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Sanyou Group

2021 Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd Sustainability Report

CONTENTS

I. Introduction

1 Chairman's Message — Baishan Zheng

Year 2021 is the beginning of China's 14th Five-Year Plan and the start of a new journey toward building a modern socialist country in all respects. This year, the impact of the COVID-19 pandemic and the complex and volatile international situation exacerbated the stagnation and recession of the global economy, and the world was facing both drastic changes unseen in a century and an urgent need for a "long-term planning". At this point in history, China proposed a new development pattern "featuring dual circulation, in which domestic and overseas markets reinforce each other, with the domestic market as the mainstay" and emphasized that "good development is sustainable". At the same time, "carbon peaking and carbon neutrality" and sustainable development have become important national development issues now and in the future.

In this context, Sanyou Chemical Fiber upheld the concept of clean production and green development and continued to promote its development towards the goal of low and zero carbon by means of low-carbon product development, application of energy-saving and emission-reducing technologies, construction of brand strategy planning, etc. In October 2021, Sanyou Chemical Fiber officially disclosed its corporate vision of carbon peaking and carbon neutrality — "strive to achieve a 30% carbon emission reduction per unit of product by 2030 and carbon neutrality by 2055". In the same year, Sanyou Chemical Fiber joined the "30·60 Net-Zero Acceleration Plan", and under the leadership of the Office for Social Responsibility of CNTAC and Collaboration for Sustainable Development of Viscose (CV), continued to promote low-carbon energy, green materials, clean production and low-carbon products, taking a leading role in addressing global climate change in the industry and the country. In the future, Sanyou Chemical Fiber will work together with our partners to achieve the green and low-carbon development of the textile industry and build a sustainable future.

2 About This Report

Release cycle

This report, the Tangshan Sanyou Sustainability Report 2021-2022, is the second corporate sustainability report issued by Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. Follow-up reports are planned to be released annually.

Reporting period

The disclosure period of this report is from January 1, 2021 to December 31, 2021, covering some historical data.

Report scope

The organizational scope of this report covers Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. and its subsidiary Sanyou Yuanda Fiber Co., Ltd. Part of the content involves the parent company Tangshan Sanyou Group Co., Ltd. and other subsidiaries. See “About us” for details.

Compiling principle

This report is compiled based on the China Sustainability Reporting Guidelines for Apparel and Textile Enterprises (2008 Version) (CSR-GATEs: 2008) and the Guidelines on Social Responsibility for Industries in China 2.0 (GSRI-CHINA 2.0), with reference to the Global Reporting Initiative (GRI)’s Sustainable Development Reporting Standards core program and the United Nations’ Sustainable Development Goals (SDGs).

Information sources

The data and information in this report are mainly from the official documents and statistical reports provided by Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. and its subsidiaries, and partly from Tangshan Sanyou Group Co., Ltd. and other subsidiaries.

Report verification

This report was reasonably examined by the Social Responsibility Office of China National Textile Industry Federation with reference to the Verification Criteria for Social Responsibility Reports of China's Textile and Apparel Industry CSR-GATEs (2008) to verify the objectivity, suitability and responsiveness of the report.

Report acquisition

The Chinese version of the report shall prevail. The Chinese version / English version of the report can be downloaded from the official website of Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. Website: http://www.ts-sanyou.com.cn

Feedback

If you have any suggestions, comments or questions about the report, you may send emails to: syhx002@sanyouhx.com

Location of enterprise

No. 6 Xiwang Road, Nanpu Economic Development Zone, Tangshan, Hebei Province, China (Coordinates: 118.22, 39.26)

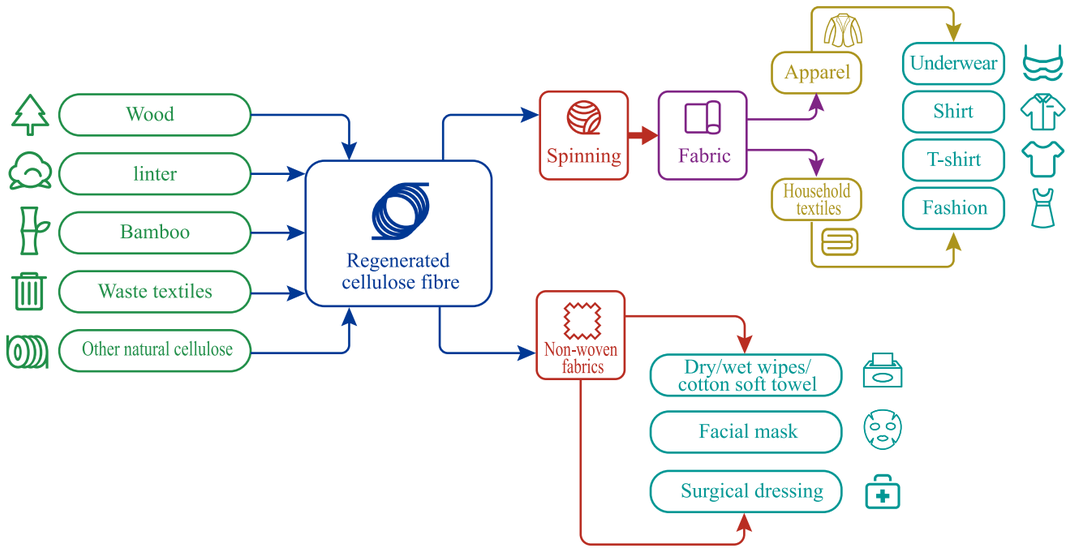
Sanyou Group has a total of 26 subsidiaries, of which 3 are tier-2 companies, 17 are tier-3 and 6 are tier-4. See Appendix 1 for details of the company structure. Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. is one of the tier-3 subsidiaries of Tangshan Sanyou Group Co., Ltd. And serves as the “fiber sector” of the Group.

The related companies involved in the report are referred to as follows:

Enterprise name	Abbreviation
Tangshan Sanyou Group Co., Ltd.	Tangshan Sanyou Group
Tangshan Sanyou Alkali Industry Group Co., Ltd.	Sanyou Alkali Industry
Tangshan Sanyou Chemical Industries Co., Ltd.	Sanyou Shares
Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd.	Sanyou Chemical Fiber
Tangshan Sanyou Chloro-Alkaline Co., Ltd.	Sanyou Chloro-Alkaline
Tangshan Sanyou Salination Co., Ltd.	Sanyou Salination
Tangshan Sanyou Silicone Industry Co., Ltd.	Sanyou Silicone Industry
Tangshan Sanyou Thermal Power Co., Ltd.	Sanyou Thermal
Qinghai Wucai Alkali Industry Co., Ltd.	Wucai Alkali Industry
Tangshan Sanyou Mine Co., Ltd.	Sanyou Mine
Tangshan Sanyou Zhida Calcium Industry Co., Ltd.	Sanyou Calcium Industry
Tangshan Sanyou Yuanda Fiber Co., Ltd.	Yuanda Fiber

3 Man-made Cellulose Fiber

The raw materials of man-made cellulose fibers come from natural cellulose such as cotton, wood, bamboo and linen. The fiber products made by procedures of processing, treatment and spinning can be subdivided into viscose fiber (including Modal), Lyocell, cellulose acetate fiber, Cuprammonium fiber, etc. based on different processing techniques. With its natural properties of "originating from nature and returning to nature", man-made cellulose fibers have gradually developed into a unique fiber product that is widely used in apparel, home textiles, industrial application and other fields.



4 Key Performance

01 Total number of employees **5278**

02 Investment in environmental protection **369.35** million yuan

03 Total annual sales **8.302** billion yuan

04 Output of regenerated cellulose fiber(thousand tons) **681.7**
including Tangcell® (thousand tons) **89.3**

05 Comprehensive energy consumption **820.4**kgce/t

06 Water consumption **34.2**m^3/t

07 Total sulfur recovery **97**%

08 Na_2SO_4 recovery **66.3**%

5 Stakeholder Identification

Sanyou Chemical Fiber actively communicates and interacts with internal and external stakeholders, listens to the opinions of stakeholders, actively uses the relevant standards, guidelines and practices recommended by them, and promotes the continuous improvement of social, environmental, economic and other sustainability issues faced by the enterprise. As an important part of interaction with stakeholders, Sanyou Chemical Fiber will issue a sustainability development report every year from 2021, so that stakeholders can better understand our current situation of sustainability and help us make more effective management decisions.

Stakeholders		Issues of concern	Communication and response channels
Main categories	Main representatives		
Government agencies	National ministries and commissions Local governments	Preservation and appreciation of state-owned assets Safety in production Industrial poverty alleviation Three-waste discharge, and environmental protection and governance Employee employment Product safety	Engagement in local economic and social development Examination and management of environmental and safety monitoring Disclosure of pollutant discharge data Participation in industry standard setting
Business operators and investors	Senior management of the enterprise and affiliated companies Investors	Profitability Information disclosure Labor protection Public opinion environment Sustainable development capacity Innovative technology development	Working sessions Large Forums Corporate website Corporate publications Emails, telephones and other social media
Staff		Salary Working environment Promotion mechanism Labor security Training mechanism	Working sessions and trainings Workers' congress and team building activities Corporate website and publications Various recruitment activities through social media such as email, telephone and WeChat
Suppliers	Suppliers of pulp Suppliers of chemicals	Payment terms Pricing mechanism Delivery date Source of raw materials Compliance management Innovation High-quality raw material supply Delivery date / Source	Supplier evaluation Supplier chain of custody system Review and evaluation Field visit Communication through meetings, emails and phone calls Product exhibitions Industry workshops
Downstream customers	Yarn enterprises Fabrics Non-woven enterprise	Payment methods Product pricing mechanism Delivery date Operational Compliance Chemicals management Green supply chain Transparent supply chain Innovative services Product quality and innovation	Technical exchange Cooperative R&D Customer satisfaction survey Corporate website and publications Meetings, emails, phone calls, etc. Product exhibitions Industry workshops
Terminal brands	Apparel brands Home textile brands Dry and wipes facial mask brand	Supplier sustainability Product safety Carbon footprint of products Traceability Degradability	Communication at conferences Testing, certification and report disclosure Strategic cooperation Establishment of a special joint working group
Non-Governmental Organizations (NGOs) / industry associations	Collaboration for Sustainable Development of Viscose Organization for Standardization Third party institutions Industry associations	Climate change Biodiversity conservation Energy management Water resource management Environmental management Transparency and traceability of the supply chain Biodegradable products Innovative technology promotion Product innovation Three-waste discharge Compliance advocacy Safety in production	Industry surveys and research reports Disclosure of environmental pollutant discharge data Review and evaluation of the supplier chain of custody system Industry surveys and research reports Participation in industry standard setting Product exhibitions and industry workshops Meetings, emails, phone calls, etc.
Universities / research institutes		Technological innovation (raw materials, production processes, circular economy, and differentiated products)	Cooperative R&D mechanisms Strategic cooperation in personnel training Academic and industry research reports
Surrounding communities		Wastewater and waste gas treatment Corporate social responsibility	Interview in communities Public open day events Complaints and public email for feedbacks Community events and daily communication
Other stakeholders	Other production companies	Compliance competition Environmental communication Goals and pathways Joint development Patent protection	Technical exchange Cooperative R&D Product exhibitions and industry workshops Industry surveys and research reports Participation in industry standard setting

Analysis of Substantive Issues

During the reporting period, to promote the corporate sustainable development, Sanyou Chemical Fiber continued to improve the creation of mechanisms related to the identification, analysis and ranking of sustainability-related issues and strengthened the management of important issues.

Analysis procedures for substantive issues:

Data collection and issue identification

Identify a list of substantive issues through communication with stakeholders, background checks and peer benchmarking comparisons.

Issue analysis and ranking

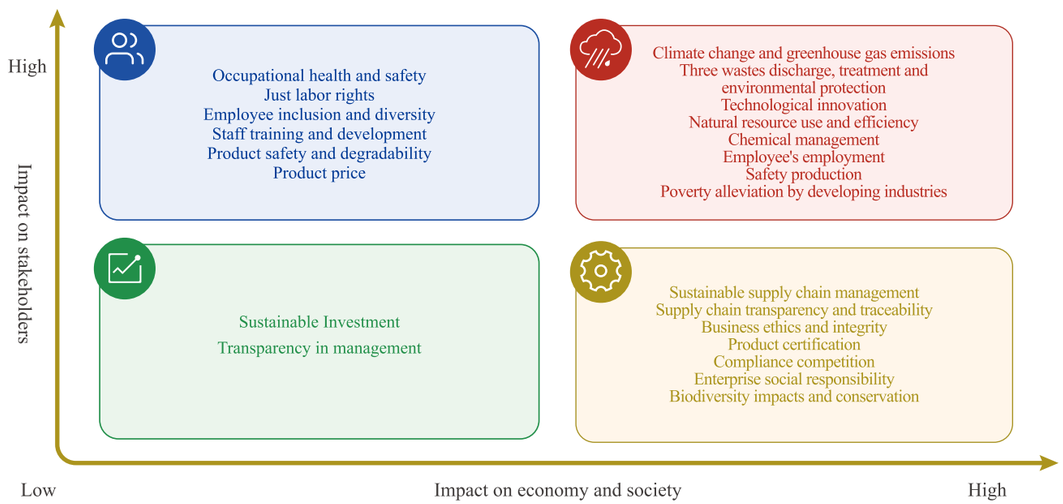
Understand the importance of different issues for the stakeholders by means of questionnaires and in-depth interviews. Background checks, collated results of stakeholder feedback, and opinions of senior management are important bases for prioritizing issues.

Importance matrix

rank different key issues based on the results of surveys, research and interviews to create an importance matrix as the basis for disclosure in this report.

A comprehensive analysis of the importance of substantive issues was carried out in terms of both the degree of impact on the business development of Sanyou Chemical Fiber and the importance to stakeholders to obtain an importance evaluation matrix for key issues. This report will disclose key issues in detail with reference to the importance evaluation matrix.

Importance evaluation matrix for key issues:



II. Regional Circular Economy

1 Introduction

After more than 20 years of development, relying on the four main businesses of chemical fiber, soda ash, chlor-alkali and organosilicon and the supporting business systems of thermal power, raw salt, lime stone, logistics, international trade, etc., Tangshan Sanyou group has formed a regional circular economy system, greatly reducing the environmental impact of the whole industrial system to the greatest extent, and realized the unity of environmental, social and economic benefits, embarking on a unique road of green, circular and low-carbon development.

Sanyou Group products cover **9** categories

Sanyou Group products cover more than **140** varieties

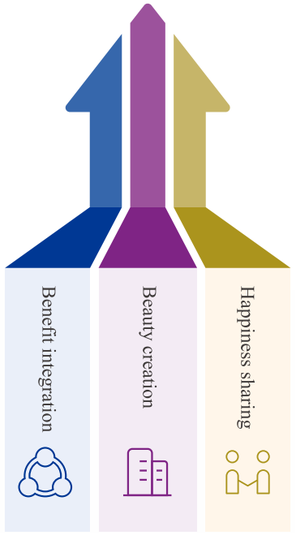
2 Tangshan Sanyou Group

Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. is a subsidiary of Tangshan Sanyou Group Co., Ltd. Based in Tangshan, Hebei Province, China, Tangshan Sanyou Group has grown from an enterprise with soda ash as the single business to a leading enterprise with the four main businesses of chemical fiber, soda ash, chlor-alkali and organosilicon.

At present, Sanyou Group has nearly 20,000 employees and its products cover more than 140 varieties in 9 categories, mainly including 3.4 million tons of soda ash, 780,000 tons of viscose staple fiber, 530,000 tons of caustic soda, 525,000 tons of PVC and 200,000 tons of organosilicon monomer. Among these products, its soda ash and viscose staple fiber have both won Chinese brands, and Sanyou trademark is a “China Well-known Trademark”. Sanyou’s products are sold to more than 120 countries and regions in Asia, Africa, Europe, America and Australia. According to the data disclosed in Sanyou Share’s (600409) 2021 annual report, Sanyou Chemical had total assets of RMB25.99 billion, operating revenue of RMB23.18 billion and profit of RMB1.67 billion in 2021, of which the chemical fiber segment had a revenue of RMB8.28 billion and gross profit of 11.97%.

Main product	Design production capacity (thousand tons)	Annual production of 2021 (thousand tons)
Soda ash	3,400	3,382.5
Polyvinyl chloride resin	525	361.0
Caustic soda	530	472.1
Viscose staple fiber	780	681.7
DMC	200	46.0
107 RTV		22.0
HTV		37.0

Mission of Sanyou Group



3 Circular economy — closed-loop production based on the industrial park

From salt to soda ash, chemical fibers, chlor-alkali and organosilicon, Tangshan Sanyou Group organically connects the textile industry chain with the upstream chemical industry chain through the global original circular economy development model of "two alkalis and one fiber", and realizes the regional circular economy by organically combining the resources, products and wastes in multiple industries. It allows multiple industry chains to intertwine with each other to reduce as far as possible the environmental impact of the whole system, realizing the unity of environmental, social and economic benefits, and embarking on a unique green, circular and low-carbon development road.

The annual operating income reaches more than **36%** of the total operating income of Sanyou Shares

With its annual operating revenue reaching more than 36% of the total of Sanyou Shares, Sanyou Chemical Fiber is not only the largest plate of the group, but also an important link in the transition of Sanyou Group from upstream chemicals to consumer goods. Naturally, it has become the core node of the circular economy system of Tangshan Sanyou Group. Therefore, in the process of promoting sustainable development, not limited to the pursuit of reducing the environmental impact of the factory, Sanyou Chemical Fiber makes use of the advantages of its own industrial network to creatively turn the by-products or wastes produced by one enterprise into the raw materials of another enterprise, thus realizing the closed-loop utilization of materials and multi-level utilization of energy, and creating a circular economy system of collaborative innovation of multiple industry chains.

Inner circle of closed-loop production at Sanyou[1]

Seawater desalination

Sanyou Group pioneered a new process in which concentrated seawater is directly used for soda ash production in China. The production of soda ash using desalinated seawater containing concentrated salt as a raw material effectively solves the pollution caused by discharging such concentrated seawater into the sea, and provides a steady supply of part of the freshwater resources for the park.

Industrial cycle of chlor-alkali (NaOH)

NaOH is an essential raw material for the production of viscose fiber. The NaOH produced by Sanyou Group can be piped directly to the chemical fiber plant without the need for a storage tank field, which reduces both the risk of leakage and the carbon emissions generated in transportation. The waste carbide slag slurry from NaOH production is used in the wastewater treatment of the viscose plant, enabling the recycling of waste.

Technological innovation in combined heat and power generation

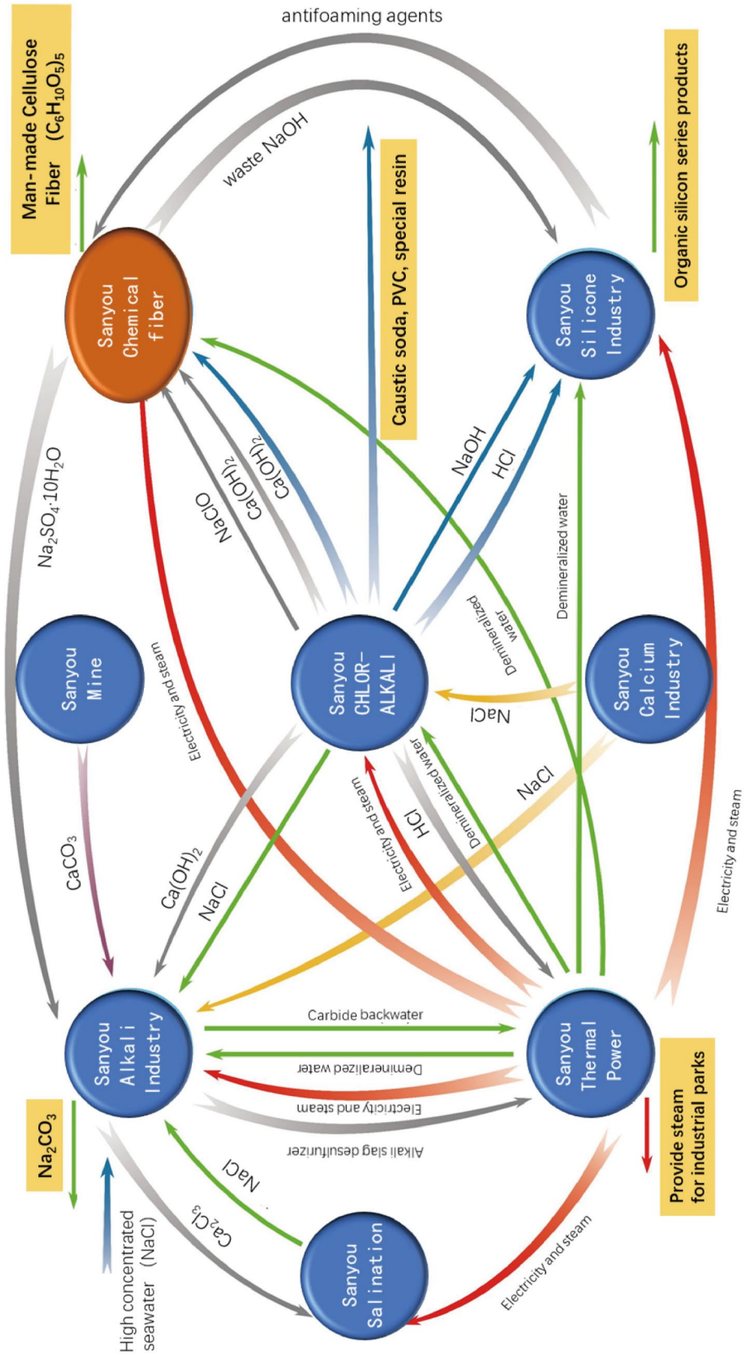
In addition to supplying the electricity and steam necessary for industrial production, the thermal power plant in the industrial park also undertakes the task of district heating. Through continuous process optimization and a series of renovation projects, the thermal power plant's boilers have met China's ultra-clean emission standards. In addition, the waste alkali slag generated by Sanyou Soda Ash is effectively recycled as a desulphurizing agent in the thermal power plant, turning waste into wealth.

Recycling of Na_2SO_4

Na_2SO_4, a by-product of viscose fiber production, has drawn attention to stakeholders in recent years. However, its low economic value places many restrictions on its recycling. Relying on the Group's circular economy system, Na_2SO_4 solution can be recycled for soda ash production, reducing steam/electricity consumption for Na_2SO_4 crystallization recovery.

1.For more examples of circular economy in the industrial park, see the Tangshan Sanyou 2020 Sustainability Report.
http://www.ts-sanyou.com.cn/syhx/upload/2021/12/159420568.pdf

Circular economy diagram of Tangshan Sanyou Group



4 Purpose and philosophy of social responsibility

Sanyou Group has always taken the performance of its social responsibility as its obligation and mission, advocating and practicing the idea of "being a responsible corporate citizen" and adhering to the principle that "social responsibility is a sign of social civilization and progress, and the obligation of civilized entities". It shoulders the corporate mission of "benefit integration, beauty co-creation and happiness sharing", advocates the values of "justice, inclusiveness, responsibility and integrity", insists on "being an excellent person, doing the right thing and developing a positive culture", actively participates in and devotes itself to the social cause, serves society and creates values, tirelessly striving to achieve a comprehensive and harmonious development of the enterprise, society and environment.

Sanyou Group adheres to the management theory of "harmony, sharing and win-win" and actively integrates the requirements of fulfilling social responsibility into the whole process of its operation and daily management to ensure that it comprehensively fulfills the social responsibility in the whole process with all its members, thus promoting the harmonious and mutually beneficial development for itself and the whole society. The Group is committed to boosting energy-saving and low-carbon sustainable industries, developing and producing higher-quality products and services, creating a better green supply chain and striving to reduce pollution to the environment. It continues to pursue a win-win business model for customers, shareholders, employees, society, the environment, etc. and provides a greater stage for fair development for employees while it grows, aiming to create more wealth value for society.

5 Sanyou Chemical Fiber

Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. is a chemical fiber enterprise engaged in the production of the third-generation man-made cellulose fibers, including viscose staple fiber, modal and Lyocell. The company has been rated as national high-tech enterprise, national technological innovation demonstration enterprise and national cellulose fiber new product R&D base successively.

With total assets of about RMB9 billion, the company covers an area of 1,700 Mu and has more than 5,000 employees. The first production line was introduced from Austria. For more than two decades, the company has carried forward the corporate spirit of "Start a business and keep it, with human effort as the decisive factor". Through digestion, absorption and re-innovation, it has successfully built 11 large-scale production lines and three pilot lines, and its production capacity has been increased from 20,000 tons to 780,000 tons.

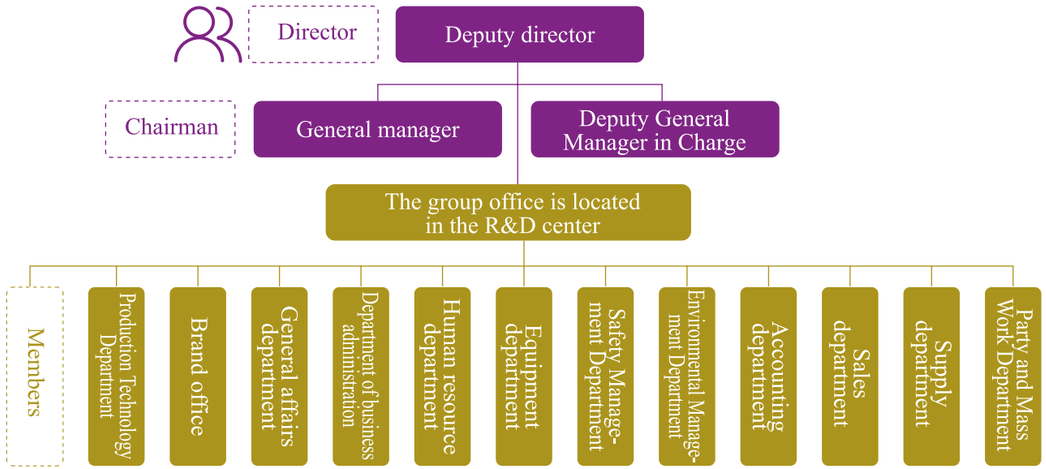
Over the years, the company has always adhered to the core values of "principle, responsibility and integrity", continued to focus on customer needs and its own social responsibility, and realized the whole-chain and whole-process ecological supervision from raw materials to products. A number of products developed by the company have been selected into the "Chinese Fiber Fashion Trend". The products sell well in more than 40 countries and regions in Asia, Africa, Europe, America and Australia, and the annual export volume accounts for more than 40% of the total domestic export volume. The company has successively won such honors as "Products with National Customer Satisfaction", "National Brand Cultivation Demonstration Enterprise", "National Advanced Enterprise Implementing Excellent Performance Model" and "National Circular Economy Demonstration Pilot Unit".

Sustainable development strategy

With the starting point of "creating happiness and beauty together and sharing labor achievements together", Sanyou Chemical Fiber has unswervingly implemented the new development concept of innovation, coordination, green, openness and sharing, strengthened the circular economy, enriched the green connotation of products, and provided low-carbon green textile raw materials for the textile industry chain starting from the man-made cellulose fiber "originates from nature and returns to nature", contributing to the realization of a harmonious society in which man and nature live in harmony.

6 Sustainable development management system

Establishment of a Sustainable Development Management Committee for Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd.
According to its requirements of sustainable development management, Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. established a Sustainable Development Management Committee, of which the members will be as follows:



7 Corporate honors in 2021

Serial number	Name	Granting institution
1	Passed the re-examination of "national technological innovation demonstration enterprise"	Ministry of Industry and Information Technology of the People's Republic of China
2	The "Method of preparing man-made cellulose fibers" won the third prize of Hebei Provincial Technological Invention	The People's Government of Hebei Province
3	Single champion product in provincial manufacturing for 2020	Industry and Information Technology Department of Hebei Province
4	Youth Civilization Unit	Youth Civilization Organizing Committee of Hebei Province
5	Advanced Unit in Emergency Management and Work Safety for 2020	Emergency Management and Work Safety Association of Hebei Province
6	Top 100 Innovative Enterprises in Strategic Emerging Industries in Hebei Province in 2021	Heibei Development and Reform Commission, Heibei Provincial Department of Science and Technology, Industry and Information Technology Department of Hebei Province and Heibei Administration for Market Regulation
7	Demonstration enterprise "increasing variety, improving quality and making a brand" in Tangshan (re-examined)	Bureau of Industry and Information Technology of Tangshan
8	"Bamboo Modal Fiber" was identified as a strategic emerging product in Tangshan	Tangshan Municipal People's Government
9	"Lyocell fiber" was identified as a strategic emerging product in Tangshan	Tangshan Municipal People's Government
10	First Prize for Group Integrated Rescue in the Work Safety Emergency Rescue Skills and Physical Fitness Competition	Tangshan Emergency Management Bureau
11	May 4th Red Flag Youth League Branch	Tangshan Municipal Committee of the League
12	Joined the "30·60 Net-Zero Acceleration Plan"	China National Textile and Apparel Council (CNTAC)
13	Leading enterprise in the chemical fiber industry for high-quality development during the 13th Five-Year Plan period	China Chemical Fibers Association (CCFA)
14	Demonstration enterprise in the chemical fiber industry for green development during the 13th Five-Year Plan period	China Chemical Fibers Association (CCFA)
15	The project "Graded and Classified Treatment and Comprehensive Utilization of Wastewater in Viscose Industry" won the 2020/2021 chemical fiber green development contribution award of the "CCFA - Grerial Foundation"	China Chemical Fibers Association (CCFA)
16	Quality supplier of man-made cellulose fibers - cotton textile industry chain for 2020	CCFA and China Cotton Textile Association (CCTA)
17	Excellent supplier in China's industrial textiles during the 13th Five-Year Plan period	China Nonwovens & Industrial Textiles Association (CNITA)
18	National Customer Satisfaction Product (Market Quality Credit Rating: AA)	China Association for Quality (CAQ)

III. Closed-loop Production

1 Production process introduction

Since the industrial production of viscose fibers in 1905, the basic principles and core parts of the viscose process have remained almost unchanged, despite continuous improvements in process equipment and increases in single-line capacity. Typically, viscose fiber manufacturing can be divided into the following steps.

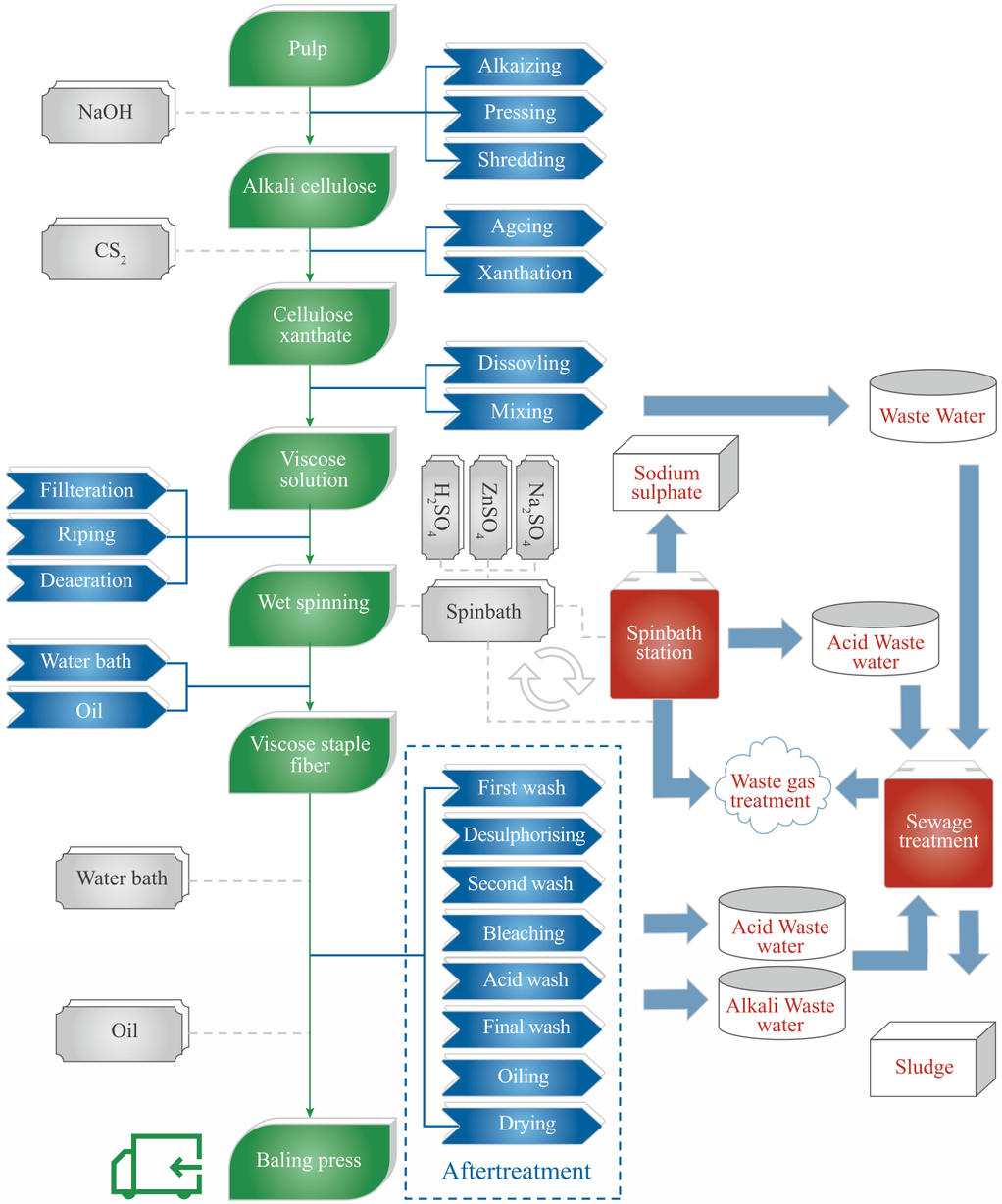
01 The pulp is impregnated in a caustic soda solution to produce alkali cellulose, which is then pressed, crushed and aged to make the alkali cellulose with a certain degree of polymerization.

02 The alkali cellulose is reacted with carbon disulfide to produce cellulose sulphonate.

02 The cellulose sulphonate is dissolved in dilute alkali to make a viscose solution, which is then filtered, defoamed and matured before being sent to the spinning machine for formation.

02 After wet spinning and forming, the viscose liquid undergoes a series of post-treatment processes before being dried and packaged as finished products.

In addition to the core processes mentioned above, taking into account the economy of the entire process, the acid station of a viscose company is a core step in the process, which plays a role in circulating, blending and recycling the coagulation bath. By efficiently circulating, recycling, blending and filtering the coagulation bath, the water and alkali brought into the bath by the spinning process can be removed, facilitating normal production. In recent years, with the increasing global attention to environmental issues, the three-waste discharge from the production of viscose fibers has become a growing concern, and the industry is continuing to optimize the relevant processes and technologies.



Production process of viscose staple fiber

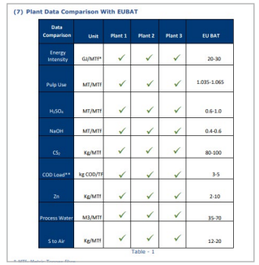
2 Key performance disclosure

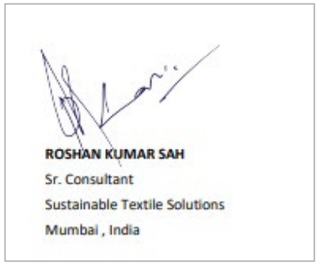
Sanyou Chemical Fiber, as the president unit of CV, is continuously improving the level of clean production in viscose production and promoting the industrial closed-loop production with reference to the requirements of CV Roadmap 2025 and the requirements of advanced standard systems at home and abroad.

In 2021, due to both the pandemic and the market situation, Tangshan Sanyou continued to optimize its product mix according to the market situation and increased the output ratio of modal and functional viscose fibers. Compared to the same period, the output of viscose fibers decreased (8.3%) and the overall energy and material consumption levels of the plant increased year on year due to multiple factors.

Special column — Third party certification

EU-BAT





FSC

RCS

SLCP

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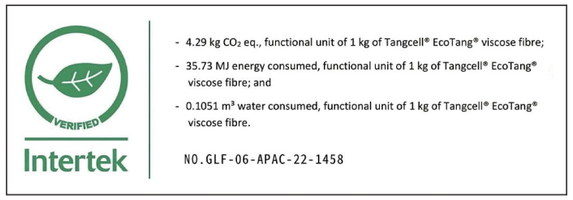
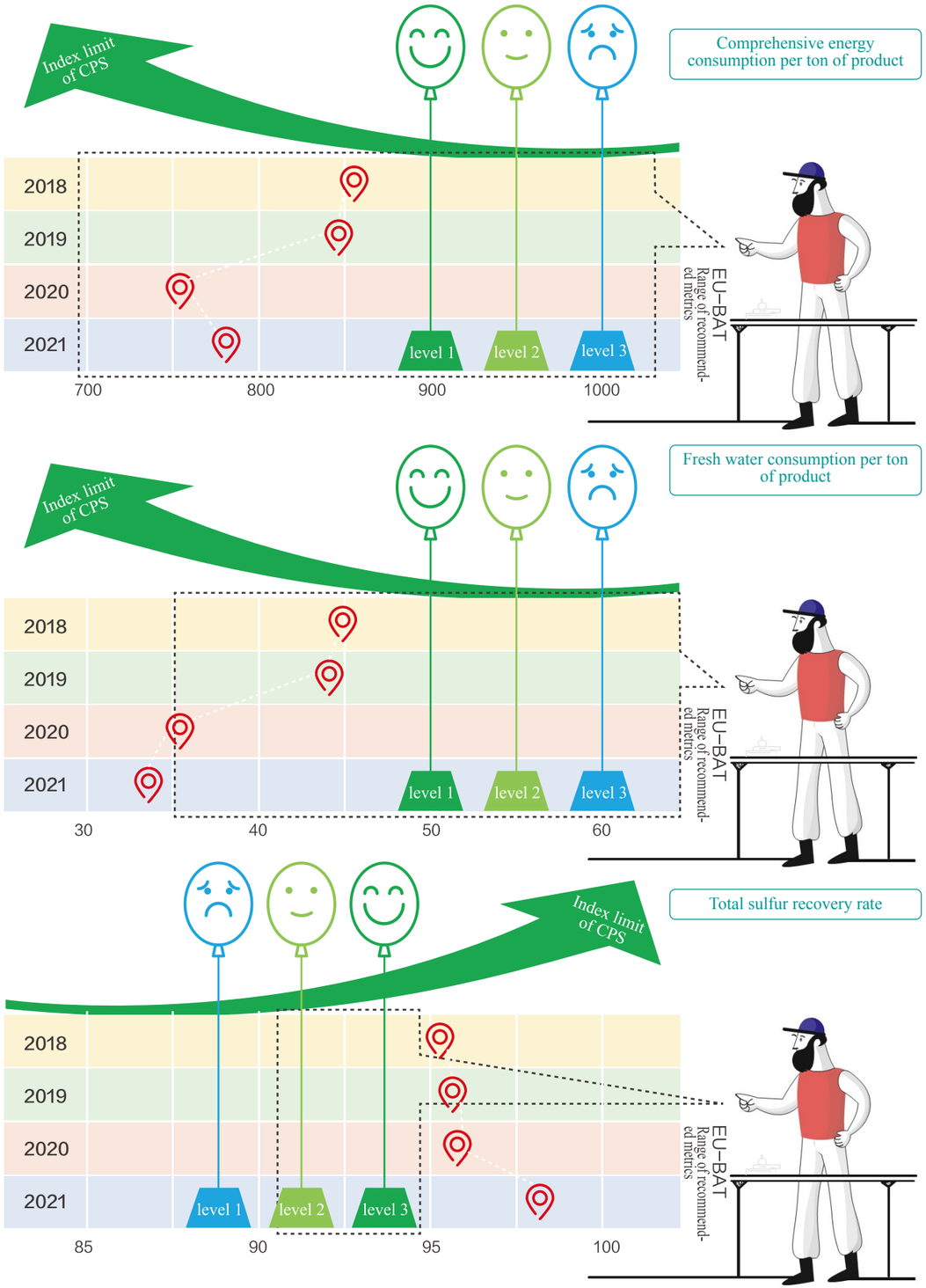
PEFC

Degradation of certification

LCA





Special column

Data disclosure--Pollutant Release and Transfer Register (PRTR)

IPE 公众环境研究中心 Institute of Public & Environmental Affairs

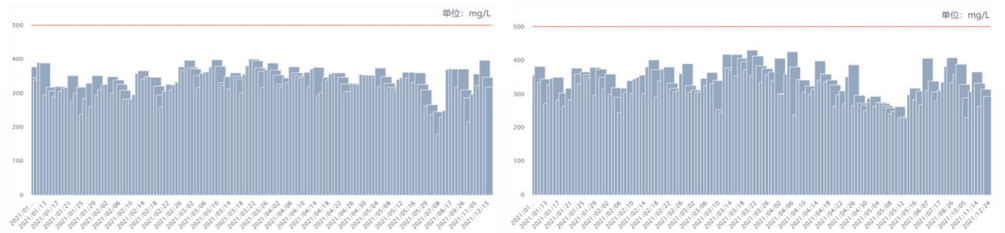
The PRTR system refers to an inventory or environmental database of pollutants that release harmful chemicals to the atmosphere, water and soil and are transferred to other locations for treatment or disposal. Sanyou Chemical Fiber has made its annual PRTR data publicly available on the IPE platform since 2019, and stakeholders can get the whole picture of the company's environmental performance with the publicly disclosed data from third parties.

The Institute of Public & Environmental Affairs (IPE) is committed to collecting, collating and analyzing publicly available environmental information from governments and enterprises. In 2013, IPE established the PRTR information voluntary disclosure platform and introduced brands to encourage manufacturers with high environmental impact to disclose their data, including annual resource and energy utilization, total annual emissions and releases of wastewater and waste gas pollutants (including hazardous chemicals), annual generation and transfer of hazardous waste, etc.

Disclosure of information on major sewage outfalls

Main pollutants: Chemical oxygen demand (COD) and ammonia nitrogen. After being treated by the company's internal sewage treatment station and meeting the requirements, the sewage is discharged into the Sewage Treatment Plant in Nanpu Economic Development Zone.

Implementation standard: In addition to Class 3 standards in Table 4 of the Integrated Wastewater Discharge Standard (GB8978-1996), COD 500mg/L, the wastewater quality requirements of the Wastewater Treatment Plant in Nanpu Economic Development Zone should also be met at the same time.



Real-time data of the COD of the wastewater from Sanyou Yuanda/Xingda Chemical Fiber Co., Ltd.

3 Energy saving and emission reduction cases

01 Yield increase of the sugar production line with hemicellulose

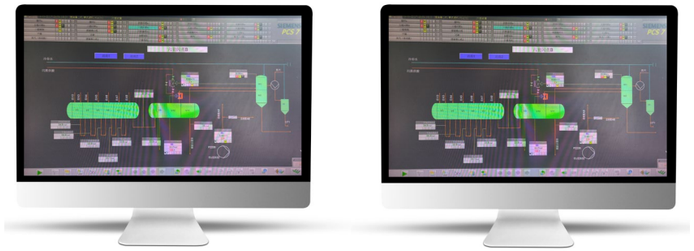
In 2021, the company added a hemicellulose hydrolysate pre-settlement process through technical renovation and enhanced the filtration capacity of the original vacuum rotary-drum filter unit. In addition, it upgraded the closed filter and ion exchange equipment, optimized the structure of the steam spray pump to improve its processing capacity and replaced the hydrolyzer with the one made of the material resistant to high acid and salinity, reducing the frequency of equipment maintenance and replacement. After the renovation, the syrup yield of the production line was increased from 17,000 tons/year to 20,000 tons/year.

02 Application study of the submerged steam-water mixer

In order to further improve steam utilization and conserve steam, the company conducted an in-depth study on the application of the submerged steam-water mixer in the bath heating process of the spinning system. Through the research and exploration of steam addition control parameters, it achieved the excellent use effect of immersed soda mixer of the submerged steam-water mixer. The successful implementation of the project can save 1 ton of steam per hour.

03 Upgrading and R&D of flashing energy saving technology

In order to timely and accurately measure the evaporated water and steam consumption of each set of flashing system in the acid bath workshop and other control parameters, and to accurately identify the operation effect of the flashing system, the company researched and developed corresponding methods and designed a program to automatically display the evaporation amount and water to steam ratio of flashing, realizing the accurate measurement of the evaporation amount and water to steam ratio of a single set of flashing system. The implementation and application of this project provides the basis for flashing accident detection and maintenance and flashing backwashing, ensuring stable operation of flashing at a desirable water to steam ratio and saving steam consumption.



04 Study of low-consumption operation of alkali washing and carbon disulfide desorption of sulfur-containing waste gas

The chemical fiber company uses a carbon disulfide adsorption system to treat the tail gas emissions and to recover the carbon disulfide contained in the contaminative gas. In recent years, the company has continued to research and adjust the steam pressure in the desorption process, improve the hydrophobic system of the fresh air heat exchanger, and study the reuse process of washing soda, etc. It has developed a new process to reduce steam consumption in the process of desorption of carbon disulfide with activated carbon and a new process to reduce caustic soda consumption in the process of removing hydrogen sulfide in the carbon disulfide adsorption system. In 2021, the project achieved monthly savings of 1,639t of steam and 30.7t of caustic soda, with economic benefits of RMB4,007,800/year.

05 Study of techniques to improve the efficiency of CS_2 condensation recovery

In order to further improve the recovery rate of CS2 in the viscose fiber production process and reduce production costs and total carbon emissions, a new high-efficiency double-layer stacked reticular-tray type condenser, designed and developed independently by the company, was put into operation in 2021. The condensation principle is that water falls from the tray holes to form a uniform water curtain, and that the condensation process is optimized and adjusted to achieve full condensation. The condensation effect of this new reticular-tray type condenser is significantly improved, with CS2 recovery improving by 0.5kg per ton of fiber.

06 Study of efficient separation technique for wastewater containing carbon disulfide

During the production of viscose fibers, some of the carbon disulfide is dissolved in various baths, forming the wastewater containing carbon disulfide. By studying the separation and recovery techniques for carbon disulfide dissolved in wastewater and free carbon disulfide in wastewater, the company has improved the packing volume and packing form of the degassing tower and developed an efficient carbon disulfide separation unit, achieving efficient separation and recovery of carbon disulfide from wastewater and reducing the wasting of carbon disulfide, With a recovery of up to 90% of carbon disulfide from wastewater.

07 R&D of an efficient push-flow aeration system

In 2021, the company conducted research and improvements to the wastewater biochemical treatment system. According to its indicators including the AO tank dissolved oxygen and effluent COD, it independently designed and manufactured a new type of push-flow aeration system, which is an efficient push-flow aeration unit suitable for high-speed rotation, which, combined with the original jet aeration unit, formed a new wastewater treatment operation process. This project has solved the problems of high number of operating AO tank units and high energy consumption, improved the biochemical treatment capacity in terms of wastewater, and reduced the operating cost of the biochemical system by RMB880,000 annually.

4 Green procurement

In 2021, Sanyou Chemical Fiber continued to strengthen procurement management and further improved the Management Measures for Supplier Evaluation and Access and the Pulp Procurement Policy to conduct comprehensive evaluation of suppliers. In its pulp purchase and sale contracts with suppliers, the company states its requirements for the purchase of FSC certified pulp and recycled cotton pulp. In 2021, it purchased up to 168 thousand tons of FSC certified pulp and 257 tons of recycled pulp. In the procurement of electromechanical equipment, it proposes that the motor energy efficiency must meet the requirements of the motor energy efficiency limit value and primary energy efficiency specified in GB18613-2020. In addition, for the raw materials purchased, including pulp for viscose, caustic soda, sulfuric acid, carbon disulfide, zinc sulphate, sodium hypochlorite, hydrogen peroxide, oil agents, auxiliaries, titanium dioxide, defoamer, flame retardant, flocculant, corrosion and scale inhibitor, algaecide, acetic acid, stock, hydrochloric acid, liquid zinc sulphate, etc., the plant has set strict incoming inspection requirements according to the company's Quality Standards for Raw and Auxiliary Materials, and the raw materials will only be accepted for storage after passing the inspection with an inspection sheet issued.

"Green Shirts" by Canopy

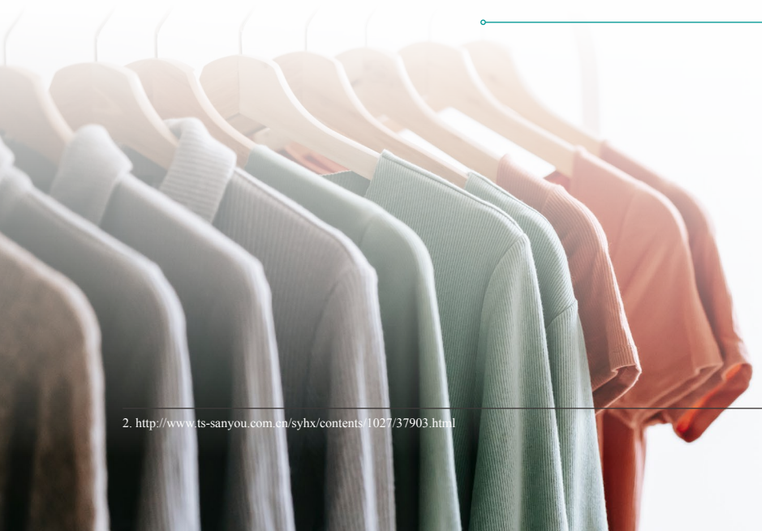
Canopy is an international non-profit environmental protection organization aiming for the protection of forests, species and climate. With hundreds of partners, it jointly formulates innovative solutions to improve the sustainability of the fiber supply chain and protect the primitive and endangered forests in the world. As an initiative of sustainable fiber procurement, CanopyStyle aims to improve the value chain of the whole cellulose fiber, confirm whether and when manufacturers confirm that the procurement sources of wood pulp are low-risk, i.e. whether they come from primitive endangered forests or controversial raw materials.

Sanyou Chemical Fiber has conducted active cooperation with Canopy for many years. It has disclosed the pulp procurement policy and completed the second Canopy audit in 2019, which made it become the first man-made cellulose fiber enterprise in China to obtain the rating of "Green Shirts" in the Hot Button Report released by Canopy. In November 2021, The Hot Button Report 2021 released by Canopy was released, and Sanyou Chemical Fiber got 27.5 buttons and obtained the rating of "part of Green Shirts". Sanyou Chemical Fiber adheres to its sustainable development strategy and continues to improve its corporate sustainability level. Since it started to step into the Green Shirts rating in 2019, the number of buttons that it got had increased from 22 to 27.5.

27.5 in 2021

25 in 2020

22 in 2019



2. http://www.ts-sanyou.com.cn/syhx/contents/1027/37903.html

5 Technological upgrades

01 Improvement of the Modal production line

In order to further optimize its product mix, from July to October 2021, Sanyou Chemical Fiber launched the "seven-line modal improvement" project, further increasing the output of Tangcell® Modal. The project, with a total investment of RMB3.73 million, enabled seven lines to meet Modal production requirements by adding sodium sulfide tanks, sodium sulfide pumps and other equipment to Yuanda's workshops such as No. 1 viscose making workshop, No. 1 spinning workshop and No. 1 acid bath workshop. The improvement has resulted in a production capacity of 40,000 tons/year of Tangcell® Modal on the seven lines, with 3,970 tons produced in the period from November to December 2021.

02 Improvement of the highly-white material project

Against the backdrop of the global spread of the COVID-19 pandemic, the viscose fiber is an important raw material for medical treatment and sanitary products. In order to meet the demand for highly white products in both domestic and overseas markets, Sanyou Chemical Fiber launched the improvement project of highly white material production in 2021. This project commenced in January 2021 and was completed in May 2021. Through equipment transformation and technology update, the production capacity of high white viscote staple fiber has increased by 70,000 tons/year.

03 Study of the suitability of pulp

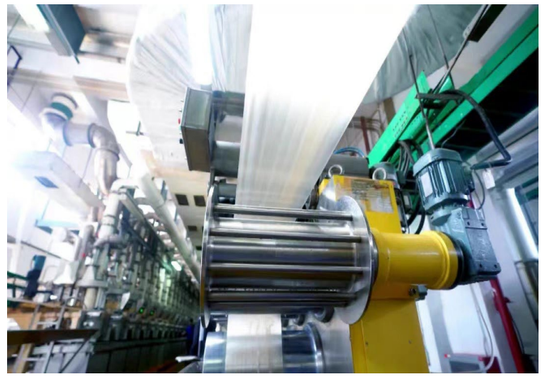
Pulp is an important raw material for the production of viscose fiber. There are hundreds of different pulp varieties available worldwide, including wood pulp, bamboo pulp, waste textile pulp, etc. from different regions. Pulp varieties vary greatly in terms of performance indexes due to their different sources. How to evaluate the advantages and disadvantages of various varieties of pulp in the selection of raw materials and make a reasonable mix will directly affect the fiber spinning and forming and viscose fiber performance.

Sanyou Chemical Fiber has studied and analyzed the varieties of trees, production process, methylcellulose content, degree of polymerization and alkali absorption value related to pulp, established a pulp data file, and Optimize the application solutions for pulp, improving its ability to cope with pulp procurement risks.

Sanyou Chemical Fiber has developed a stable production process by optimizing and adjusting the viscose making and spinning processes. At present, the company has successfully applied more than 50 varieties of pulp to produce viscose fiber and explored a supporting process route suitable for waste textile pulp, which provides more technical guarantee to achieve green and sustainable procurement of raw materials for the enterprise.

Improvement of the Lyocell pilot line

In 2021, the company implemented a number of projects for the Lyocell fiber pilot line, including the development of technical equipment for the industrialization of Lyocell, research on the dry process and segmental dissolution technology of green cellulose fiber, and research on the oiling process. This has increased the capacity of the Lyocell pilot line from 5,000 tons to 7,000 tons, while providing technical support in terms of process and equipment for the construction of a Lyocell production line with a capacity of 60,000 tons. Through the improvements in dissolution technology, oiling processes and production controls, the quality of Lyocell products continues to improve and the consumption continues to decrease.



6 Work safety

Sanyou Chemical Fiber always puts safety in the first place, strictly implements risk control, timely governance of safety hazards, to ensure production safety and stability. Sanyou chemical fiber strictly implements the epidemic prevention and control requirements of the superior, and all cadres and employees cooperate in prevention and control, and do a good job in implementing the work. Focusing on production, operation and project investment, the whole chain will be investigated for 38 risks, all of which will be included in the key monitoring category to ensure that all the rectification is in place.

01 Pandemic prevention and control





02 Safety training





03 Risk identification



04 Emergency exercise



IV. Carbon Reduction Practice

1 Vision for carbon peaking and carbon neutrality

In October 2021, Sanyou Chemical Fiber officially disclosed its corporate vision of carbon peaking and carbon neutrality — "strive to achieve a 30% carbon emission reduction per unit of product by 2030 and carbon neutrality by 2055". At the same time, Sanyou Chemical Fiber has officially launched the Tangcell LCA project based on the traceable industry chain being built, in order to develop low-carbon Tangcell products that can reduce carbon emissions in the downstream processing process based on a clear definition of the percentage of carbon emissions in each stage of the whole life cycle and its own technological advantages.

Biodiversity conservation

Sanyou Chemical Fiber will rely on third-party tools to fully audit the sustainability risks of the dissolving pulp and forestry chain to ensure that products do not come from primitive and endangered forests.

Sanyou will continue to support the R&D of innovative pulp and increase the proportion of application of waste textile pulp.

Circular economy

Relying on Sanyou Group's circular economy system, Sanyou Chemical Fiber will further explore the potential of circular economy based on the grand industrial cycle in the park, making full use of production waste and greatly reduce the environmental impact of the entire circular system.

Closed-loop production

Sanyou continues to take CV Roadmap 2025 as guidelines and use tools including the Evaluation Index System for Cleaner Production of Regenerated Cellulose Fiber Manufacturing Industry (Viscose Method), EU-BAT and ZDHC MMCF guideline to continuously improve its energy conservation and emission reduction level. All the plants of Sanyou Chemical Fiber shall meet the requirements of the Grade 1 targets specified in the CV Roadmap 2025 by 2025, based on compliance with EU-BAT requirements.

Growing together

Sanyou Chemical Fiber will continue to bear in mind General Secretary Xi Jinping's instruction that "consolidating, strengthening and expanding state-owned enterprises is an important guarantee for giving full play to the superiority of the socialist system with Chinese characteristics". Sanyou will continue to bear the social responsibility of state-owned enterprises, continue to improve the community environment, increase the income of employees, maintain regional stability, undertake poverty alleviation obligations, and support rural revitalization, fully playing the role of state-owned enterprises as a "pillar".

Sanyou's Vision for Carbon Neutrality

Sanyou will strive to achieve **30%** carbon emissions reduction per unit product by 2030 and **carbon neutrality** by 2055

Biodiversity protection

Circular economy

Closed-loop production

Growing together

2 30·60 Net-Zero Acceleration Plan

In the context of carbon peaking and carbon neutrality, since it formally coordinated the transformation, upgrading and carbon reduction process in 2021, Sanyou Chemical Fiber has officially joined the "30·60 Net-Zero Acceleration Plan" in the same year, and under the leadership of the Office for Social Responsibility of CNTAC and Collaboration for Sustainable Development of Viscose (CV), continued to promote low-carbon energy, green materials, clean production and low-carbon products, taking a leading role in addressing global climate change in the industry and the country.

According to the overall work arrangement of the "30·60 Net-Zero Acceleration Plan", Tangshan Sanyou will further organize climate training camps, regular carbon verification and information disclosure, and further develop a more specific plan and roadmap for the carbon peaking and carbon neutrality initiative on the basis of its official release of the vision for carbon peaking and carbon neutrality.

"30·60 Net-Zero Acceleration Plan"

Climate change is a global challenge. Promoting the achievement of carbon peaking and carbon neutrality has become a strategic choice for countries around the world to address climate change. As a major emitter of greenhouse gas, China has also announced more ambitious emission reduction targets, namely "striving to achieve carbon peaking by 2030 and carbon neutrality by 2060", and is systematically promoting related work in all respects.

The textile industry is closely related to people's livelihood and has always been of great concern to all circles at home and abroad. The textile industry remains in the spotlight in the field of climate change research and is one of the first industries in the world to take climate action. In China, a large textile country, the textile industry shall assume its due responsibility and mission in combating climate change. In recent years, the Chinese textile industry has been at the forefront of China's manufacturing sector in terms of climate action, guided and promoted by the Office for Social Responsibility of CNTAC (a special unit of the CNTAC to promote sustainable development in the industry).

In 2017

the Office for Social Responsibility of CNTAC launched the "Carbon Management Innovation 2020 Initiative", pioneering the grand vision for a zero-carbon industry by 2050.

In 2018

CNTAC signed the UN Fashion Industry Charter for Climate Action as a party, specifying the phased reduction target of the fashion industry, i.e. 30% reduction in carbon emissions by 2030 (relative to the 2015 baseline of emissions).

In 2019

based on the integration of the previous efforts, the Office for Social Responsibility of CNTAC launched the "Fashion Industry Climate Innovation Initiative 2030", aiming to bring together all parties to collaboratively advance the achievement of the fashion industry's emission reduction target and make industrial contributions to global climate governance.

In order to implement the national carbon neutrality strategy, accelerate the "Climate Innovation Initiative 2030" and speed up the green and low-carbon transformation of the industry, the Office for Social Responsibility of CNTAC officially launched the "Innovative Climate Action and Carbon Neutrality Acceleration Initiative by Chinese Fashion Brands" (hereinafter referred to as the "30·60 Net-Zero Acceleration Plan") on June 1, 2021. Under the guidance of relevant departments and with the support of technical institutions, 30 key brand enterprises and 60 manufacturing enterprises have been selected and supported to carry out climate innovation initiatives, and key industry clusters have been guided to pilot demonstrations on climate innovation initiatives for carbon neutrality.

3 Carbon footprint of products

In 2021, Sanyou Chemical Fiber cooperated with CV and Intertek in analyzing the product carbon footprint from “cradle to gate” based on Tangcell products. Throughout the research, PAS2050 and ISO 14040/44 were used as guiding standards.

The LCA research on Tangcell® EcoTang® indicates the following:

01 Raw material (wood pulp, etc.) production contributes about **44**% to global warming, and fiber production **50**%.

02 The contribution of the fiber production stage to the cumulative energy demand is about **76**%, and raw material production at approximately **13**%.

03 In the analysis of water consumption, the raw material production phase and the fiber production phase account for **56**% and **44**% respectively.

04 Overall, the impact of product packaging and transport is relatively limited.

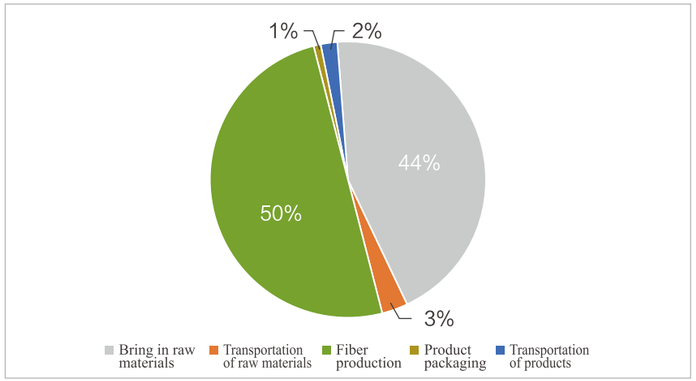
Carbon footprint allocation

According to ISO 14044:2006, where allocation cannot be avoided, the inputs and outputs of a system should be divided among different products or functions to show the potential physical relationship between them. In other words, they should present how changes in the number of products or functions provided by the system change the inputs and outputs.

In addition to viscose fiber, Na_2SO_4 (anhydrous sodium sulphate and mirabilite) is also an important by-product in the production process. In this research, the carbon footprint allocation for both was carried out using the gravimetric method.

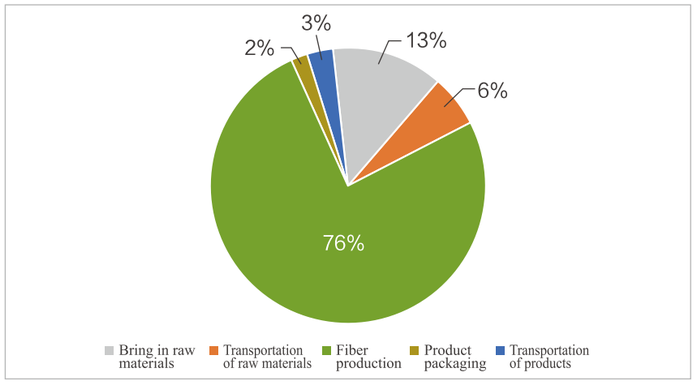
1.Greenhouse gas emissions

According to estimates, the greenhouse gas emissions from 1 kg of Tangcell® EcoTang® are 4.29 $kgCO_2eq$.



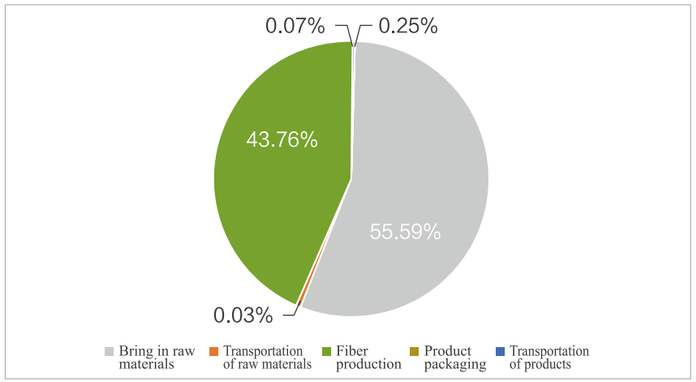
2.Cumulative energy demand

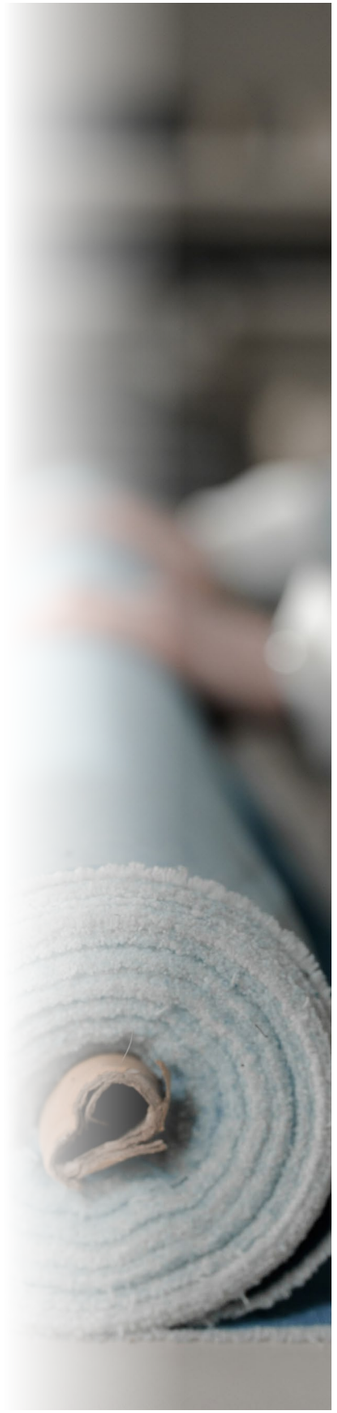
According to estimates, the cumulative energy demand of 1kg of Tangcell® EcoTang® is 35.73MJ.



3.Water consumption

According to estimates, the water consumption of 1kg of Tangcell® EcoTang® is 0.105m^3.



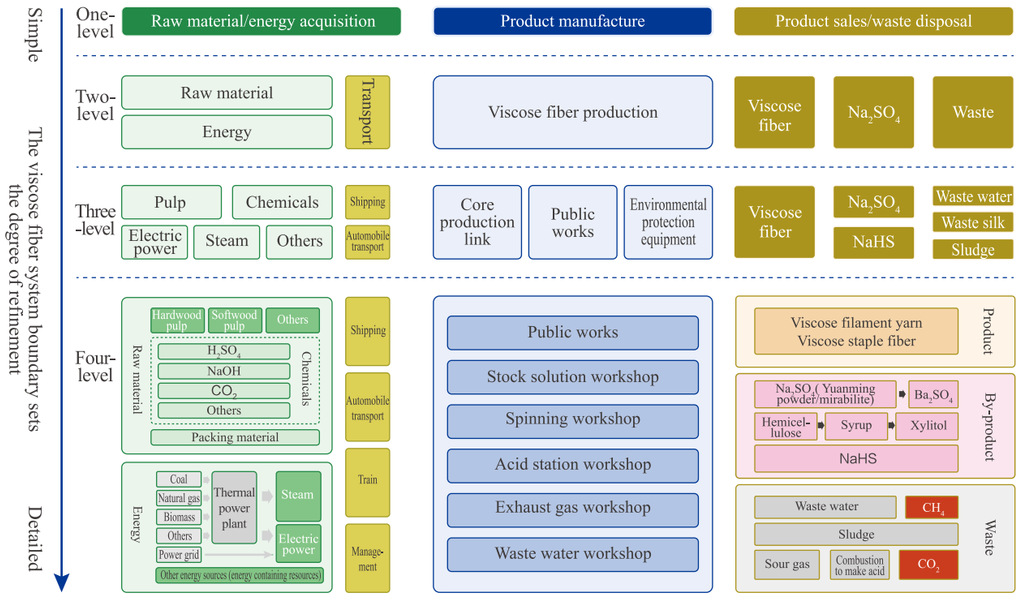


4 Prospects of industry efforts for carbon reduction

In 2021, as CV incorporated carbon emissions into the assessment requirements of CV Roadmap2025, CV and allied enterprises began to work with third-party organizations to gradually launch carbon verification and other related tasks. In the light of the analysis of third-party LCA reports issued by the Office for Social Responsibility of CNTAC, Intertek, SGS, Chengdu IKE Environmental Technology Co., Ltd., etc., the differences in the choice of data, such as system boundary construction, activity data selection, carbon footprint allocation, secondary data selection and biochar, in the reports issued by different institutions make the carbon emission data of different enterprises not yet comparable. To this end, Sanyou Chemical Fiber worked with CV and the CCFA on the development of carbon verification standards in the field of man-made cellulose fiber to provide standards for different enterprises to benchmark and learn from each other's experience in emission reduction.

System boundary construction

In the completed carbon footprint reports, the system boundary models are generally coarse, only reaching Level 1 or Level 2 (See Figure 3 for the structure of the system boundary models at different granularities). Differences in the granularity of system boundaries will directly affect the breadth of data collection.



Secondary data selection

In performing carbon footprint calculations, it is clearly not possible for a company to actually measure the carbon footprint of all raw materials, so secondary data is necessarily used to estimate carbon emissions for some of the activity data. In the viscose fiber industry, secondary data cannot be used for data relating to the plant itself. In addition, relatively rigorous reporting generally requires that secondary data cannot be used directly for the upstream main raw material (pulp). However, secondary data are mostly used for pulp raw material (wood chips) and other raw materials (caustic soda, sulfuric acid, etc.).

Several secondary database sources are currently available in the industry, among which Ecoinvent, GaBi, ELCD and CLCD are relatively popular. Therefore, in practice, both the use of secondary data and the choice of a secondary database will influence the carbon footprint results. At present, almost none reports disclose carbon emission factors for secondary data, which further increases the difficulty in comparing sources of differences between reports.

V. Innovative and sustainable green products

1 Introduction

In order to lead the development of the new generation of green and sustainable man-made cellulose fiber, based on the brand of "Sanyou®", Sanyou Chemical Fiber has launched the high-end environmentally friendly brand, Tangcell® with the connotation of "technology, green and fashion". It guarantees a green, transparent and sustainable industry chain while ensuring the lower carbon emission in the production process, and the traceability throughout the whole life cycle, thus providing green and sustainable solutions for the textile industry chain from the source.

Output of Tangcell® products in 2021

01 EcoTang® **15,257.44** tons

02 ReVisco® **229.28** tons

03 Colored Viscose **14,871.64** tons

04 Lyocell **5,644.00** tons

05 Bamboo Modal **262.71** tons

06 Modal **55,873.67** tons

07 Custom fiber **2,834.14** tons

2 Product matrix of Sanyou Chemical Fiber

Brand	Product name	Differentiated raw material	Innovative production process			Industry chain innovation
Sanyou	Custom fiber for vortex spinning		Innovative process	Special oil agent		
	Custom fiber for ring spinning		Innovative process	Special oil agent		
	Fiber for hygienic nonwovens			Special oil agent		Special for wiping and sanitary materials
	Ultra staple		Innovative process			Can be washed away naturally
	Bamboo fiber	Bamboo				
	Fire-resistant fiber		Function customization			
	Negative ion fiber		Function customization			
	Antibacterial fiber		Function customization			
	Bamboo charcoal fiber		Function customization			
Tangcell	Colored fiber		Color customization			Avoid pollution from the printing and dyeing process
	EcoTang	Sustainable raw material	Closed-loop process	Low carbon		Traceability
	Modal	Sustainable raw material	Closed-loop process	Low carbon	Innovative process	Traceability
	Lyocell	Sustainable raw material	Innovative process	Low carbon		
	ReVisco	Waste textiles	Innovative process			Recycled
	Bamboo Modal	Sustainable bamboo	Innovative process			
	Custom fiber	Customized raw material	Innovative process	Customized functions		Applicable to unique application scenarios

3 The green industry chain led by Tangcell® EcoTang®

Relying on a selected third-party certification matrix, EcoTang ensures that the products come from compliant forest or sustainable raw materials. The control over the production process meets the requirements of top global specifications. With tracer agents, the product can be traced throughout its life cycle and eventually degrade in the natural environment, realizing the life reincarnation: nature-based products finally come back to nature.

TangCell 源于自然

Tracer agent

In order to ensure the traceability of Tangcell® EcoTang® products, Sanyou Chemical Fiber, breaking the research bottleneck, has independently developed the molecular tracing technology and detection method with special components. The special tracer agent for Tangcell® will not disappear in the production process, and it can realize the whole-process identification of products even after the processing and transformation of textiles through the industrial value chain, thus ensuring the complete transparency and traceability for fiber brands and consumers in finished clothing.

For varieties of products (including fibers, yarns, fabrics, garment, etc.) in the process of industry chain processing, Sanyou Chemical Fiber has provided special supporting customized detecting devices, and assigned professional personnel to conduct testing and issue test reports. That will help ensure that retailers, brand owners and consumers can timely and accurately identify whether textiles contain components of Tangcell®EcoTang®.

Sustainable raw materiala

FSC certification
Canopy audit[3]
(Green Shirts)

Closed-loop production

STeP by OEKO-TEX®
EU BAT audit

Sustainable products

MADE IN GREEN STANDARD 100 by OEKO-TEX®
Product degradation certification (OK biodegradable SOIL certification by TÜV AUSTRIA)

3.https://hotbutton.canopyplanet.org

OEKO-TEX® Association

Based on the requirements of CV Roadmap, Sanyou Chemical Fiber selects STANDARD 100 by OEKO-TEX®(Confidence Textile) certification and STeP by OEKO- TEX® (sustainable textile production) issued by OEKO-TEX® Association as a tool to verify the content of harmful substances in its products and the sustainable management level in all aspects of its production and operation.

Sanyou Chemical Fiber strictly complies with the list of prohibited use specified in the standard. At the same time, Sanyou requires all suppliers to abide by the requirements of OEKO-STeP and sign the Code of Conduct Commitment to prohibit the use of restricted chemicals.

Apart from the two certifications, Sanyou Chemical Fiber has obtained the label of MADE IN GREEN by OEKO-TEX® issued by the organization, so as to ensure that the products pass the test of harmful substances, be manufactured in a sustainable manner, while providing a safe and secure supply guarantee for the textile industry chain.

4 Tangcell®ReVisco® — The next generation of cellulose fiber raw material

Sanyou Chemical Fiber, together with its partners in the industry chain have actively promoted the R&D of pulp and spinning viscose preparation technology through the recycling and classification of waste textiles, successively solved problems such as poor quality and difficulty in forming when using recycled pulp for spinning, and broke the technical bottleneck in terms of man-made cellulose fiber recycling. The total output of recycled fiber reached 229.284 tons in 2021.

01 ReVisco® partner Re:newcell

Re:newcell is a Swedish company engaged in textile recycling and its independently developed waste textile recycling technology can convert waste textiles such as jeans and T-shirts into new dissolved wood pulp. Sanyou Chemical Fiber started to cooperate with Re:newcell in 2019. They jointly optimized the key technological parameters in terms of waste textiles pulping - regenerated pulp spinning, breaking the technical bottleneck in terms of waste clothing pulping - spinning technology. Sanyou Chemical Fiber uses Re:newcell's regenerated pulp as a raw material to produce regenerated viscose, and more than 30% of the recycled pulp is added to the production of regenerated viscose. In 2020, Tangcell® and Re:newcell reached a five-year cooperation agreement, aiming to continue to build a new circular economy chain.

02 ReVisco® partner Södra

Södra is an association of forest owners in Sweden and is also an international forest industry group. With its business being based on the processing of forest products of its members, it is committed to sustainable logging rate, responsible logging, and more management measures.

In February 2020, Sanyou Chemical Fiber successfully produced the viscose staple fiber with OnceMoreTM dissolved pulp as the raw material. At present, Södra provides OnceMoreTM dissolved pulp based on waste textile recycling technology for Sanyou Chemical Fiber.

03 Recycling raw materials — the next generation of solutions[4]

Sanyou Chemical Fiber attaches great importance to the sustainability of the main pulp source - the forest. To this end, it continues to focus on examining the sustainability of raw material sources of suppliers and make active efforts to explore solutions in terms of innovative raw materials. As the initiative "Next Generation Solutions" proposed by Canopy is in line with Sanyou's concept of sustainable development, both sides agreed to reduce the demand for natural cellulose and stop wasting global forests by using "next generation" pulp alternatives, which reduces carbon emissions and drives circular economy. To this end, Sanyou Chemical Fiber became a supporter of "CanopyStyle Next Generation" and signed the world's first "Early Adopter of Next Gen MMCF Pulp". It supports Canopy and its partners to develop and expand a new generation of alternative fiber products and takes the lead in bringing new materials to the market and promoting the commercialization of new technologies.

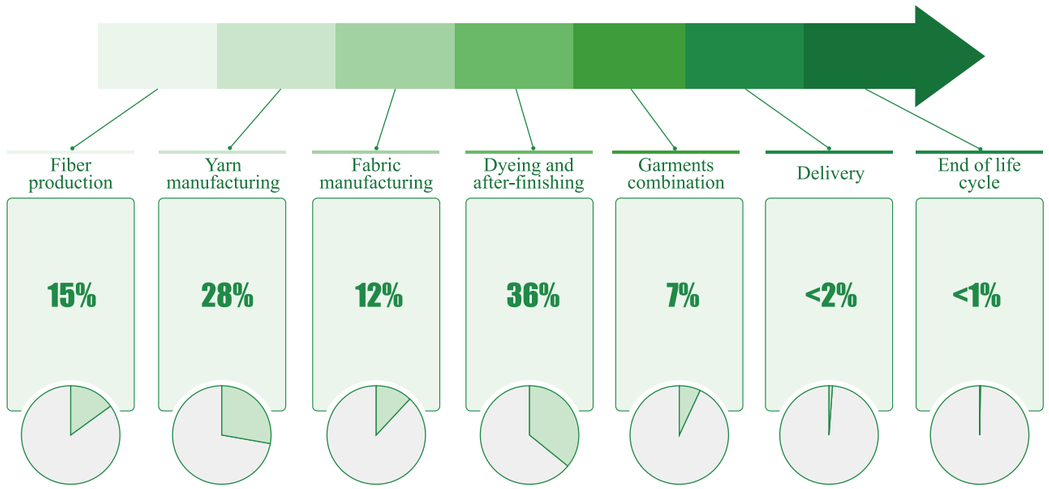
From Södra's official website

4.https://canopyplanet.org/campaigns/canopystyle/canopystyle-next-generation-vision-for-viscose/

5 Tangcell® Colored Viscose — a low-carbon solution for the industry chain

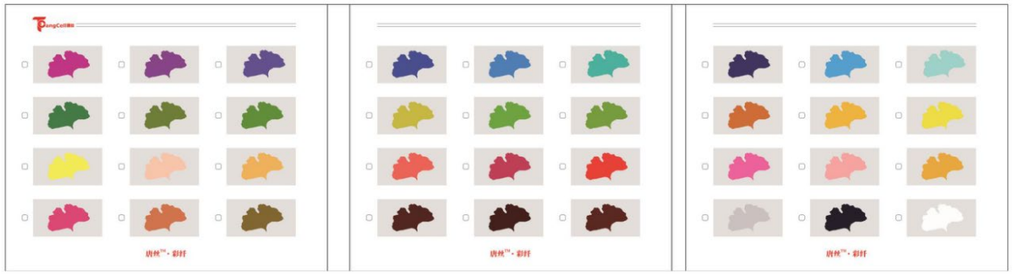
According to the research on the impact of the global textile and garment industry on the environment conducted by Quantis[5], the carbon emission in the printing and dyeing / after-finishing stage accounts for about 36% of the total carbon emission of textiles in the full life circle of clothing. Therefore, a new solution is proposed to reduce the environmental impact brought by the textile and garment industry during the full life cycle, namely, dying and coloring the fiber directly in the pre-spinning injection process in the production to avoid the carbon emission produced by textiles in the printing and dyeing process.

Greenhouse gas emissions from clothing at different life cycle stages



Tangcell® Colored Viscose fully mixes environment friendly color paste with sustainable paste, and hassuccessively developed colored fiber products in black, navy blue, pink, water blue, clear blue and other colors, avoided the using of chemicals such as formaldehyde and aromatic amine for printing, dyeing and after-finishing. It can provide you with safer care while maintaining the comfortableness brought by cellulosic fiber. In 2021, the total production of Tangcell ® color fiber amounted to 14,871.66 tons.

It is estimated that using 1 ton of Tangcell® Colored Viscose can reduce[6]: 1.1 tons of coal equivalent and 90 tons of water.



5. https://quantis-intl.com/measuring-fashion-report-press-release/
6.According to the “Printing and dyeing Industry standrad Management Requirements” issued by the Ministry of Industry and Information Technology of China.

6 Tangcell® Lyocell Fibe

For the purpose of promoting the green transformation of the man-made cellulose fiber industry, Sanyou Chemical Fiber actively promoted the R&D of Lyocell production technology, and used NMMO as the solvent to replace carbon disulfide in the viscose fiber process, avoiding the pollution from sulfur-containing waste gas in the production of fiber. NMMO solvent can be recycled in the whole production process system, and an independent closed-loop production system is then formed, with a product recovery rate of more than 99.7%.

The 5,000-ton Lyocell Fiber project of Sanyou Chemical Fiber was completed and put into operation in 2019. In 2021, the annual output reached 5,644 tons and the capacity utilization rate reached 113%. In 2021, Sanyou Chemical Fiber announced that it planned to invest an additional RMB1.635 billion in preparing for the 60,000-ton Lyocell Fiber project, with the planned long-term production capacity of 200,000 tons.

Aannual output reaches **5644** tons

Capacity utilization reached **113** %

7 Tangcell® Bamboo Modal

01 Raw material

Tangcell® Bamboo Modal originates from sustainable bamboo, carrying forward the concept of “replacing cotton and wood with bamboo”. It aims to reduce the dependence of man-made cellulose fiber on forest resources as far as possible, and to figure out an effective way for the rational and efficient utilization of bamboo resources.

FSC certification

02 Technique

Produced on the basis of Modal technique, Tangcell® Bamboo Modal fully inherits the advantages of modal fiber in terms of fiber strength and wet modulus. It features good air permeability and moisture transfer effect, and the fabrics made of it is quite suitable for personal wearing directly on the skin.

8 Industry chain cooperation

01 Research on the application of man-made cellulose fiber in the spinning industry[7]

With the support of CV, the CCTA and the CCFA jointly conducted research on fiber applications for the man-made cellulose fiber-spinning industry chain in China in 2021. The entire research covers spinning capacity of over 20 million spindles and an annual consumption of over 1 million tons of man-made cellulose fiber, covering over 30% of the demand in the field of man-made cellulose fiber spinning in China.

The research involves market evaluation, consumption, product usage, product quality indicators, service satisfaction, product development capability and suggestions and requirements for manufacturers. Through a comprehensive rating of man-made cellulose fiber suppliers, six enterprises, including Sanyou Chemical Fiber, were awarded the “Quality Supplier” in 2021 in the man-made cellulose fiber - cotton textile industry chain.

Quality suppliers

- Sateri Group
- Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd.
- Xinjiang Zhongtai Group Co., Ltd.
- Lenzing (Nanjing) Fiber Co., Ltd.
- Shandong Yamei Sci-Tech Co., Ltd.
- Yibin Grace Group Co., Ltd.

02 Night of Tangcell - Launch of Tangshan Sanyou’s sustainable vision

On October 9, 2021, Tangshan Sanyou launched its sustainable vision in Shanghai. While releasing the Tangshan Sanyou Group Xingda Chemical Fiber 2020 Sustainability Report, Sanyou Chemical Fiber invited industry leaders, experts, downstream partners and end-brand enterprises from the textile industry chain to exchange and discuss on the sustainable development of man-made cellulose fiber.





7. Research report: https://mp.weixin.qq.com/s/LSofiBNTprgrM2a61IrgGg

03 Industry chain exchange

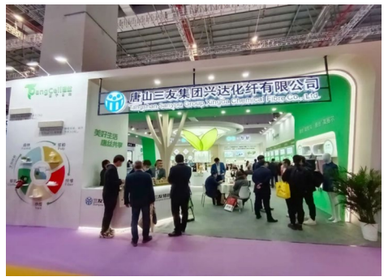
On May 10, 2021, Ms. Zhao Xiuyuan, Director of Technical Development Department and Mr. Li Lianshuang, Director of Sales Department of Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. visited JPNSKA and had an in-depth discussion with Mr. Liu Shuai, General Manager of JPNSKA, on the further R&D and promotion of Bamboo Modal.

In July 2021, Mr. Zhang Dongbin, Deputy General Manager, Ms. Zhao Xiuyuan, Director of Technical Development Department and Mr. Li Xiaodong, Director of Sales Department of Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. led a team to High Fashion Group for an exchange. This exchange broke tradition and was a direct dialogue between fibers and fabrics, with precise matchmaking and exchange of cutting-edge technologies. Both parties decided to work together to innovate and promote the sustainable development of the textile industry.

In July 2021, Mr. Zhang Dongbin, Deputy General Manager, Ms. Zhao Xiuyuan, Director of Technical Development Department and Mr. Li Xiaodong, Director of Sales Department of Tangshan Sanyou Group Xingda Chemical Fiber Co., Ltd. led a production, marketing and research team to visit downstream enterprises, and exchanged with Shandong Long Run Textile Co., Ltd. and Shandong Zhink New Material Co., Ltd.

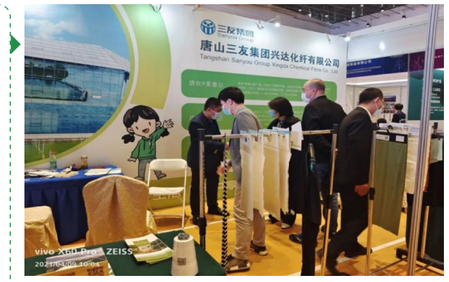
04 Industry exhibitions

The 2021 China International Yarn Expo (Spring/Summer) was held at the National Exhibition and Convention Center (Shanghai) from March 17 to 19, 2021. Sanyou Chemical Fiber presented the Tangcell® family to display the charm of Tangcell® fiber and its application in end products such as garments, home textiles, conveying the life concept of “Enjoy life, Enjoy Tangcell”.





During the 2nd China International Textile Materials Conference, Tangcell® participated with its main products Tangcell® Lyocell, Tangcell® Modal, Tangcell® Custom and Tangcell® EcoTang® on April 9, 2021, providing the textile industry with innovative raw material mixing solutions that start from the original aspiration for nature, attracting visitors to stop by for exchanges and discussions.



From May 26 to 27, 2021, the 15th China Hangzhou Cellulose Fiber (Viscose) Industry Forum was held in Hangzhou. Experts from all walks of life and quality enterprises in the textile industry chain came together to discuss the path to quality industry development the after the pandemic had become stable.

On June 22, 2021, the 15th China International Trade for Technical Textiles & Nonwovens (CINTE21) was launched at the Shanghai New International Expo Center (SNIEC). As an innovative leader in the cellulosic fiber industry, Sanyou Chemical Fibers showcased its Tangcell® series fibers, flame retardant fibers, Sanyou Clean High Whiteness Fiber, Sanyou Bamboo Fiber, etc. under the theme of “Enjoy life, Enjoy Tangcell”, presenting a clean lifestyle with high environmental value.



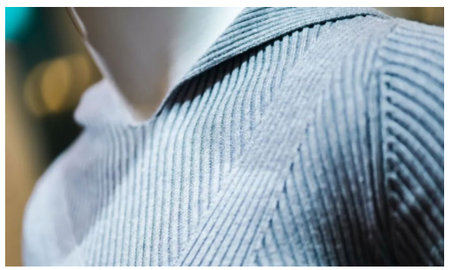


From September 26 to 27, 2021, the 34th China New Fiber and Yarn Face-to-Face Meeting was held at the Oriental Grand Hotel in Shaoxing. Sanyou Chemical Fiber, as a co-organizer, participated with its Tangcell® products and presented a dynamic and innovative raw material mixing solution to the participants inside and outside the industry. A constant stream of customers came for advice, creating a lively atmosphere of communication on site.

The 2021 China International Yarn Expo (Autumn/Winter) was held at the National Exhibition and Convention Center (Shanghai) on October 9, 2021. As a sustainable raw material supplier in the textile industry, Sanyou Chemical Fiber, under the theme of “Enjoy life, Enjoy Tangcell”, worked with downstream partners to showcase the innovative application of Tangcell® in the textile, apparel and household sectors, conveying the life concept of “green, development, technology and fashion” to the industry.




On November 15, the 2021 Hebei Brands “Cloud” Series was launched. The Tangcell® products were showcased at the Textile and Consumer Goods Exhibition.
As an independent online exhibition platform designed by the Hebei Exhibition Promotion Center, the Hebei Brands “Cloud” Platform provides one-stop services of display, cooperation, live broadcast and classroom “in the Cloud”. It is both digital and functional, and has become an important platform for enterprises in Hebei to carry out online display and cooperation. In 2021, a total of six sessions of Hebei Brands “Cloud” were held, with 60 Hebei brand companies appearing on the “Cloud” Platform at each session.



VI. Personnel Training and Social Responsibility

1 Party construction
2 Public service
3 Subject research and scientific and technological innovation
4 Democratic management, sharing of achievements
5 Heartwarming projects
6 Cultural activity
7 Personnel training

1 Party construction

Sanyou Chemical Fiber has always been guided by Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era and comprehensively implemented the spirit of the 19th National Congress, the plenary sessions of the 19th Central Committee and the Central Economic Working Conference. Focusing on the central tasks of production and operation, reform and development, it continues to improve the scientific level of Party construction, lay a solid foundation, give full play to its strengths, highlight the key points, pay close attention to implementation, and continuously transform the Party's political advantages into its core competitiveness, providing a strong organizational guarantee for its high-quality development.

01 Build a solid ideological foundation

Adhere to the use of "first topic", party committee theoretical learning center group and other learning mechanisms, and promote innovative theory into the mind. Strengthen the leadership of the party to give full play to the role of party organizations in "taking the direction, managing the overall situation, and promoting implementation", implement the party's leadership in all aspects of corporate governance, and ensure the implementation of various decision-making and deployment.

02 Deepen the study and education of Party history

33 reading classes were established, the leadership participated in more than 40 Party classes and special lectures, and the Party Branch held more than 180 thematic Party classes. In addition, using the Li Dazhao Memorial Hall and other red spirit resources, the company organized more than 600 Party members and cadres to receive education on the Party spirit. The company organized activities such as "Micro Party Lessons on the History of the Party for a Century" and "The Power of Faith", educating the Party members for more than 2,000 person-times.

03 Activate the effectiveness of party building

It took initiatives such as selection of star-rated Party branches and quarterly post competitions. 28 Party branches got promoted, and the standardized construction of the branches was 100% up to standard. Focusing on the central work, it deepened its Party construction enhancement plan. Through the improvement of indicators and Party members tackling topics, it achieved more than RMB25 million in benefits. It extensively carried out more than 80 activities on the themes of "Benefit Improvement under the Red Party Flag" and "Party Flag Flying High on the Front Line", fully aspiring the Party Branch to play the role as the fighting base and the pioneering and exemplary role of Party members.







2 Public service

Case 1 “Used Clothing with a Deep Sentiment for Green” voluntary donation campaign.

The company organized a total of over 3,000 donations of clothing and household textiles in this campaign, sending warmth to poor mountainous areas while advocating the sustainable development concept of recycling waste textiles and reducing forest deforestation, contributing to the green development of Sanyou.

Case 2 “Passing on Love, Volunteering first” blood donation campaign.

52 staff members donated a total of more than 16,000ml of blood. Through the blood donation campaign, they contributed to the creation of a civilized unit by giving their love and contributing to the cause of public blood donation with practical actions.

Case 3 Campaign of volunteer service to increase the public awareness of the law

In order to further carry forward the concept of the socialist rule of law with Chinese characteristics and further enhance the staff’s awareness of the rule of law, on the occasion of the National Constitution Day, the company organized the campaign of volunteer service to increase the public awareness of the law. Its carefully selected contents such as constitution propaganda, fraud prevention, loan risks and other content and printed publicity pages to publicize legal knowledge among staff members, aiming to enhance their consciousness to know, understand and apply the law and create a civilized and harmonious corporate environment.

3 Subject research and scientific and technological innovation

Sanyou Chemical Fiber has always adhered to the goal of increasing its overall scale, optimizing production costs, enriching its connotation and outreach, and enhancing the Sanyou brand. It has deeply implemented the innovation-driven strategy and continuously advanced its high-quality development by strengthening the management of scientific and technological innovation, enhancing the development of new products and technologies, and organizing internal benchmarking and upgrading seminars. In 2021, Sanyou Chemical Fiber implemented 79 innovation projects, including “Development of a new process for acidic water recycling”, “Study of the matching performance of ultra staple cutting”, “R&D and manufacturing of an efficient push-flow aeration system”, “Gradient energy utilization of three companies”, etc. Among these projects, 50 innovative projects have been completed and achieved good results in implementation and application, including “Study of low-consumption operation of alkali washing and carbon disulfide desorption of sulfur-containing waste gas”, “Development of efficient separation technology and equipment for carbon disulfide-containing wastewater”, “Study of the matching performance of ultra staple cutting”, etc.

Innovative projects
79

4 Democratic management, sharing of achievements

The company constantly adheres to and improves its democratic management systems such as the congress of workers and staff and transparency in factory affairs, listens carefully to the staff, actively reflects staff demands, promotes the harmonious development of labor relations and gives full play to the role of staff as the main force in the corporate development. It holds the congress of workers and staff, participates in the protection of staff rights and interests from the source, guides and regulates the employees’ orderly participation in corporate governance, and gives full play to the role of the employees as masters. It organizes staff representatives to make inspections, effectively give full play to the role of staff representatives participating in corporate governance, serving the corporate reform, and urging the implementation of the practice benefiting the people and key project tasks. It has established a “three-tier” disclosure system: the company, workshops and work teams, to make timely announcements on major decisions involving the immediate interests of employees and the direction of corporate reform and development, and to accept checks and supervision by the staff members.

It carried out post competitions and the “Techniques Carrying Originality and Individual Power” staff skills competition, focusing on skills competition and passing on craftsmanship, covering all positions. Ten outstanding teams in terms of benefit promotion, 40 best team leaders and 264 post stars were selected. On the eve of May 1, the best worker commendation conference titled “Fight for New Heights and Individual Power” was held, inspiring all staff to strive for improvement of benefits.

Tao Xingming won the 17th place in the National Workers Vocational Skills Competition (Bench Worker Group), becoming the only player in the province to be shortlisted for the top 20, setting the best result in the history of the bench workers competition in Hebei. Zhao Qiurong was awarded the title of “Gold Internal Trainer” in China, and only five people in Hebei were awarded this title.

5 Heartwarming projects

The company insisted on holding the practical activities of “Bring tangible benefits to the public”, solicited 127 opinions and suggestions, and researched and formulated the List of Practices to Bring Tangible Benefits to the Public. In addition, it identified more than 20 specific measures to guarantee four major services, including staff health, sympathy and support, happy Sanyou staff and creation of a green plant, with a cumulative investment of over RMB3 million. These measures include special physical examination for female workers, renovation of staff carports, allowance for high temperature in summer, financial assistance to students in autumn, staff housing improvement, etc.

01 Special physical examination for female workers

02 renovation of staff carports

03 llowance for high temperature in summer

04 inancial assistance to students in autumn

05 taff housing improvement

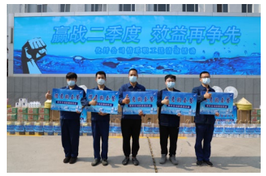












6 Cultural activity



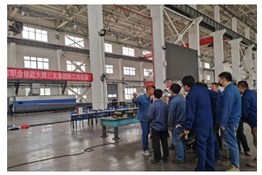



7 Personnel training

In 2021, with the orientation of "improving quality and empowerment, precise training" and centering on the central tasks of production and operation, Sanyou Chemical Fiber insisted on serving enterprises and staff, promoted the construction of the training system, and strengthened the personnel training for "three teams", i.e. leading cadres, professionals and skilled personnel, aiming to comprehensively improve the competencies and skills of all employees, and accelerate the growth of personnel.

It strengthened the training infrastructure, improved the training environment, promoted curriculum development and enhanced the quality of training. It invested RMB460,000 in equipping the workshops and training classrooms with 91 sets of special equipment for training, such as laptops and projectors. It organized special training on micro-course development to develop micro-course s applicable to various positions. Throughout the year, it developed 6 groups of micro-courses in series and 32 single micro-courses, of which 7 were selected for the national micro-courses competition and 5 for the national short video competition. It sorted out 185 micro-course applicable to various positions from the Group's micro-courses developed over the years, and promoted and applied these courses to employees in the front line via its WeChat Official Account, training management platform and offline micro-course display board, achieving seamless connection and allowing independent learning by employees.

The company took multiple measures to promote the personnel training for "three teams". By means of intensive teaching, reading sharing, cadres making speeches in class, short-term off-job training, etc., it organized training for 164 cadres, effectively enhancing the theoretical attainment and comprehensive management ability of cadres. 57 professionals were selected to participate in external training to enhance their vocational level and keep abreast of policy developments, further guaranteeing the legal and orderly running of production and operations. In order to pass on skills, technical backbones were organized to make speeches in class to share knowledge, skills and work experience. In order to ensure personal safety, work safety and stable production and operation, the staff job competence enhancement training titled "Understand the process and structure and identify risks" was organized. A network training was organized for all staff to consolidate post knowledge and business skills, with a total of 3,601 participants.



Relying on the national and provincial training bases for highly skilled personnel, the company selected excellent lecturers and organized vocational skills upgrading training for employees engaged in various types of work, with 979 participants. The company undertook a number of events, including the welders vocational skills upgrading training, welders vocational skills appraisal examinations, the group welders qualification for the 1st Vocational Skills Competition in Hebei Province, and pre-competition training for the Tangshan Craftsmen Competition, giving full play to its role as a training base in personnel training. In the 4th Tangshan Craftsmen Competition, five people won excellent results and one person was awarded the title of "Tangshan Craftsman". So far, four employees of the company had been awarded this title.

The company improved the staff structure by upgrading the staff's academic and technical qualification levels in a number of ways. In 2021, 338 employees obtained their academic certificates through the adult higher education examination and other approaches to independent study. 85 employees obtained the corresponding professional and technical position qualifications by attending the professional and technical personnel title evaluation, accreditation and examination. Through vocational skill level accreditation or vocational skill appraisal, 400 employees obtained vocational skill level/vocational qualification certificates for the corresponding types of work.

Attachment 1： Corporate architecture

Enjoy life, Enjoy Tangcell

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