SYENSQO

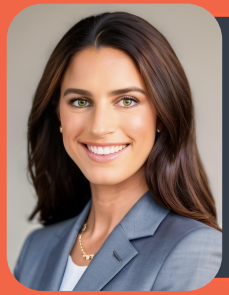
Webinar

Redefining the Future of E-Bikes with Syensqo's High-Performance, Sustainable Polymers

SYENSQO
ADVANCING HUMANITY

| Speakers

Phil Martin PhD
Senior Customer Technical Development



Meghan Powers
Global Marketing Manager

Webinar Agenda

1. Market trends and drivers shaping the industry
2. Introduction to Syensqo Specialty Polymers
3. Commitment to Sustainable Solutions
4. Product portfolio for bicycles and e-Bikes
5. Advantages of Specialty Polymers
6. Application highlights
7. Conclusion and Q&A

1

Market trends and drivers shaping the industry

Market trends and drivers shaping the industry

- Alternative raw materials for metal replacement
- Shift towards regional manufacturing
- Eco-friendly solutions and greener production processes
- Government incentives, subsidies, and support programs
- Personalization and design improvements

Audience Poll

SYENSQO

Which market trends do you see impacting your business the most?

A Alternative raw materials for metal replacement

B Shift towards regional manufacturing

C Eco-friendly solutions and greener production processes

D Government incentives, subsidies, and support programs

E Personalization and design improvements

Introduction to Syensqo Specialty Polymers

A pioneering legacy and a passion for science and bonding

SYENSQO

Solvay innovates in social welfare (paid vacations, social security, 8-hour day)

1878

Ernest Solvay established the first Councils of Physics and Chemistry, which continue to bring together the brightest scientific minds today

1911 & 1922

Launch of PEEK, a very strong thermoplastic to replace metal for lighter, more fuel-efficient planes

1978

CHEMISTRY FOR THE FUTURE Solvay Prize

First Chemistry for the Future Solvay Prize

2013

Solvay partners with the Ellen MacArthur Foundation: a bold step toward circular economy

2018

13 products labelled Efficient Solutions by the Solar Impulse Foundation

Prof. Katalin Karikó wins Solvay Prize on 100-year anniversary of the Solvay Conferences

2022

SYENSQO

2023

Launch of Syensqo

SOLVAY

1863

Ernest Solvay invents a new process for producing soda ash

1880

Solvay is the first industrial multinational operating simultaneously in the US and Europe

1965

Development of PSU, a revolutionary healthcare polymer used for hemodialysis membranes

1990

Rhodia, a future Solvay unit, invents precipitated silica for green tires

2015

Solvay flies around the world with Solar Impulse

2020

Solvay creates the Solvay Solidarity Fund, to help colleagues and communities facing hardship

Launch of our 4th Growth Platform on Renewable Materials and Biotechnology

Top-tier specialty player

~13,200
Employees

62
Industrial sites

12
Major R&I centers

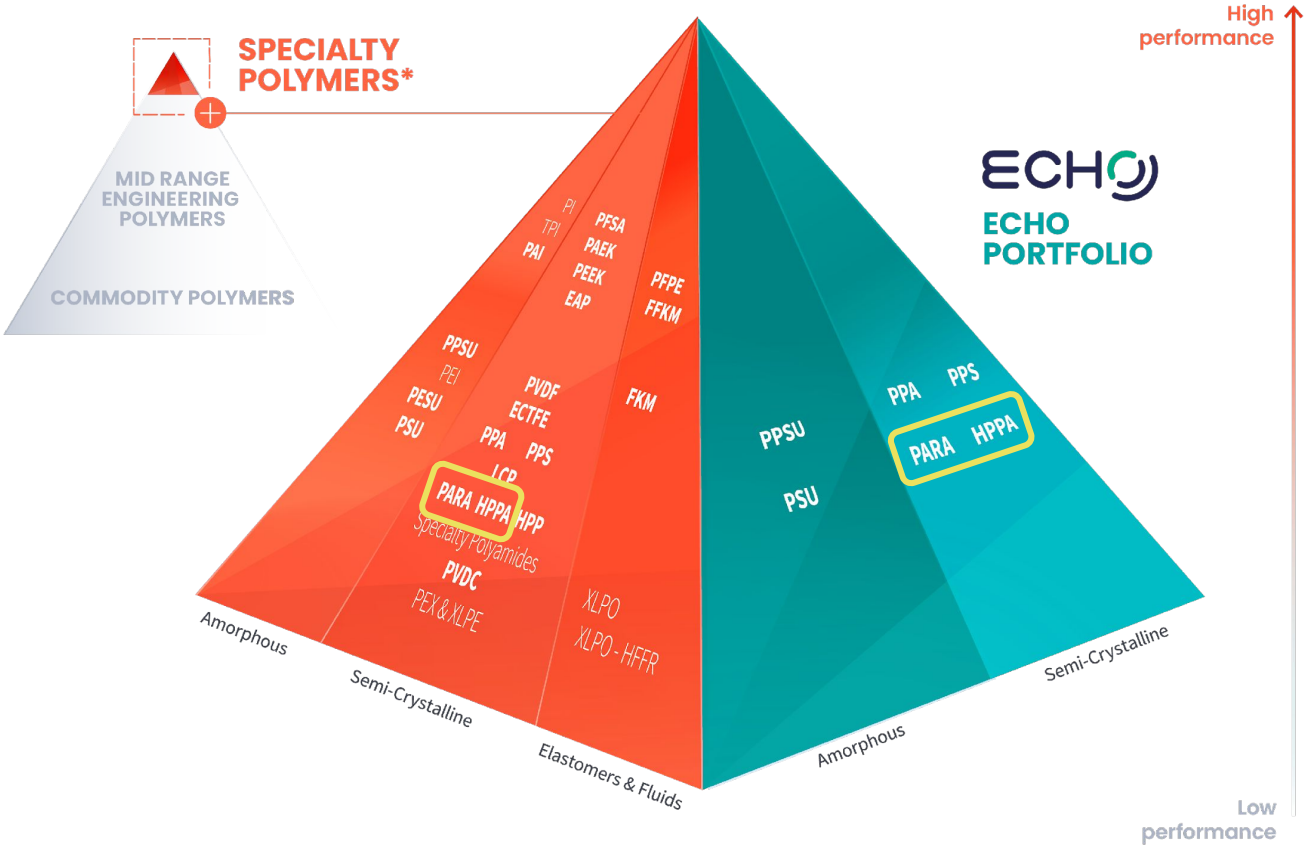
€6.8bn
Net sales

€1.6bn
Underlying EBITDA

23.7%
Underlying EBITDA margin

2023 Syensqo audited combined financial statements
FTE figures as of March 31st 2023

Specialty Polymers Product Overview



SYENSQO

Commitment to sustainable solutions

One Planet

A roadmap for growth & sustainability

Carbon Neutral
by **2040** (Scopes 1 & 2)

-40%
Scopes 1&2[2]
by **2030**

-23%
Scopes 3
by 2030[2]

Sustainable Solutions
driven by **circularity**

18%
circular sales
by 2030[2]

Injuries and illnesses[1]
Target: zero

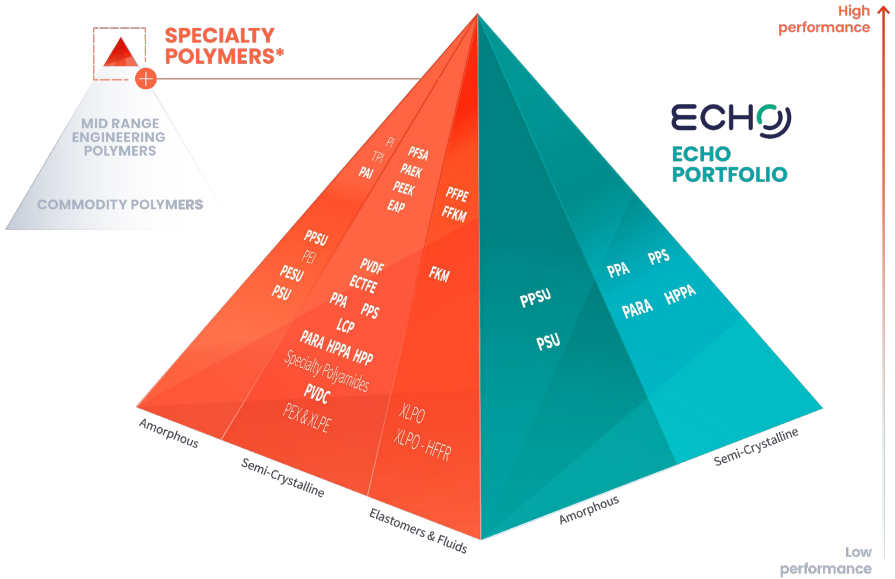
Gender parity[3]
Achieved in 10 years

Living wage
For 100% of our
workforce by 2026

[1] Reportable Injuries and Illnesses per 200,000 work hours
[2] Reference year 2021. For scope 3, on Focus 5 categories.
[3] Mid and senior management

Meet our ECHO Portfolio

More Sustainability, same performance



ECHO

More sustainability,
same performance.

BIOBASED | RECYCLED

- Sustainable grades with biobased and/or recycled content
- A lower carbon footprint than standard grades
- No compromise on performance

Audience Poll

SYENSQO

What are the primary areas of focus for your company's sustainability goals?

A Raw Materials

B Manufacturing

C Logistics

D Recyclability

E All of the Above

F None of the Above

SYENSQO

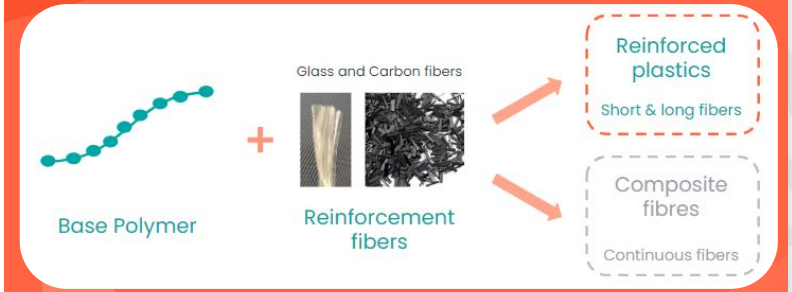
4

Product portfolio for bicycles and e-Bikes

Specialty Polymers for Bicycles and e-Bikes

SYENSQO

Approach for Metal Replacement



Omnix® HPPA
High-Performance Polyamide
- Glass Fiber ♻
- Carbon Fiber

Ixef® PARA
Polyarylamide
- Glass Fiber ♻
- Carbon Fiber ♻

Xencor™ PARA
Polyarylamide
- Long Glass Fiber
- Long Carbon Fiber

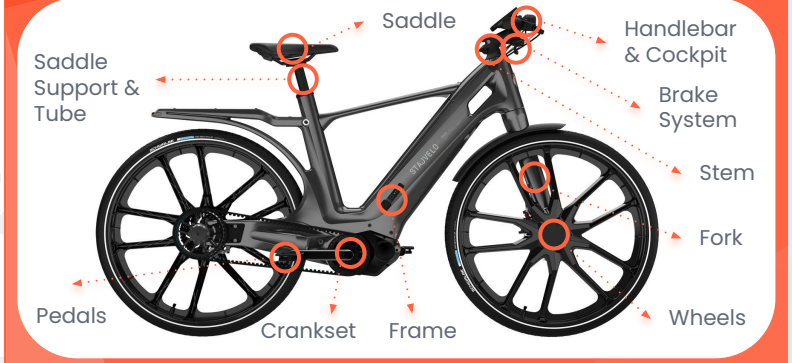
Xencor™ HPPA
High-Performance Polyamide
- Long Glass Fiber ♻

Thermoplastic Composites

♻ ECHO version available

SYENSQO
–
The Right Partner

Design Optimization with Polymers



SYENSQO

PA 6.6

–

Linear Molecular Structure

- Chemical resistance
- Good mechanical performance
- Good heat resistance
- High moisture absorption

Omnix® HPPA

–

Best of PA 6.6 plus…

- Lower water absorption
- Better dimensional stability
- Better retention of mechanical properties
- More aesthetic surface appearance
- Reduced warpage

Ixef® PARA

–

Best of HPPA plus…

- Even lower water absorption for exceptional dimensional stability
- Ultra-smooth surface finish for unparalleled aesthetics in structural thermoplastics
- Metal-like feel
- Best in class appearance

Xencor™ LGF & LCF

–

Best of HPPA & PARA plus…

- Long fiber reinforcement available for **Ixef® PARA**, **Omnix®HPPA**, and **Kalix® HPPA**
- Improved impact resistance
- Enhanced fatigue resistance
- Better creep and dimensional stability

Material Performance Spectrum

Omnix® HPPA

OMNIX® 1000 ECHO series

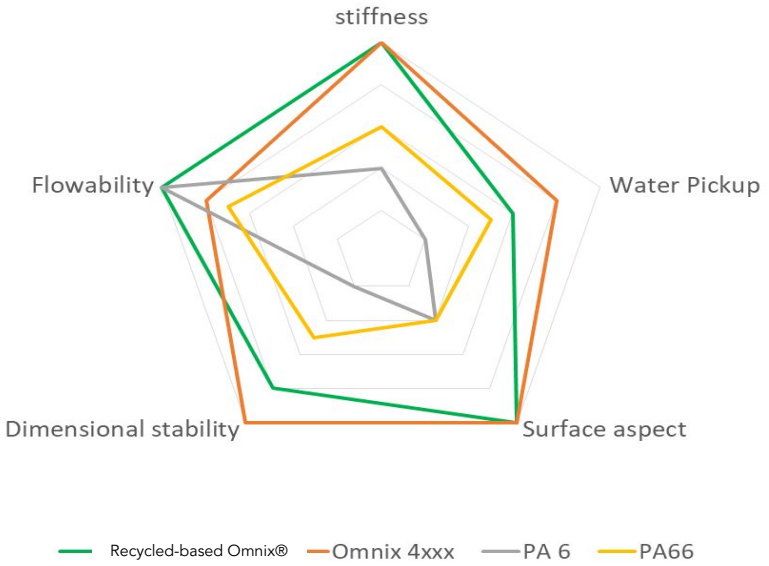
Drop-in solution into polyamide applications

- UV stabilization
- Heat stabilization
- 30 and 55% recycle glass fiber
- 98% allocated recycled content with up to 60% PCF[1] reduction potential.

OMNIX® 6000 ECHO series

Superior performance vs PA6 and PA66 base materials

- Lower water absorption
- Better dimensional stability
- Better retention of mechanical properties
- More aesthetic surface appearance
- Reduced warpage
- 30 and 55% recycle glass fiber
- 78%-83% allocated recycled content with up to 45% PCF[1] reduction potential.



IXEF® PARA

IXEF® Standard series

Unique combination of strength and aesthetics, making it ideal for complex parts that require both overall strength and a high-gloss, glass-free finish with naturally reflective shell

Key Features

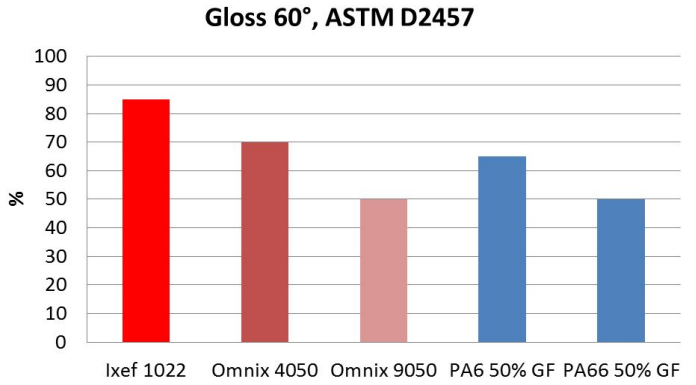
- Very high rigidity
- Excellent resistance to mechanical stresses
- Rigidity, injectability for complex, thin shapes
- Excellent surface finish
- Slow & low water pickup
- High flow even with 60% filler loading

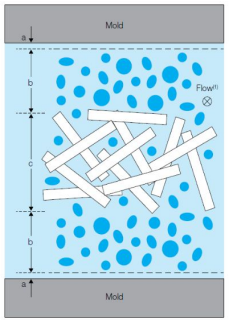
IXEF® Carbon Fiber Compounds for Structural Parts

A range of grades offering carbon fiber filled (30% and 40%) and carbon fiber with glass fiber filled PARA materials combining IXEF features with outstanding stiffness and rigidity.

ECHO grades offer up to 74% product carbon footprint reduction

A resin-rich surface provides superior aesthetics





Surface Layers
Resin-rich surface forms when part is packed into a mold with temperatures above 120°C

Core Layer
Glass fibers orient randomly in the center of the part

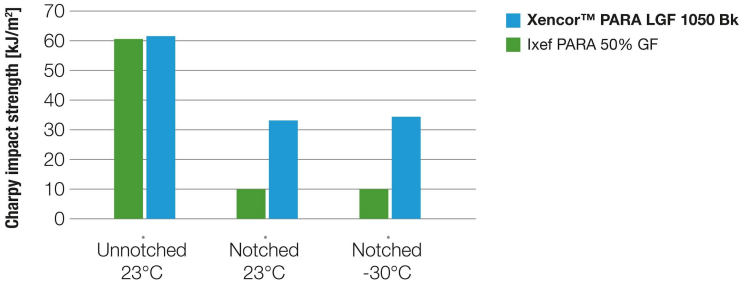
Skin Layers
Glass fibers preferentially orient in the flow direction near the mold

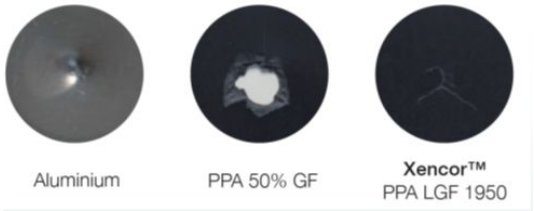
Xencor™ LFT Compounds

Long fiber compounds combines the key features of the polymer with significant improvements of high-temperature performance, fatigue, impact, creep and dimensional stability vs. std. GF compounds

Key Features

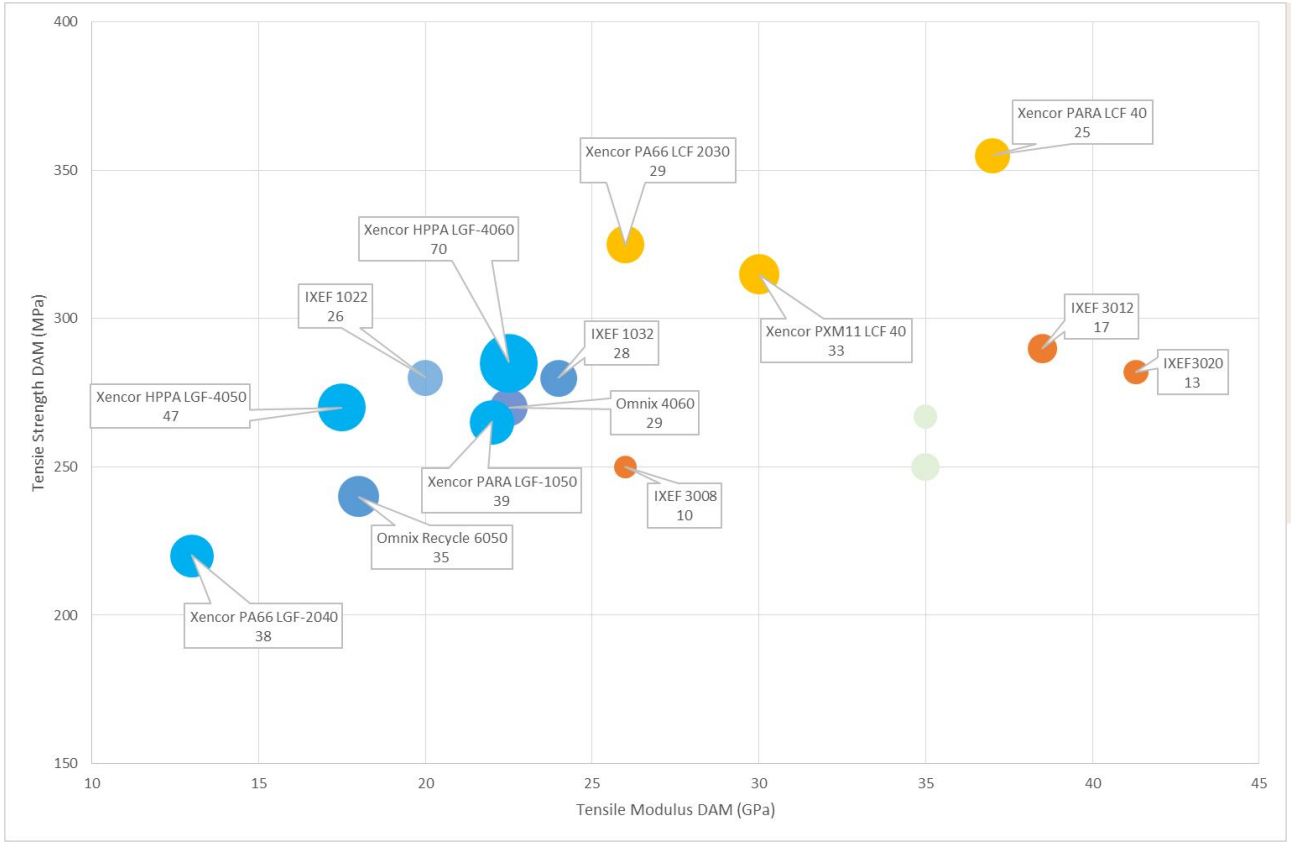
- Available in combination with **HPPA, PARA**, PPA and PPS resins
- Based on **long glass fiber (LGF)** or **long carbon fiber (LCF)** for maximum performance
- Advantage of long fibers vs short fibers
  - +10% stiffness at room T
  - +50% retention of mechanics at high T
  - **+250% crash resistance**
  - Up to 50% higher dimensional stability
  - **Up to 300% lower creep under high load**
  - +150% wear resistance
  - **Limited crack propagation**
  - No change in surface appearance & gloss





Part damages after high-sped multiaxial impact test PTI-CEAST -23°C -28,5 Joules Impactor

Syensqo Material Performance Overview



The size of the bubble (reported) corresponds to an impact indicator based on 80% notched + 20% unnotched impact strength

I <25	Low impact resistance
25 < I < 40	Good impact resistance
I > 40	Excellent impact resistance

- GF reinforced
- LGF reinforced
- CF reinforced
- LCF reinforced

SYENSQO

5

Advantages of Specialty Polymers

versus Metal and Engineering Plastics (PA6, PA66,...)

Advantages of our specialty polymers in bicycles and e-bikes

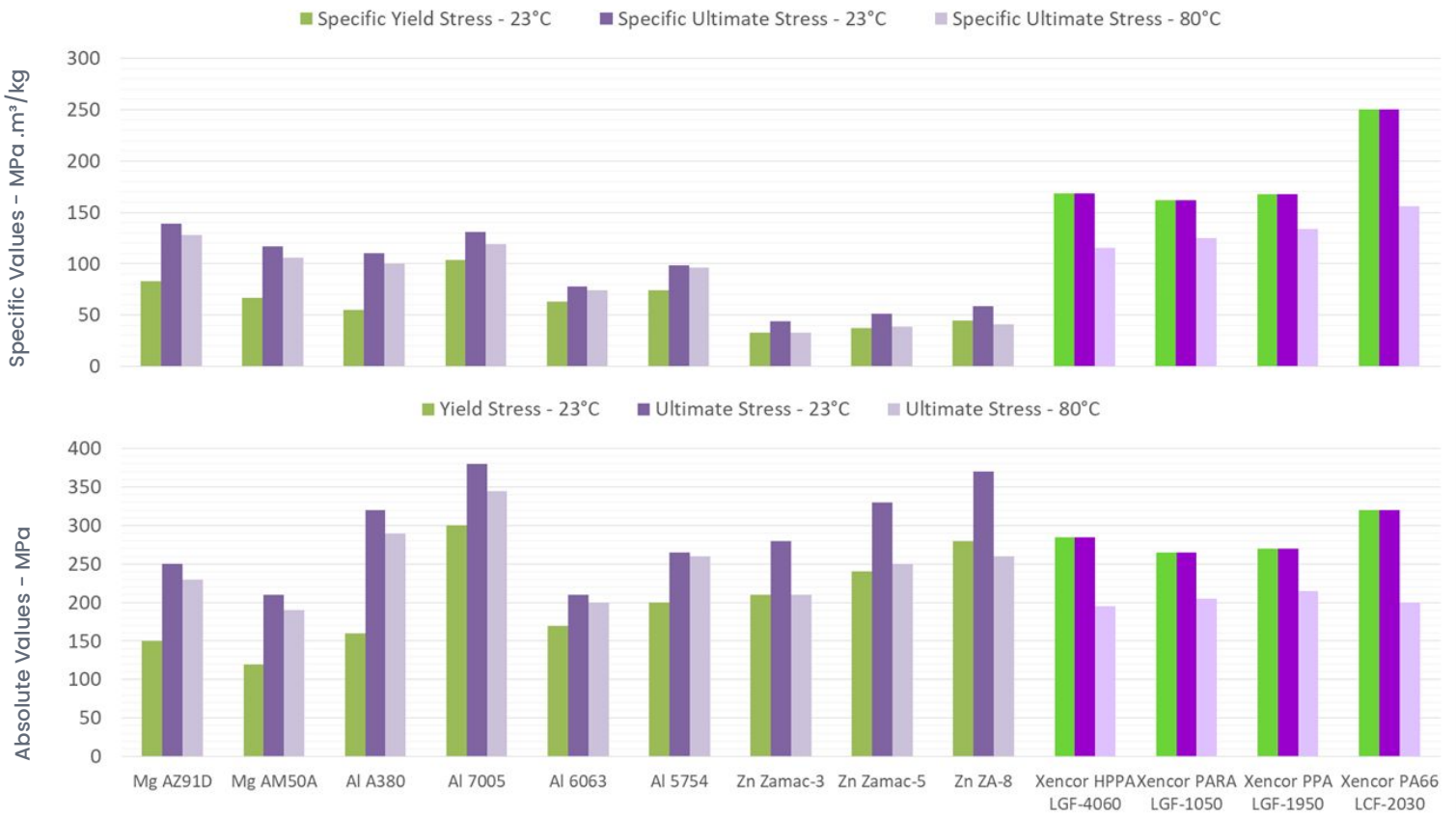
SYENSQO

Syensqo Polymers vs Metal

Cost Reduction & Manufacturing Efficiency	› Injection molding cuts production costs by an average of 39% versus premium Aluminum for e-Bike frames. › Enhanced design freedom and weight reduction through part reduction/integration › Faster cycle time › Post-operation tasks reduced (painting, polishing, …)
Design Flexibility	› Enhance design freedom and easier integration of new functionalities
Durability	› Corrosion free
Sustainability	› ~70% GWP reduction for the frame component with injection molding compared to Al manufacturing › ECHO grades offer up to 72% product carbon footprint reduction for a greener solution › End of life recycling possibilities versus metal which is only partially recyclable

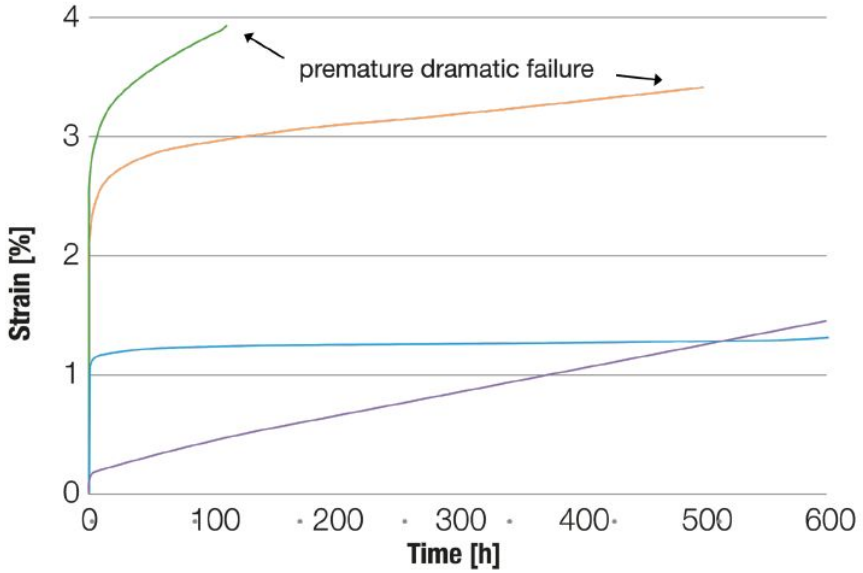
Syensqo Material Performance vs Metal

Syensqo materials exhibit better specific mechanical performance than metal



Syensqo Material Performance vs Metal

Xencor® LF compounds exhibit outstanding creep performance long-term, compared to Aluminum



Tensile Creep - 170°C - 60MPa

PPA 50% GF HS
PPA 45% GF HS
Xencor™ PPA LGF 1950 HS
Alu 6082 T6

Audience Poll

What do you consider the biggest advantage of replacing metal with Specialty Polymers in bicycles and e-Bikes?

A Cost Reduction & Manufacturing Efficiency

B Design Flexibility

C Durability

D Enhanced Sustainability

E All of the Above

Advantages of our specialty polymers in bicycles and e-bikes

Syensqo Polymers vs Engineering Plastics (PA6, PA66,...)

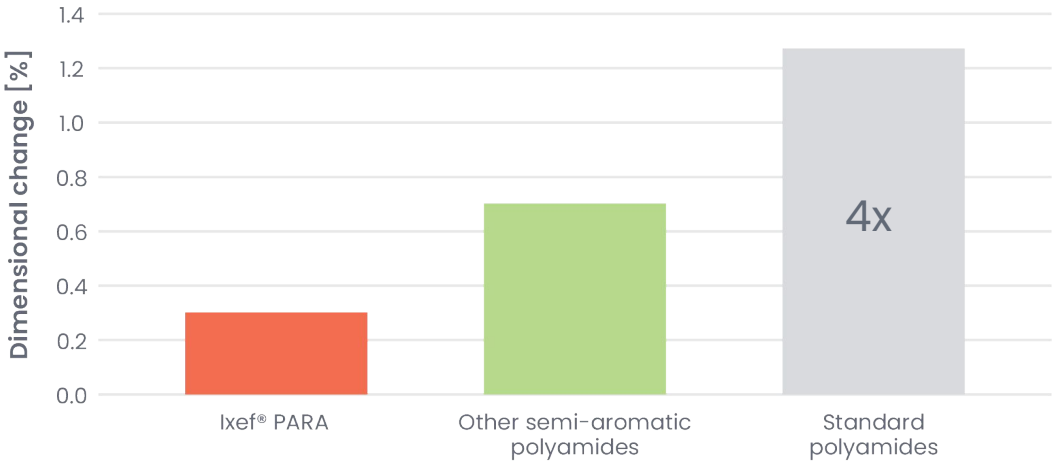
Material Performance	› Exceptional dimensional stability due to lower moisture absorption › Lightweight design for equivalent performance due to property retention › Lower warpage › Higher strength and stiffness
Improved Aesthetics	› Enhanced aesthetic surface appearance
Material Customization	› Broad material portfolio offers fiber reinforcements and high performance polyamides for flexibility and customization to meet specific design and performance requirements.

Syensqo Material Performance vs Engineering Plastics

High performance polymers exhibit better dimensional stability compared to PA6/PA66.

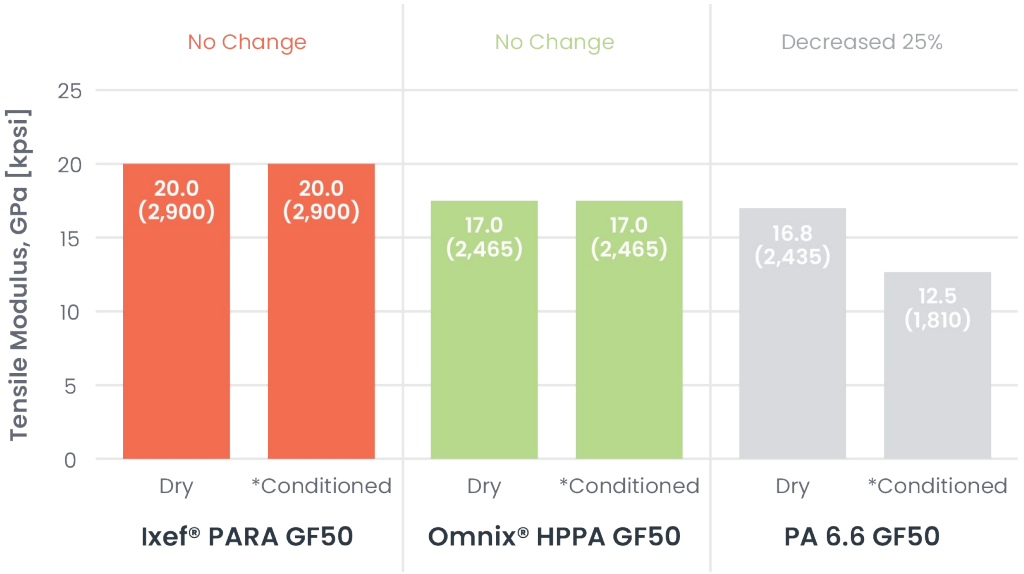
Moisture Absorption

after 24 hours at 23°C, ISO 62 test method

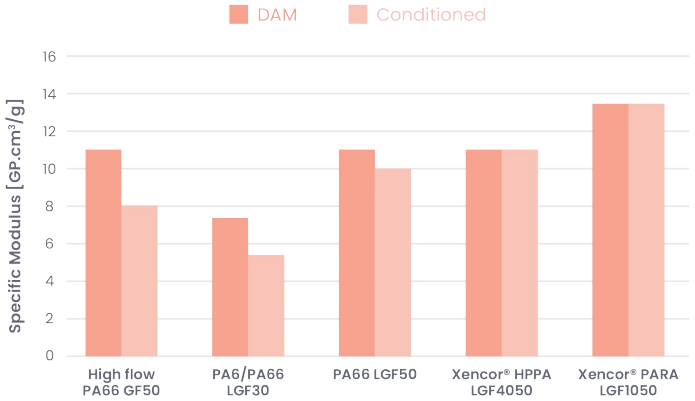


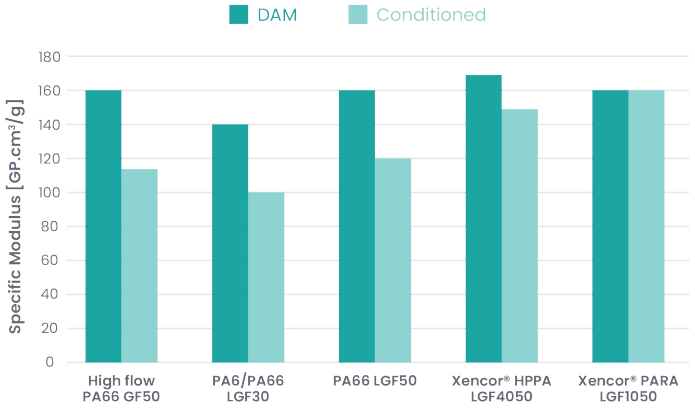
Syensqo Material Performance vs Engineering Plastics

Syensqo high-performance polymers retain mechanical properties with no change, unlike PA66, which loses 25% stiffness when conditioned.



*ISO 1110 (70°C/158°F, 62% RH)





Syensqo Material Performance vs Engineering Plastics

More aesthetic surface appearance

6

Application highlights and partnership success stories

Application highlights, material advantages and solutions

SYENSQO

Handlebar & Cockpit

- Omnix® HPPA GF
- Ixef® PARA GF & CF
- Xencor® HPPA LGF
- Xencor® PARA LGF & LCF

- Weight reduction
- Design freedom & function integration
- Surface finish
- Dimensional stability
- ECHO version available

Brake System

- Ixef® PARA GF & CF

- High stiffness and mechanical strength
- Dimensional stability
- Surface appearance
- Resistance to oils (hydraulic)
- ECHO version available

Fork

- Xencor® PARA LGF & LCF
- Xencor® HPPA LGF

- High stiffness and strength
- Impact resistance
- Fatigue resistance
- Surface appearance
- ECHO version available

Application highlights, material advantages and solutions, continued.

SYENSQO

- High strength/Modulus
- High impact resistance
- Creep & Fatigue resistance
- Surface appearance
- Integration of functions
- ECHO version available

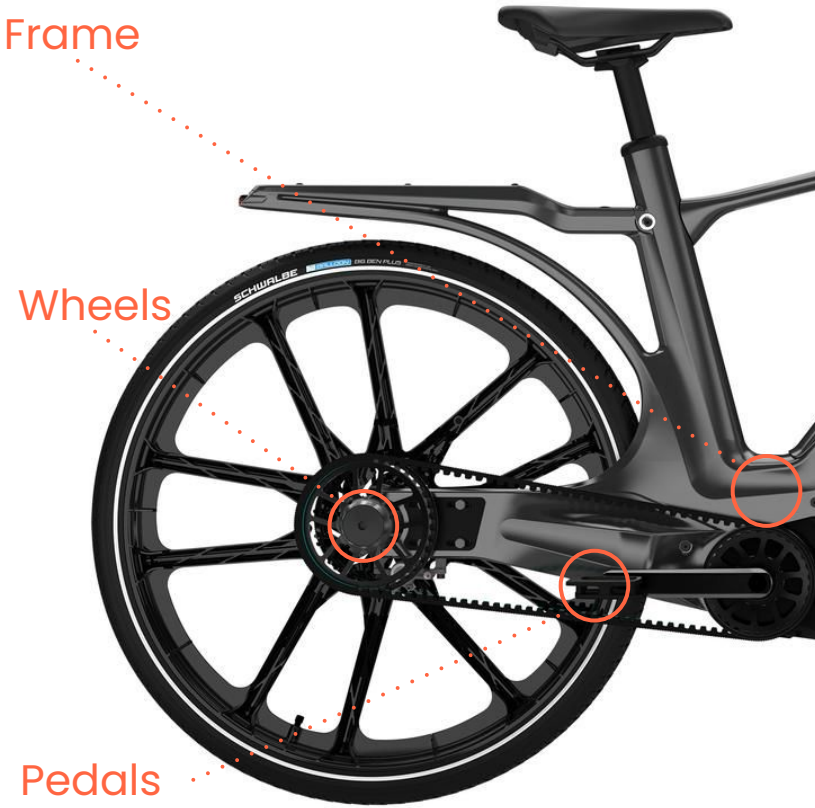
- Xencor® PARA LGF & LCF
- Xencor® HPPA LGF
- IXEF® PARA CF

- Design freedom
- Tubeless ready
- No spoke/no maintenance
- Impact and fatigue resistance
- Creep performance
- ECHO version available

- Xencor® PARA LGF & LCF
- Xencor® HPPA LGF

- Weight reduction
- Design freedom
- Surface finish
- Corrosion free
- High stiffness, high mechanical strength
- ECHO version available

- IXEF® PARA GF, CF
- Xencor® PARA LCF



Stajvelo - The world's first e-bike in injected advanced composites

Syensqo partnered with Monaco-based Stajvelo to create a cutting-edge electric bike made entirely of plastic, showcasing a new high-performance polymer.

The stylish bike is both technically innovative and environmentally sustainable.

Photo courtesy of Stajvelo

Key features of Syensqo Xencor PARA LGF material :

- Unique combination of stiffness & impact resistance
- Insensitivity to corrosion stress cracking
- No fissure propagation
- Outstanding creep and fatigue performance
- Outstanding gloss and surface appearance
- Excellent flexural properties
- High durability
- Cost attractiveness
- Easy colorable for customization
- Direct function integration
- Use in simulation tools and automatic industrial process

Trek Bicycle Corporation – Syensqo introduces more sustainable polymers on the new Madone road bike

Photo courtesy of Trek Bicycle Corporation; Syensqo, PR027

Trek's Madone road bike, debuted at the 2024 Tour de France, and features small parts in the headset area made from Syensqo's high recycled content polymer.

> *"We are thrilled to embark on this exciting partnership with Trek, as part of our efforts to forge a greener future. Leveraging our expertise, we aim to assist Trek in meeting their ambitious sustainability goals within the rapidly expanding bicycle and e-bike industry."*
>
> Floryan Decampo, Market VP Life Solutions at Syensqo

Ultima Mobility - Syensqo solutions offer sustainable innovation

Photo courtesy of Ultima Mobility

Syensqo's **Omnix® 6000 ECHO HPPA** used as a sustainable solution in **Ultima Mobility MULTIPATH bike**

- Designed to meet the rigorous demands of high-impact global sporting events.
- Superior balance of performance and a reduced carbon footprint.

7

Conclusion and Q&A

Partnering with Syensqo

Broadest portfolio of high-performance polymers for even the most specific processing demands, backed by a highly skilled technical development team and continuous partnership support.

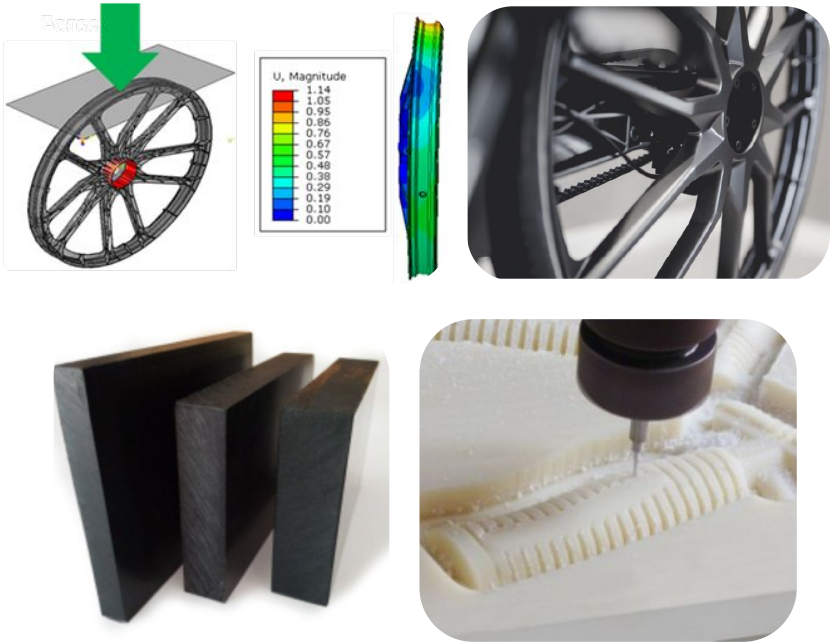
Virtual prototyping to optimize design including:

- Moldflow
- Abaqus/Ansys/Solidworks
- Digimat
- Fluent
- StarCCM+ - CFD

Physical prototyping and manufacturing pre-production.

Mold and part design review.

On-site support during processing trials with direct support to molders and processors.



Questions?

Please submit your questions via the text box.

Phil Martin PhD

Senior Customer Technical Development

Meghan Powers

Global Marketing Manager

SYENSQO

Thank you!

IMAGES COURTESY OF STAJVELO

SYENSQO

Life Solutions
Consumer Goods

[1]PCF disclaimer

SYENSQO

The data was calculated according to the international standard for LCA, ISO 14040–44, using a cradle-to-gate approach including all raw materials and process steps to the final product exiting Syensqo's site gate.

The calculation was performed using LCA software Simapro 9.5 in combination with EcoInvent database V3.9. Results refer to 1 kg of product as the functional unit, without packaging.

NOTICES

The information in this document ("Information") is provided by Syensqo in good faith and Syensqo believes it to be accurate as of the date of this document, based on a review of recent composition data and information obtained from third-parties. The Information, including, but not limited to, the LCA results hereinabove, is provided "as is," without guarantee, warranty or representation of any kind. To the maximum extent permissible at law, Syensqo disclaims all warranties, express or implied, including, without limitation, any warranty of accuracy; completeness; merchantability; fitness for a particular purpose, or non-infringement of third parties' intellectual property rights. Syensqo shall incur no liability in connection with the Information. According to ISO 14040-44 standards, the use of LCA results to support comparative assertions intended to be disclosed raises special concerns and requires specific critical review. No critical review of these data was performed.

Information is Property of Syensqo and Syensqo authorizes possession and use of the Information only by the recipient of this document. Syensqo reserves the right to revise the Information at any time and to issue superseding declarations as industrial processes, methodology and data may change over time. The most current certificate is only available upon separate requests in writing. Syensqo will not automatically forward it to you.