



Responsible Sourcing Initiative

RSI Participating Mill Sharing

Jiangsu Lianfa Textile Co., Ltd

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Introduction to Lianfa Textile



1. Basic Information

- Jiangsu Lianfa Textile Co., Ltd. was established in 1955.
- It is an enterprise with full vertical industry chain from cotton production, spinning, DAP, weaving, finishing, garment to marketing. It has 25 subsidiaries
- Lianfa has its own power generator and now has 6609 employees.
- Its annual outputs of yarn-dyed fabrics and T-shirt are 185 million meters and 7.5 million respectively

2. Advanced Equipment

- The company has more than 10,000 sets of advanced equipment from Switzerland, Italy, Germany, Japan, Sweden, Taiwan.

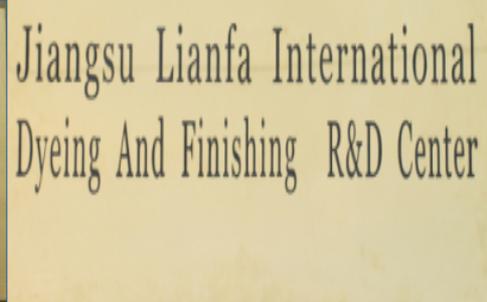
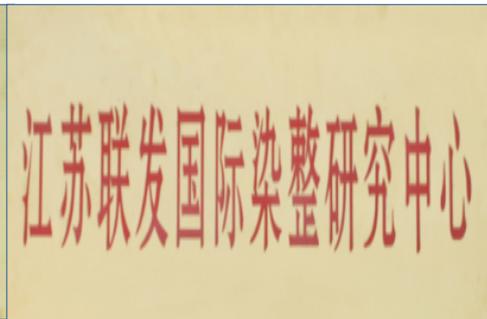


Introduction to Lianfa Textile



3. Research Center with leading technology

The company has one training institution, two workstations, three pavilions, four semi-works workshops and five research center. It also has national laboratory, provincial technical center, provincial yarn-dyed fabrics engineering technology research center, provincial enterprise academician workstation, postdoctoral scientific research workstations, and other research and development platform. Lianfa has a long-term cooperative relations with domestic and foreign well-known colleges and universities, famous enterprises and professional institutions to provide the guarantee for its innovation.



Introduction to Lianfa Textile



- In July 2010, jointly with Dystar (Singapore), Huntsman (American), Pulcra (German) and Fong's (Hong Kong), the company founded the “Jiangsu Lianfa International Dyeing and Finishing Research Center”.
- Yarn-dyed fabrics of new varieties, flower patterns and materials independently developed by the company reached as many as 1,000 per year. The company has taken part in the development of 6 national and industrial standards and more than 185 national projects, such as the Yarn-dyed Jacquard Standard and Cotton Yarn-dyed Fabrics Standard, and undertaken over 15 scientific research projects of provincial or national level. The company owns 258 patents and 30 software copyrights. It was awarded by China Textile Industry Association the “Award for Contribution to Product Development”

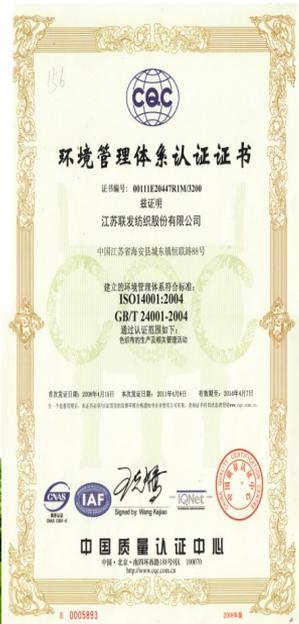


Introduction to Lianfa Textile



4. Sound management system

Lianfa has passed the ISO9000 quality management system, ISO14000 environmental management system, OHSAS18000 occupational health and safety management system, SA80000 social responsible management system and European "OEKO-Tex Standard 100" standard and AA measurement management system certifications. It also passed national export inspection-free product certification.



Introduction to Lianfa Textile



5. Performance of Enterprises

Total revenue reached 2.731 billion Yuan and total profit reached 422 million Yuan in 2012. The company's economic indexes have been completed well, ranking Top 10 Enterprises of Printing and Dyeing Industry for a consecutive 12 years. The comprehensive strength of the company ranks Top 20 in China's cotton spinning and yarn-dyed fabrics industry, top 500 in China's textile and garment industry, top 100 for a consecutive 6 years in China's textile and garment exportation business, and No.1 in Jiangsu Province. In 2012, it was the Top 10 Enterprises of Printing and Dyeing Industry.



Introduction to Lianfa Textile



Lianfa actively implements the strategy of “establishing a world-class fabric supplier and top-notch garment brand”, and establishes “environment friendly and conservation-minded enterprise” as a model leading the industry.

1. Take the lead in ecological warping and realize PVA-free warp sizing industrialization for under 60s (pure cotton products).
2. Combine ERP and production process for constant Low Bath Ratio Dyeing Technology to save over 60% of energy.
3. Study for mercerizing alkali recovery process, mercerizing alkali is reduced by more than 30% ;
4. Develop new dyeing production process to reduce formaldehyde in the fabric.

Strive for a unique textile supply chain with Lianfa’s characteristics of “less consumption, resourcefulness and recycling” .

Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



1. Study new process to reduce energy consumption

1.1 From cotton transportation to yarn transportation

Lianfa invested in its own spinning mill in Xinjiang, reducing 26% of transportation energy consumption for original transportation of cotton.

1.2 From carton box to wood board and plastic film

This practice encourages recycling and saves cost, also reduce paper production and related emission by 1300tons (carton box production and its water discharge).



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



2、 Study new production technique to achieve cleaner production

2.1 Industrialization of beam dyeing production

Short process/ Efficient frequency conversion beam dyeing machine is developed and adopted to replace old-fashioned bobbin dyeing equipment/process for streamline production, reducing 16% of power consumption and doubling production efficiency, also avoiding yarn loss, yarn aberration and waste of energy.



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



2.2 Constant Low Bath Ratio Dyeing Technology R&D

Lianfa developed a one-way dye liquor circulating dyeing process and lab recipe control system V1.0 (The national copyright administration software copyright registration number 2008SR13639), which simplified production operation, as well as realized a reduction of bath ratio from 1:15 to 1:4~1:7 and improved efficiency while water immersion requirement is just 20%-70% of the original system. It is a globally advanced system which wins Lianfa an advanced energy conservation and emission reduction award in the industry.



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



2.3 Develop one bath process for color fixation & softening, and one bath process for acid pickling & enzyme wash

- One bath process for color fixation & softening: develop the softener which can be used with fixer at the same time by controlling PH index, temperature and time of feeding in raw material.
- Acid pickling enzyme wash technology: add the acid first, and then add alkali by bath temperature and pH value control, which can help saving one step water consumption. (by now, this technology saves 10% water, which is about 165000 tons of water per year)



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



2.4 Application of PVA-free sizing technology

PVA-free sizing technology (farinaceous substance sizing agent) reduces cost, wastewater treatment pressure, as well as reduce COD discharge by 8%-20%. This technology is awarded with second prize of scientific achievement of Nantong City.



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



3. Work on new technology and better management for cleaner production

3.1 Heat recovery from high temperature waste water and condensate recover technology

Lianfa applies heat exchange system to recover heat from hot temperature waste water generated from dyeing and finishing processes, as well as reuse the steam condensate and cooling water generated from dyeing, finishing, heating and heat preservation processes to new dyeing and mercerizing/sizing processes

Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



3.2 Neutralization exhaust gas by mercerizing effluent

Mercerizing effluent with alkali can neutralize exhaust gas of coal burning by reduce PH value from 13 to 10. The effluent then will be sent to WWT for further treatment. In this way, 60% of SO₂ can be eliminated and 1500 tons of 98% sulfuric acid for WWT are saved yearly



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



3.3 Micro aeration technology for WWT

Uniform distribution micro aeration technology is applied in WWT, which is proved to be simple and reliable. The utilization rate of oxygen increased from 6%~8% to 14~24% and biochemistry removal rate increased by 5%~10%. At the meantime, 806,400 KWH electricity can be saved yearly, amounting to 628,900RMB.



Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



4. Actively participating to Target / NRDC Mill Project

No	Project description	Investment 10,000RMB	Effect
1	Insulation for drying cylinder ends and dyeing machine	54.56	3,026tons of steam are save yearly, amounting to 596,000RMB
2	Recovery of Waste Heat from Compressor	34	180 tons of steam are save yearly, amounting to 110,160 RMB
3	Cycling Use of Cooling Water from Wet-splitting	3.6	68,841 tons of water are save yearly, and 80,438 unit of electricity , amounting to 388,353RMB
4	Oil to Gas and Frequency Converter Transformation of setting and baking Machines	48	Save coal consumption by 2800 tons per year, amounting to 433040 RMB。
5	Maintenance of Steam Traps	3.6	
6	Reuse of Condensate Water	25.4	23,106 tons of water and 860 tons of gas are saved, amounting to 20,6400RMB

Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



4. Actively participating to Target / NRDC Mill Project

No	Project description	Investment 10,000RMB	Effect
7	WWT methane gas utilization	15	1700m ³ of sewage gas are produced daily. Daily income is 2000 RMB and annual income is 600000 RMB.
8	Light Alkali Recovery Project	312.275	Recover 4220 tons of alkali with 170~180 concentration, save water discharge by 47040 tons, as well as recover water for 36000 tons per year. Amounting to 1,075,828 RMB cost saving
9	Energy-saving Transformation of Air-conditioner Fan Blades	29.8	6%-9% electricity is saved. Annually 156,000 kWh of electricity are saved, amounting to 118,560 RMB.
10	Adding Insulating Layer to Hot Water Tank to Reduce Surface Heat Loss	7.68	256 tons of steam is saved annually, amounting to 52,240 RMB.
11	Recover Cooling Water from Singeing Machine to Reduce Waste of Water	0.6	51,200 tons of water is saved yearly, amounting to 244,736 RMB.
12	Recycling of cooling water from pre-shrinking machine	1.2	23,040 tons of water are saved yearly, amounting to 105,523 RMB

Energy & Water Conservation, Emission Reduction and Cleaner Production Initiatives by Lianfa



4. Actively participating to Target / NRDC Mill Project

No	Project description	Investment 10,000RMB	Effect
13	Installing High-efficiency padder to Reduce Moisture Content of Cloth Surface	24	It is estimated that 130,000RMB can be saved each year, and 640tons of steam would be saved yearly.
14	Adding New type of Insulating Layer Valves	0.21	Each can save 6.5 tons of steam each year, amounting to 1,326 rmb
15	Turning off all fans of the cooling tower in night or winter to reduce electricity consumption in WWT	0	It saves 88,128RMB operational cost yearly, reducing 117,500kwh of electricity
16**	Upgrade the motors of dyeing machines	43.66	Use TYJX series motor is adopted, saving 10% of electricity.
17**	Transform the yarn dyeing automatic blanking system	800	It saves 2.56 million Yuan, and avoids dust pollution.

1. Insulation for drying cylinder ends and dyeing machine

- 328 drying cylinders of desizing machines, mercerizers and washing machines and 36 new dyeing machines are insulated
- It has reduced the heat loss of the surface of drying cylinders, reducing the surface temperature by at least 35°C.
- By metering results, it shows that these insulation application on dyeing machines and drying cylinders saves 4%~5% and 2%~3% of steam respectively.
- Totally saved 3,026 tons of steam per year with months of payback period. Annual saving of capital: 596,000RMB.





2. Recovery of Waste Heat from Compressor

- the company purchased two heat exchangers from Germany. The waste heat from air compressor was sent to living area to heat water in bathrooms for the staff . It reduced steam consumptions. In winter, the waste heat was sent to the finishing workshop for heating purpose, reducing water drops.
- After the implementation of the project, 3 tons of steam can be saved with living area each day, and 540 tons each year (given 180 working days).
- Investment: 340,000RMB; Payback period: 36 months.
- By sending waste heat to the roof , moisture content in the air which is caused by the difference of temperatures indoor and outdoor is reduced.



3. Cycling Use of Cooling Water from Wet-splitting



The branches used cooling water recover tank to recover cooling water from the wet-splitting part of the sizing machine, reducing the running time of the freezer and saving electricity. And cooling water has been reused, saving a lot of water.

- 68,841 tons of water is saved each year, annual saving of water cost of 110,146RMB
- 80,437kwh of electricity is saved each year, amounting to 57,915RMB
- Annual saving of sewage treatment amounts to 220,292RMB。

A total of 388,353RMB are saved.

Total input: 36,000RMB; Payback period: 1 month.



4. Oil to Gas and Frequency Converter Transformation of setting and Drying Machines



The company changed the heating method, namely, from conducting oil to natural gas.

- Reduce a cost of 395,000RMB each year for saving 2800 tons of coal consumption
- Cutting 3 boiler operators, reducing boiler maintenance fees.
- Reducing pollution to the environment.
- Saving 52,000kwh of electricity, equivalent to 37,440RMB.
- Input: 520,000RMB; Payback period: 1.5 year.



5. Maintenance of Steam Traps

- The company developed an equipment maintenance system which takes the daily maintenance of steam traps into the equipment daily maintenance plan.
- Spirax Sarco carried out an inspection for our plant and found that there were problems with 27 steam traps.
- The company invested 36,000 RMB and purchased a Spirax Sarco steam trap leak detector for daily inspections.
- Failures or problems with steam traps can be timely found out and solved due to the implementation of the equipment maintenance system and the regular maintenance of equipment, which greatly reduces waste.



6. Reuse of Condensate Water



- Recovery of condensate water from desizing and mercerizing machines
- Daily recovered condensate water was 40 tons, which also saves steam by 1 ton daily. (Annual saving is 84500 RMB)
- All condensate water from yarn sizing machines was also recovered. Annual saving of water was 9720 tons and steam 540 tons, amounting to 121,900 RMB.
- Total investment is 254,000 RMB with annual saving of 206,400 RMB.





7. Utilization of Sewage Gas



- By adding equipment and pipes, sewage gas generated by high concentration waste water was recovered and sent to the thermal power plant to heat the water supplying out of the plant. That makes full use of resources.
- Through the implementation of the project, 1,700 cubic meters of sewage gas which is directly discharged off is reduced each day. Using sewage gas for heating water can save coal, which is equivalent to saving 380 tons of standard coal each year.
- Daily income is around 2,000RMB. Thus, an annual increase of revenue of 600,000RMB.
- Input: 150,000RMB; Payback period: 3 months.



8. Light Alkali Recovery Project



- Purchase of alkali recovery system in Germany
- Daily recovery can reach 14 ton; yearly saving is 925300Yuan.
- Reduce waste alkali water discharge 140 ton per day, amounting to 150,528RMB per year.
- Also saves 120 tons of fresh water per day, amounting to annual saving of 1.134million RMB.
- Investment: 2million. Payback period is about 2 years



9. Energy-saving Transformation of Air-conditioner Fan Blades

- Fan blades of 11 air-conditioners were replaced and the weight and angle of fan blades were adjusted.
- It is tested that it saves 520kwh of electricity each day and 156,000kwh each year. Creating an economic value of 118,560RMB.
- Payback period: 30 months.



10. Adding Insulating Layer to Hot Water Tank to Reduce Surface Heat Loss



- There was no heat insulating measure for 27 hot water tanks with desizing, mercerizing and washing machines whose temperature was higher than 90°C.
- With insulating measures taken, the surface temperature was reduced by 30°C to 35°C.
- It greatly reduced loss of heat with the equipment, as well as the ambient temperature, saving 0.8 tons of steam each day
- Input: 76,800RMB; Annual cost saving: 52,240RMB



11. Recover Cooling Water from Singeing Machine to Reduce Waste of Water



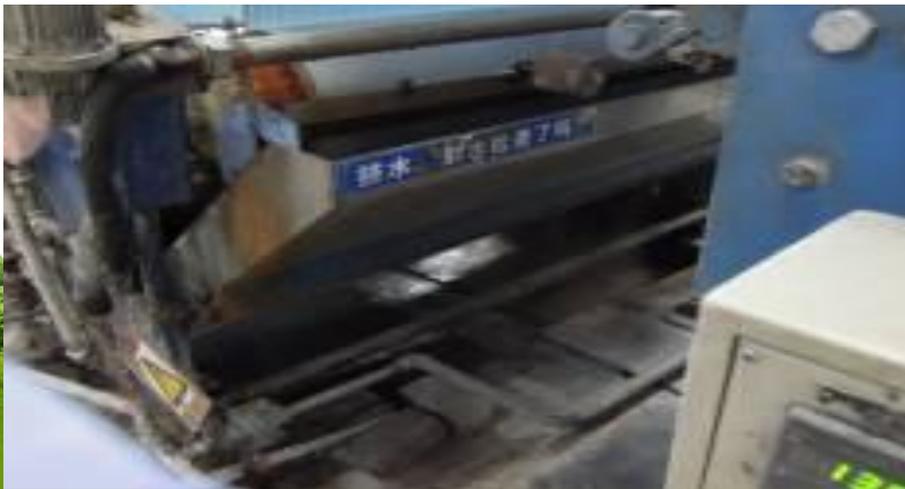
- In April 2012, the company carried out recovery of cooling water from the two singeing machines, and added pipes to send the recovered cooling water to the condensate water recovery pool at the workshop for reuse. (Temporarily, heat value is not recovered)
- By doing this, 160 tons of water can be recovered each day and 51,200 tons of water each year.
- Given the price for each ton of water is 1.68RMB and sewage water treatment cost for each ton is 3.1RMB, then 244,736RMB can be saved each year.
- Cost of investment: 20,000RMB; Payback period: 1 month.



12. Recycling of Cooling Water from Pre-shrinking Machine



- In April 2012, the company recovered cooling water from the pre-shrinking machines 1~4# by means of gravitational flow.
- The implementation of this project resulted in a daily saving of water of 72 tons, and 23,040 tons a year.
- the annual saving of capital will then be 105,523RMB.
- Investment: 50,000RMB; Payback period: 6 months.



13. Installing High-efficiency Padder to Reduce Moisture Content of Cloth Surface

- In 2011, the company consulted with manufacturer. In July 2012, high-efficiency rollers were added to desizing machines 1# & 2# and mercerizing machine 1#, to reduce the moisture content with cloth surface, reducing steam consumption.
- After the implementation of the project the moisture content of cloth surface and steam consumption dropped. However, no meter was installed to measure the specific amount, which is estimated to be 1%-2%.
- It is estimated that 130,000RMB can be saved each year, and 640 tons of steam would be saved yearly.
- Input: 240,000RMB; Payback period: 22 months.



14. Adding New Type of Insulating Casing for Valves



- Before the implementation of the project, most of stop valves (DN80 or less) had not insulating protection. The current asbestos insulating can only be used one time. If it needed filling or maintenance it could not be used again. Heat insulating usually was not timely after repairing or replacement. In addition, there were risks from stop valves without insulating protection because the surface temperature might be as high as 135°C. For example, a worker was injured by stop valve in July.
- After insulating measures were taken, the average temperature dropped by 77.8°C.
- After the implementation of the project, it is calculated that each stop valve can save 6.5 tons of steam each year, theoretically. And two stop valves save 13 tons steam each year.
- Input: 2,100RMB; Payback period: 9.5 months.



15. Turning off Fans of the Cooling Tower at Night or in Winter to Reduce Electricity Consumption



- Regulations were developed to better manage the operation of cooling tower. The cooling tower must be shut off when the temperature of cooled waste water was no more than 40°C and the ambient temperature was less than 10°C.
- The assessment index for electricity consumption with the sewage station was assigned to each of the operator to control unit electricity consumption.
- After the implementation of the project, electricity consumption has been reduced with the pump motor, reducing 117,500kwh of electricity.
- It saves 88,128RMB operational cost yearly.



16. Upgrade the Motors of the Dyeing Machine

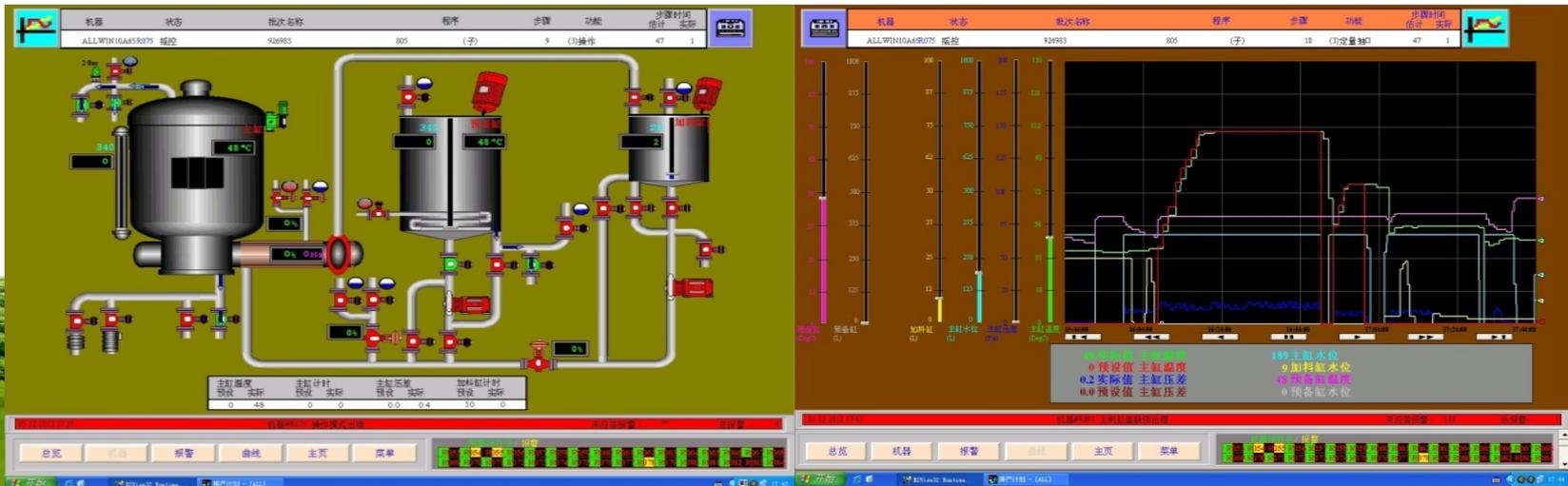
- **Three-phase rare earth permanent magnet synchronous motor is adopted, saving 10% of electricity based on metering tracking result.**
- **9 machines are changed, with a total investment of 436,600 RMB**
- **Save 376,500 kwh of electricity which is worth 293,600 Yuan annually**



17. Transform the Yarn Dyeing Automatic Blanking System



- Purchase Italian supportive system to achieve automatic production
- Save 30 workers and 1.08 million of salary.
- Improve efficiency, reduce man made color matching problems by 30%, reduce energy and auxiliary consumption by 1.2853 million savings yearly.
- Reduce auxiliary consumption by 1% created by manual work previously, which amounts to cost reduction of 204,425 RMB per year
- Avoid dust pollution
- Invest 8 million Yuan, which saved 2.56 million Yuan annually.



“5-item management” and better energy statistic management and incentives



With such statistics, workers found out and rectified 183 leaking, dropping, seeping and spilling points during the implementation of the “Five All” management method. Carefully organized publicity and education on energy-saving raised the awareness of the staff in resource-saving and energy conservation. A new outlook for all-round, coordinated and sustainable development had been shaped. During the publicity campaign, over 9,000 articles were published in the company’s internal magazine, Lianfa Textile. Various meetings, seminars and gathering on energy-saving and consumption reduction were held.

In addition, the company had received in the first half of the year 32 A-grade propositions, 36 B-grade propositions and 16 C-grade propositions from the employees after the implementation of incentive mechanisms. 47,942RMB was rewarded to those employees. Their ideas had helped the company saved 1.03 million RMB. For example, the wet-splitting cooling water recovery project, the air-conditioner fan blade transformation project and the data automatic transmission project, etc., all came from the employees from the production line.



Thanks !

Jiangsu Lianfa Textile Co., Ltd

