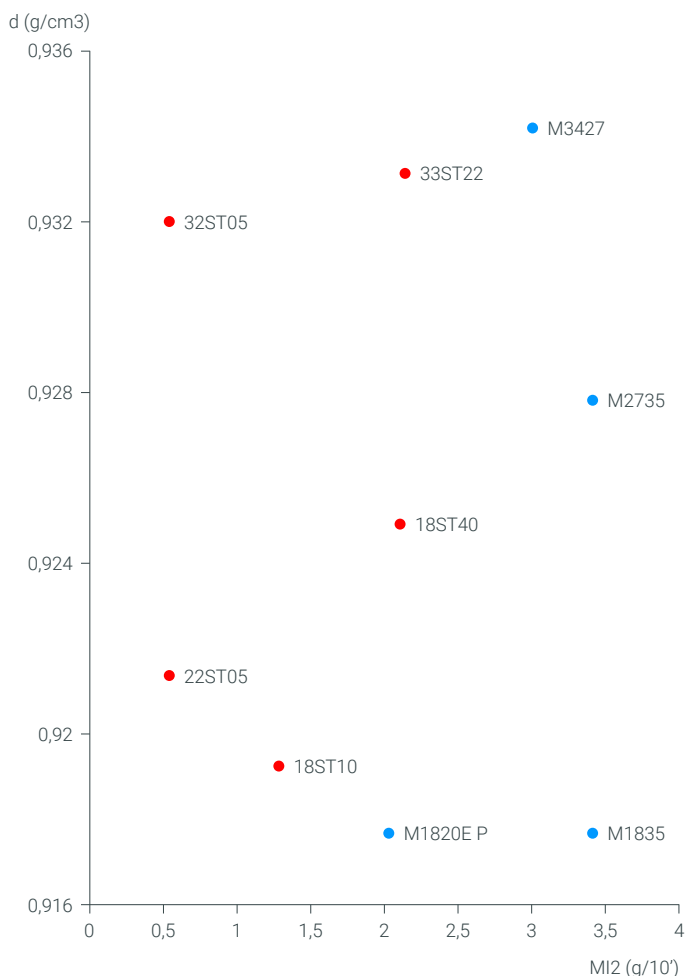
## Key products

Our **extensive product portfolio** allows yarn manufacturers to **fine tune yarn performance for any application**, be it football, rugby, golf or your backyard.



## Yarn design and performance

	d	MI2
<b>CONTACT SPORTS</b>		
Supertough 18ST40	0,918	4,0
Supertough 18ST10	0,919	1,2
Lumicene® M1820EP	0,918	2,0
Lumicene® M1835	0,918	3,5
<b>NON CONTACT SPORTS</b>		
Supertough 33ST22	0,933	2,2
Lumicene® M2735	0,927	3,5
Lumicene® M3427	0,934	3,1
PPH 3060		1,8
<b>LANDSCAPING</b>		
Supertough 33ST22	0,933	2,2
Lumicene® M1835	0,918	3,5
Lumicene® M2735	0,927	3,5
Lumicene® M3427	0,934	3,1
PPH 3060		1,8
PPH 4060		3,0
Lotrène® Q2018C (C4-LLDPE)	0,918	2,0
<b>BACKING</b>		
PPH 3060		1,8
PPH 4060		3,0
Supertough 32ST05	0,932	0,5
<b>SHOCKPAD</b>		
LDPE CD0230	0,922	2,0

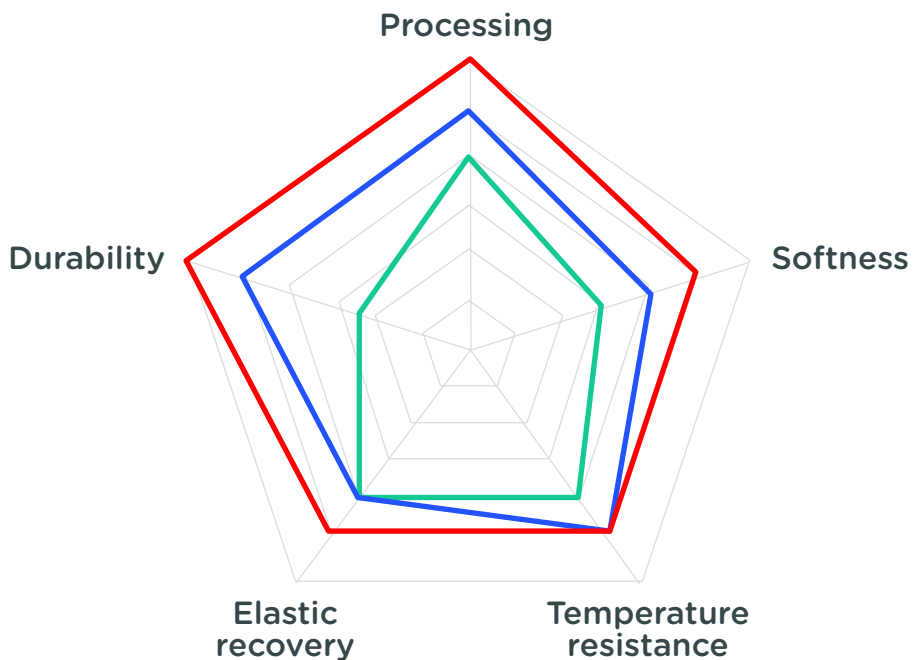


● Lumicene® ● Lumicene Supertough®

# Our technologies

**Lumicene® polyethylene** is made with TotalEnergies proprietary metallocene catalyst technology. Compared to conventional metallocene PE, Lumicene® PE can be processed faster, provides higher durability and features improved resilience.

**Lumicene Supertough®** grades are based on the combination of the Lumicene® catalyst technology with TotalEnergies proprietary production process. These high performance resins allow us to reach hitherto unknown levels of performance whilst allowing converters to reach maximum line speeds.



- Lumicene Supertough®
- Lumicene® technology
- LLDPE-C8 technology



# A sustainable approach

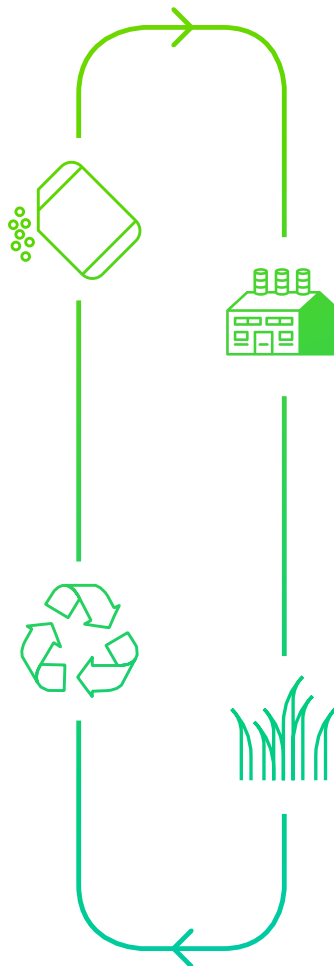
TotalEnergies is active throughout the **sustainable development chain**. As for our polymers activity, we focus on **innovation to develop both recycling and renewable solutions**.

## Raw material

We invest and innovate in our feedstock sourcing to produce either drop in polymers (PP, PE, PS) with less carbon emission impact through a mass balance approach, or full bioplastics.

## End of life TotalEnergies internal resources to develop recycling solutions

Plastics should not end up in landfills nor find their way into the environment. Consequently, we are actively developing products (TotalEnergies Circular compounds®) that enable the use of the plastic content from waste streams, including artificial turf pitches that reach their end of life, and which bring the performance and quality of virgin plastics.



## Production

Supporting EU's carbon neutrality target, TotalEnergies commits to become a Net Zero Emission Company for all its European Businesses by 2050.

Furthermore, TotalEnergies global petrochemical division, which has signed the Responsible Care® Charter, undertakes to apply and promote good management practices in hygiene, health, safety, environmental performance, stakeholder relations and security. Within the framework of Operation Clean Sweep® several measures are taken to prevent plastic pellets from being released into the environment.

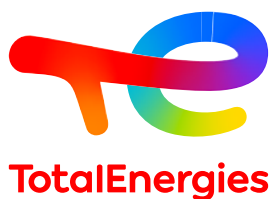
## Product use label ecosolution

Leveraging innovation to serve continuous improvement, the Lumicene Supertough® class of Polyethylene products enables our customers to improve their environmental footprint e.g. with artificial grass yarns with an extended lifetime or by enabling a PE-based primary backing, which facilitates the recycling process at the turf's end of life.



## About TotalEnergies

TotalEnergies is a broad energy company that produces and markets energies on a global scale: oil and biofuels, natural gas and green gases, renewables and electricity. Our 105,000 employees are committed to energy that is ever more affordable, clean, reliable and accessible to as many people as possible. Active in more than 130 countries, TotalEnergies puts sustainable development in all its dimensions at the heart of its projects and operations to contribute to the well-being of people.



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