



# PIONEERS IN LYOCELL TECHNOLOGY

# EMBRACE THE FUTURE WITH ONE-A

In today's rapidly evolving world, sustainability is more than just a trend, it's a necessity. At one-A, we're not just keeping pace, we're setting the standard with our cutting-edge Lyocell technology. Join us in leading the way towards a greener, more sustainable future.

***We believe in creating a future where eco-friendly materials are the norm.***

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At one-A, we envision a world where textiles are produced in harmony with nature. Our vision is quite simple: to lead the industry with green practices and innovative technologies that drastically reduce the environmental impact of fiber manufacturing.

***Our mission is to revolutionize the textile industry by making sustainable fiber technology accessible and efficient.***

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We aim to empower our customers with cutting-edge solutions that combine superior quality with eco-friendly practices. Our relentless pursuit of innovation and excellence ensures that (future) Lyocell manufacturers benefit from the most advanced and reliable solutions.



## **Lyocell is the *fiber of the future...***

Crafted from organic-based renewable wood pulp through an environmentally friendly closed-loop process, Lyocell stands out with its superior qualities, including high strength, incredible softness, and exceptional breathability. Explore the myriad benefits of Lyocell, from its eco-friendly production to its superior fiber properties and burgeoning market potential.

## **... and your *business opportunity of today***

Driven by consumer demand for eco-friendly products and regulatory pressures, Lyocell is set to become one of the dominant fibers in the textile market. As the pioneers in Lyocell technology, one-A provides unparalleled expertise and innovative solutions tailored to your needs. Partnering with one-A ensures you stay ahead of the curve, benefiting from cutting-edge technology and highly profitable systems. Lead your business into a new era of sustainability and success!





# WE ARE one-A



## HEADQUARTERS IN AUSTRIA

Located in Regau, Upper Austria, our headquarters lie in a region that is known for its strong tradition in engineering and technical education. The Regau facility functions as the central hub for research, development, and administration, including our own pilot plant.



## OFFICES IN CHINA

We have two offices in China to optimize global operations, ensuring efficient management and market reach.

The **Shanghai** office plays a pivotal role in market penetration and is the main point of contact for Chinese customers, facilitating on-time deliveries and transportation of components.

The **Zhengzhou** office operates as a joint venture sales office, furthering one-A's presence in the Chinese market.

## MICHAEL LONGIN FOUNDER & CTO

Dipl.-Ing. Michael Longin has a rich background in engineering and project management, having worked with Lurgi Austria GmbH and Lenzing AG before co-founding one-A. His role at one-A involves overseeing technical site clarifications, project management, and after-sales processes.

***“At one-A, we believe in the power of technology to transform industries.”***

**MICHAEL LONGIN**



## OUR TEAM

- ▶ Number of employees: **22 FTE**
- ▶ **16 highly qualified engineers** at our head office
- ▶ **200 years** of collective industry experience



## OUR FOCUS

Founded in 2007, one-A is a leading engineering company specializing in sustainable fiber technology, particularly Lyocell, which is known for its eco-friendly properties and minimal environmental impact. We engineer advanced, closed-loop production systems that significantly reduce water and chemical waste, positioning one-A at the forefront of the green transition in the textile industry.

***“Our work is not just about engineering fibers, it’s about engineering a sustainable future.”***

**STEFAN ZIKELI**

### STEFAN ZIKELI FOUNDER & CEO

Prof. Ing. Stefan R. Zikeli, MBA brings over three decades of experience in the fiber technology industry. Before founding one-A in 2007, he held key positions at Lenzing AG and Zimmer AG, including Director for Cellulose Technology. His expertise in Lyocell development has been instrumental in pioneering sustainable fiber solutions.



DID YOU KNOW ...

*that approximately  
**150,000 tons of fiber**  
are produced annually  
from plants engineered  
by one-A?*

# WHY LYOCELL?

## From Fashion to Function: The Many Uses of Lyocell

### Home Textiles and Apparel

Ideal for sportswear, fashion clothing, and home textiles due to its moisture-wicking, breathable, and durable properties.

### Medical and Hygiene Products

Used in wound dressings and sanitary products for its hypoallergenic and absorbent qualities.

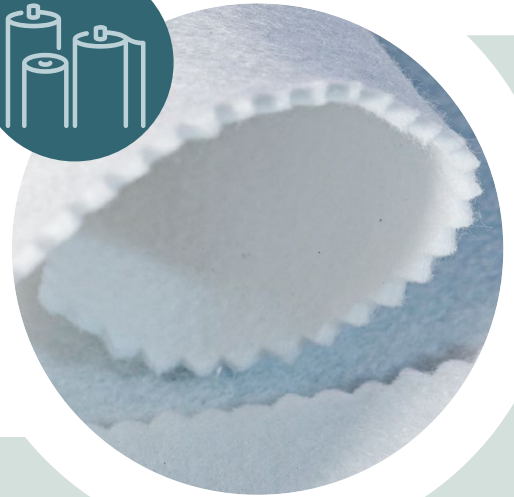
### Technical Textiles

Perfect for industrial wipes and automotive interiors due to its strength and absorbency.

### Other Uses

Current and potential future applications include:

- ▶ Eco-friendly packaging materials
- ▶ Tea bags, coffee filters, ...
- ▶ Tire cord (fabric substructure of car tires)
- ▶ Biodegradable agro-textiles and foils



## Unmatched Performance

Lyocell closely resembles Cotton and stands out among man-made cellulosic fibers due to its superior physical properties, especially when compared to the widely-used, but somewhat inferior Viscose fiber. Textiles made from Lyocell excel in terms of quality and outperform other major textile fibers in various ways:



### **Soft and comfortable:**

a luxurious, almost silk-like feel against the skin.



**Temperature regulating:** absorbs and releases moisture efficiently to keep the end-user cool and at ease.



**Strong and durable:** high tensile strength both dry and wet, ensuring the durability and longevity of textiles.



**Highly hygienic:** suitable for sensitive skin and medical applications.

**Outperforms Cotton, Viscose & Modal** in durability, tear resistance, elasticity, dimensional stability, robustness, weather resistance, color fastness, ...

**Outperforms Polyester & Nylon** in freedom of movement, temperature regulation, skin friendliness, hygiene, antistatic properties, washability, ...

## Our Unique Platform Technology

one-A's innovative platform technology is primarily used to produce **cellulose staple fibers** and **cellulose filament** (Lyocell process). However, it can also manufacture other cellulosic intermediaries, such as **cellulose films**. This advanced environmentally friendly technology allows for the customization of Lyocell fibers and other shaped cellulosic products to meet specific needs in various industries, ranging from textiles and medical products to technical and industrial applications.

**DID YOU KNOW ...**

*that Lyocell staple fibers are **75% stronger** than Cotton fibers?*

# WHY LYOCELL?

## A Sustainable Fiber for People and the Planet

The textile industry plays a key role on the road to a circular economy due to its size alone. Lyocell production is considered highly eco-friendly and supports several United Nations Sustainable Development Goals (SDGs).



**Made from wood:** Lyocell is made from cellulose derived from wood pulp, primarily from sustainably sourced trees such as eucalyptus, beech, spruce etc. This flexibility ensures a stable supply of raw materials, reducing dependency on a single source and promoting environmental sustainability. Compared to Cotton farming, cultivating wood requires much less water and pesticides.



**Fully biodegradable:** When disposed of properly, Lyocell will break down naturally without releasing harmful substances into the environment, unlike synthetic fibers that can take hundreds of years to decompose.



**Safe and worker-friendly production:** Manufacturing of other cellulosic fibers like Viscose typically involves extensive chemical treatments, which can be harmful to the environment as well as to the workers' health. Lyocell's production process uses a non-toxic solvent.



**Less waste:** one-A's technology features a closed-loop process, where water and over 99.5% of the solvent are recycled, preventing environmental pollution. The high durability of Lyocell textiles reduces waste by extending the lifespan of clothing.

## Blue Water Consumption

Cotton production requires immense amounts of surface and groundwater that are not returned to the original water source ("blue water consumption"). Cellulosic fibers have a water footprint that is several orders of magnitude smaller – with Lyocell leading the way.

**Cotton** (2,150 KG/TON)

**Viscose** (24 KG/TON)

**Lyocell** (3 KG/TON)

Source: Life Cycle Assessment of the one-A Lyocell Process by PE CEE Nachhaltigkeitsberatung & Software Vertriebs GmbH



## Facing a Steep Growth Path

Lyocell, though currently a small segment of the global fiber market, is gaining increasing recognition for its sustainability. The demand for Lyocell is on a steep upward trajectory with industry forecasts predicting a strong growth rate over the next few years.

### CURRENT MARKET LANDSCAPE

Cellulosics are a niche product, waiting for their chance to significantly alter and improve the textile market. In 2021, Lyocell still represented less than 1% of total fiber production. Lyocell is only produced in a few countries. China has by far the largest share, accounting for almost half of global production capacity. Other production facilities are located in Austria, Thailand, the USA, the UK and Turkey.

### RAPID EXPANSION, BUT IS IT ENOUGH?

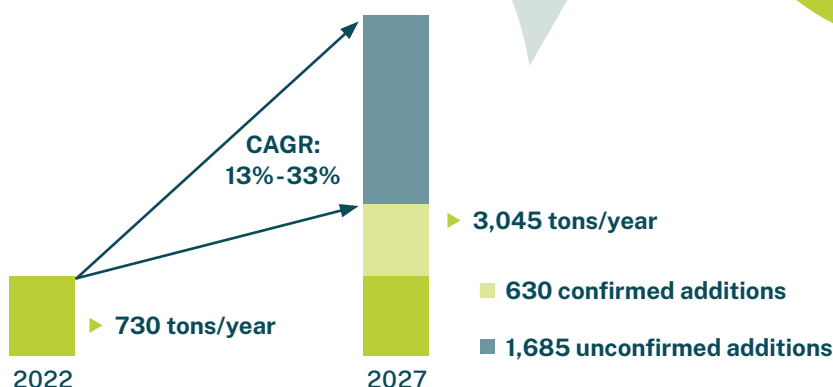
New plants are being established, especially in Asia and Europe, to meet the increasing demand. Global Lyocell production capacity surpassed 800,000 tons in 2023. Counting confirmed and unconfirmed additions, production capacities could almost quadruple by 2027, surpassing 3,000,000 tons. That's a lot, but it is still far from being able to satisfy demand in the long term.

### POLICIES BOOST DEMAND

More and more legal and corporate policies aim at reducing carbon footprints and setting sustainability goals. With many of the fibers that dominate the global market today, it will not be possible to meet the upcoming requirements. For others, production cannot be increased indefinitely. The cultivation area for Cotton, for example, is considered to be exhausted. Market analyses therefore assume that by 2030 at the latest, demand for regenerated cellulose fibers will significantly exceed supply.

### Global Lyocell Production Capacities

K-tons of annual Lyocell capacity

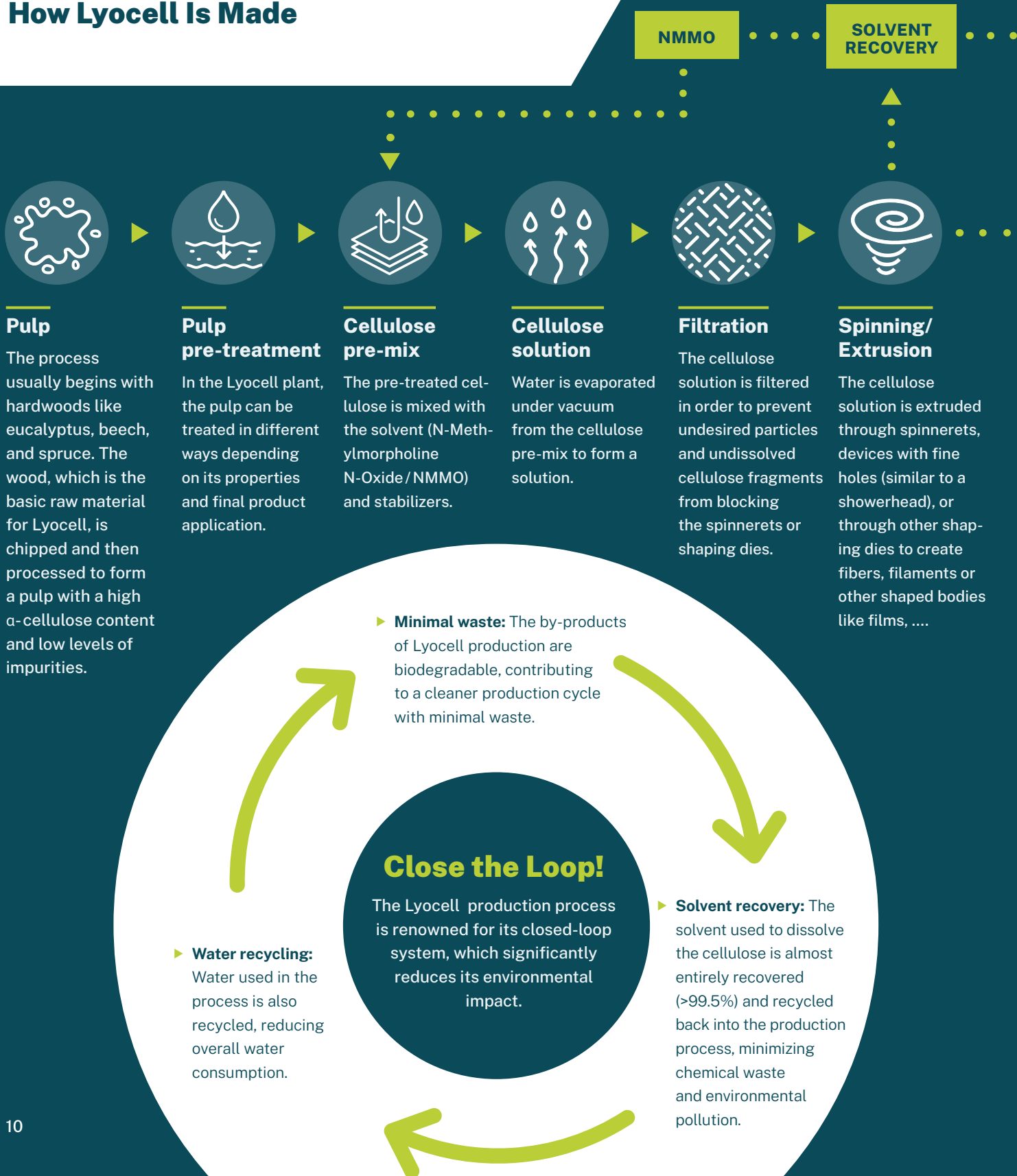


DID YOU KNOW ...

that around **85%** of the world's leading fashion brands have committed to achieving decarbonization targets in their supply chain?

# FROM FOREST TO FINAL PRODUCT

## How Lyocell Is Made



H<sub>2</sub>O

The washing bath is collected and purified in an evaporation unit. NMMO and water are separated and recirculated to the cellulose pre-mix (NMMO) and the washing step (H<sub>2</sub>O).

SHAPED BODIES

FILAMENT YARN

STAPLE FIBRE

## Washing

The fibers, filaments or shaped bodies are washed in a counter-cross flow with recirculated water, the residual NMMO and other impurities are removed and the cellulose is solidified. This step ensures the products made are clean, safe, and suitable for various applications.

## Cutting

The staple fibers are cut and flushed to the treatment section.

## Treatment

Depending on the desired final product (fibers, filament or shaped bodies) applications, various treatments like drawing, stretching, finishing or similar methods can be employed.

## Drying

The products (fibers, filament or shaped bodies) are dried to achieve the desired moisture regain (or commercial allowance) of the final product.

## Packing

The dried products are packaged, labelled and prepared for shipping for further use in the downstream processing in textile value chain.

**DID YOU KNOW ...**  
that around a **fifth**  
**of all Lyocell fibers**  
worldwide is produced  
in plants engineered  
by one-A?

# PIONEERS IN LYOCELL TECHNOLOGY

Founded in 2007, one-A quickly positioned itself as a key player in the global fiber technology industry, pioneering eco-friendly cellulose conversion processes that have set new standards in sustainability and production efficiency.

## Knowledge You Can't Buy Anywhere Else

The technological landscape in fiber production can be traced back to the pioneers of Lyocell technology, namely Lenzing AG and one-A. Over time, additional companies have entered the business field, with most of them having based their technology on the accomplishments of one-A and Lenzing AG. Lenzing AG does not offer its technology to third parties. This leaves one-A as the only provider with a deep understanding of every aspect of Lyocell technology and decades of experience.

### Proven Global Track Record

With our outstanding engineering capacities one-A is able to build fiber plants worldwide. Up to now, we have installed fiber plants with a total output of 150,000 tons/year. Most of these plants are located in China and Turkey.

### Competitive Advantage

The advanced technology developed by one-A not only enhances production efficiency but also significantly reduces operational costs. one-A stands as a true industry leader, boasting a distinct competitive advantage in CAPEX efficiency. Plants engineered by one-A offer up to 25% cost savings compared to the competitors.



# 19%

**Technology provider for  
Lyocell fiber capacities  
(in tons/year)**

Source: The Outlook for Dissolving Pulp, March 2023





Hubei Golden Ring Green Fiber Co., Ltd.

## Patents in Key Technologies

one-A and its affiliate companies hold a robust portfolio of patents that underscore its commitment to innovation and technological advancement. These patents cover critical aspects of Lyocell production and micro-reaction technology in multiple relevant jurisdictions, safeguarding the proprietary methods and ensuring a competitive edge in the market.

## PROJECTS

### Reference Project:

- ▶ **Baoding Swan Fiber Co., Ltd.**
  - Hebei Province, P.R. China
  - Annual output: 30,000 tons/year
  - Built: 2010-2018

Baoding Swan Fiber had hardly made any investments in the past 30 years. That is why the Lyocell project aimed to reduce the environmental impact while improving fiber quality. In the first phase, customized equipment with a nominal capacity of 15,000 tons/year of cross-linked Lyocell staple fiber per year were installed. A few years later, a second phase added another 15,000 tons of standard Lyocell staple fiber.

### Other Completed Projects:

- ▶ **Shandong Yingli Industrial Co., Ltd.**
  - Shandong Province, P.R. China
  - Annual output: 30,000 tons/year
  - Built: 2013-2014
- ▶ **Hubei Golden Ring Green Fiber Co., Ltd.**
  - Hubei Province, P.R. China
  - Annual output: 40,000 tons/year
  - Built: 2018-2020
- ▶ **KaraFiber Elyaf Sanayi ve Ticaret Anonim Sirketi**
  - Gaziantep, Turkey
  - Annual output: 45,000 tons/year
  - Built: 2019-2024

### Groundbreaking R&D

one-A operates its own state-of-the-art laboratory and pilot plant in Austria, which serve as hubs for continuous research and development. Additionally, one-A collaborates with cross-functional teams, prestigious research institutes, and academic institutions like Fraunhofer Institute, Penn State University, and Vienna Technical University to further enhance its technological capabilities.

# OUR SERVICES

With a clear focus on research and development and a strong commitment to engineering excellence, one-A remains a pacesetter in its industry. one-A specializes in delivering state-of-the-art Lyocell systems, innovative micro-reaction technology, and comprehensive engineering services.

## Research and Development, Plant Engineering, and Engineering Services

### FEASIBILITY STUDIES

We analyze various factors such as technical requirements, financial implications, and environmental impact to provide a clear roadmap.

### TECHNOLOGY AND PROCESS MODELING

Utilizing advanced process simulation software, we forecast process behavior, optimizing mass and energy balances, and chemical equilibria. This ensures a precise understanding of the interactions and interdependencies of the plant components.

### BASIC ENGINEERING, PLANT PACKAGE UNITS

Employing the Engineering Base (EB) tool, we provide cross-discipline engineering and documentation, centralizing all project data for optimal project coordination and execution such as process & instrumentation diagrams, sourcing specification for equipment as well as process control system engineering.

### LAYOUT AND PIPING DETAIL ENGINEERING

Employing the AVEVA E3D tool, we provide plant layout design and piping detail design in one model to minimize engineering interfaces and optimize the efficiency of project execution.

### CONSTRUCTION AND INSTALLATION SUPERVISION

Our team oversees the construction and installation phases to guarantee reliable project execution and commissioning, ensuring meticulous adherence to project plans and timelines.

### TECHNICAL SERVICES AND MAINTENANCE

Post-construction we offer ongoing technical support and maintenance services to our customers, ensuring the plant operates efficiently and continues to meet performance standards.

### ENGINEERING SERVICES

Our engineering services extend beyond plant construction. We offer process optimization, calculation of mass and energy balances, production and process automation, and maintenance planning. Our experts help identify and address system inefficiencies, improving resource utilization and competitiveness.



## The Way to a New Fiber Plant



**First contact:** A fiber manufacturer approaches one-A with a request for the design and engineering of a Lyocell plant with a specified capacity.



**Contract:** We formalize the agreement with the customer, establishing contracts with subcontractors for all off-shore services.



**Offering:** We provide a comprehensive offer covering all necessary engineering services and project supervision, distinguishing between on-shore and off-shore services.



**Implementation:** one-A manages all off-shore services, including procurement and component design. We supervise the construction and installation of the plant, ensuring alignment with the agreed scope.



**Planning:** A tailored plan is created, optimized to meet the customer's needs, specifications, and existing conditions. This includes detailed process modeling and simulations.



**Technical Service and Maintenance:** Post-implementation, we provide maintenance and technical services.

## Micro-reaction Technology

one-A offers innovative solutions not only in Lyocell technology, but also in micro-reaction technology for critical chemical reactions. Our systems are designed to seamlessly scale from laboratory to production levels and enhance efficiency and safety, making them ideal for the pharmaceuticals and fine chemicals industries. The range of applications includes nitration, epoxidation, and the production of polyurethane prepolymers as well as NMMO, the solvent for the Lyocell process.

INTERESTED  
IN OUR SERVICES?

**Make an appointment!**

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**Engineered for the Planet,  
Designed for You**