Pharma Glass Packaging Development for Patient Safety:

Cangzhou Four Star Glass Co. Explains The Pioneering Strides Taken to Become a Preferred Partner for your Pharmaceuticals

Can you please start by providing a brief overview of Four Stars Glass' history and how the company has developed since being founded?

In 1998, Four Star, via state-owned CPMIC, imported the first-ever container of Schott neutral borosilicate tubing at 18,000 yuan/t, 30 days after arrival.

In 2000, Four Star signed a five-year contract with Schott, and during this time, sales doubled.

By 2003, as Schott reneged on the contract, they opened a representative office in Shanghai with a price hike of 25,000 yuan/t and a demand of six months' cash up front, which triggered CPPA action.

In November 2005, CPPA gathered five leading buyers to negotiate a 15% reduction with Schott. Schott refused to negotiate on the price and Wang Huanyi, chairman of Four Star, announced that: "We'll make it ourselves."

The next day, Chairman Wang launched the self-built project. In 2006, premises were found in Cangzhou and the 'All-Electric Vello' route was chosen.

Fast forward to December 2007, Four Star had a one-litre furnace, pulling 24mm tubing. China's first Vello line broke Schott's 17-year monopoly.

Thinking back to when the company started, what have been the key areas of growth since then?

From "spite-built furnace" to solid footing, Four Star's first decade boiled down to chewing through three hard bones. Each set the ceiling for how big it could grow.

1. **Electric Furnace**
   After lighting China's first All-Electric Vello furnace in 2007, the team pushed yield from 55% to 85% and tube diameter from 24 mm to 51 mm. The electric-melt platform became the DNA of every later furnace and a patent wall the rest of the industry still has to climb.
2. **Neutral Boro Registered**
   A Class-I drug-packaging licence arrived in 2009, followed by CDE Class-I approval in 2010 and inclusion of "neutral borosilicate glass tubing" in the Chinese Pharmacopoeia. Pharma-tube sales vaulted from zero to 70% by 2012, with price and margin well above lighting or electronic tubes, giving Four Star its first real profit.
3. **Tubing to Container**
   In 2011, the company added its own vial/ampoule plant, extending downstream to a 'tube-to-vial' model. Converting in-house added 30% profit per ton and lifted overall capacity utilisation from 60% to 90%, while locking in top pharma customers like Hengrui, Qilu and Kelun and pushing order visibility out to 18 months.

Furnace, tubing, container. Once the three pieces clicked, 'import substitution' turned from a slogan to cash flow and laid the skeleton for later scale-ups, funding rounds and IPO.

Four Star Glass establishes a fill/finish company. Please explain how this helps your customers.

By dropping a 'tube-vial-fill' campus into Cangzhou's pharma cluster, Four Star hands customers three cuts and three boosts in one go.

1. **Cut miles, boost cash speed**
   Park sits on the Beijing-Shanghai & Jinshi expressways and Cangzhou-West freight hub. The average haul to Ji-Jin-Ji-Lu plants fell from 280–350 km, −15 % freight, lead time 6 → ≤2 weeks and −30% inventory capital.
2. **Cut energy cost, boost margin**
   The zone buys in discounted steam, WFI and chilled water. Four Star passes the 20% saving straight into filling quotes: 3–5 fen less per vial or RMB 3–5 M a year on a 1 B-vial line.
3. **Cut audits, boost calendar speed**
   With 120+ drug firms and 20+ CROs/CMOs in town, the local FDA runs combined inspections. One on-site visit covers tube, vial and fill inspections. Customers slash QA travel 50% and file IND/NDA 4–6 months sooner.

Add Cangzhou's 'green channel' for packaging registration and MAH pilot; Four Star's ready-made DMF, process validation and stability pack let sponsors skip the usual three-stop tango. A minimum of 50,000 vials for Phase I means no half-batch waste. The all-in cost is 20–25% lower than the multi-vendor route.

In short, inside the 'Ji-Jin-Ji Pharma Corridor', Four Star compresses four suppliers into one shared factory, giving clients cheaper inputs, proven utilities and a shorter shot-clock to market. This means that time and money go to trials and launch rather than supply-chain fatigue.

What are the unique points that make Four Star Glass stand out in the market?

What makes Cangzhou Four Star stand out is not a single perk but a hard-tech, green and full-chain combination that few can copy.

1. **Cold-top All-Electric Vello furnace – the 4th industrial line worldwide and the first in China.**
   This results in a 15–20% higher yield, 60% lower energy and no zero flue glass.

   The furnace has also been named a National Manufacturing Single Champion, breaking the Schott-Corning-NEG blockade.

2. **One-park tube-to-vial-to-fill ecosystem.**
   Four Star offers 50kt tubing, 5B vials and grade B filling in one fence.

   With 50k pcs MOQ, a 2-week lead and 30% less WIP capital, one QA audit covers everything.

3. **In-line closed-loop sizing & vision check.**
   At Four Star, we use laser OD ±0.05 mm, 200 fps imaging and auto-reject. Although it's the same look as import, it is 8-12 % cheaper.

4. **24-month price lock and tariff shield.**
   Using self-made glass, there is a fixed price for 2 years. FTZ origin cuts tariffs in Korea and the Association of Southeast Asian Nations up to RMB 1 M/yr for clients.

5. **5G 'lights-out' plant.**
   Cloud MES lifts OEE 15% and cuts costs by 20%. This reduces the defect rate by 75% and batch records are opened for remote release.

6. **Widest pharma-grade portfolio.**
   Four Star uses clear/amber tubing, vials, ampoules, PFS and screw-neck, all of which are with Class A registration, which means that customers never need a second source.

   With this tech loop, cost basin and compliance accelerator, Four Star lets drug makers put money into clinics, not supply chains.

Four Star Glass operates in local markets and further afield. Please tell us a bit more about your work extending into different continents.

Four Star's global footprint follows a four-step playbook. Tech breakthrough, certification first, tariff leverage and local warehouse, which is now active on five continents.

1. **There is zero duty on exports to Asia/Association of Southeast Asian Nations and exports to Korea are direct.**
   China-Association of Southeast Asian Nations FTA gives 0% duty to Indonesia, the Philippines and Vietnam. This puts the price at 8-12 % below EU rivals and results in 35% of export volume.

   Four Star own a 2,000m² bonded hub in Seoul, which enables a 48-hour delivery. This means that as of 2024, we account for just less than 30% of the Korean vaccine-vial share.

2. **Europe – dual certs and spot delivery.**
   Four Star have passed their EDQM inspection and have their CE DMF in hand. We started with French and Spanish generics and now we are moving into Germany and Italy via a Nordic agent. Europe accounts for 28% of exports.

3. **The Americas – FDA pathway and Mexico**
   An on-site FDA was done in Q3-2023, a response was filed in Q3-2025 and a notice of opportunity for hearing is expected in 2026.

   We have a 3,000m² distribution centre in Mexico City, which serves both the USA and Canada markets. Sea freight takes 35 days with approximately 5 days of land bridge.

4. **Latin America – tender wins and price edge**
   Argentina and Brazil public tenders score 'neutral borosilicate'. Our offer is 10-15% below that of EU/US firms. This has resulted in a three-year consecutive award with 120m vials provided to public hospitals.

5. **Middle East and Africa – Belt & Road and Dubai hub**
   Our products became part of a bundled export with Chinese aid vaccines to Egypt and Algeria. Our Jebel Ali Free Zone (JAFZA) warehouse covers the six Gulf Cooperation Council states. This means in 2024, Middle Eastern sales were up 60% year on year.

The overall result of this means Four Star serves 55 countries. 42% of our 2025 revenue came from overseas. Dutch and Mexican tube-vial-fill lines are scheduled for 2026-2027 to give 48-hour European and American spot delivery, raising export share to more than 55% within five years.

Four Star Glass are operating sustainably, with a green process. Please explain a bit about how you achieve sustainability through your practices.

Cangzhou Four Star turns 'green' into a process design and tracks it as a KPI via three hard-wired lines.

1. **Furnace minus - cold-top All-Electric melting**
   The world-first cold-top all-electric Vello furnace eliminates fuel, oil and gas, cutting energy per ton by 60%, SO_2 to zero and CO_2 by ~42 kt/a/. A crown temperature <200°C shrinks the HVAC load by another 30%.

2. **Water-gas-waste loop – nothing left to waste**
   Water reuse is now more than 92%. Reverse Osmosis concentrate feeds cooling towers, which saves 400kt of fresh water yearly. Our in-house cullet recovery (colour-sorted) feeds 35% of the melt, dropping the virgin batch by the same share. RTO on vial printing keeps VOCs <20 mg/m³, far below the 50 mg/m³ Hebei limit.

3. **Smart plant plus green electrons leads to continuous decarbonisation**
   A digital upgrade of 9 PFS lines has taken place. Each line has 12 robots, which allows for AGV feeding that brings the defect rate to 1‰ → 0.3‰.

20 MW rooftop PV (2024) delivers 24 GWh/a, which is 18% of site power, avoiding 19 kt CO_2e.

Our net-zero demo workshop is currently under construction. This will run 100% renewable power and waste-heat recovery, slicing carbon intensity per revenue by a further 25% by 2026.

Four Star has been named as a National Green Factory for four consecutive years and was a 2025 MIIT Single Champion. Our green tubing is exported to over 40 countries, turning a once energy-hungry sector into an energy-efficient showcase.

How does Four Star Glass' facility stand now?

As of August 2025, Cangzhou Four Star Glass is running at full throttle, producing while it builds.

Some key numbers are as follows:

1. **Existing Site (Old Park) Offers:**
- 80 kt/a neutral borosilicate tubing. #4 globally, #1 in China
- 8 B vials/ampoules per year (vaccine, antibiotic, oral)
- Seven cold-top All-Electric furnaces on stream; #8–9 ready for start-up at any time

2. **New "Made-in-China" Pharma-hub (CNY 2.2 B, 500 mu) Offers:**
- 12 extra drawing lines (+30 kt tubing → 110 kt total)
- 75 high-speed converting lines (+3 B vials – 11 B total)
- 20 pre-filled syringe lines (100 M each – 2 B total; capex 1/3 of import, output 3×)
- Smart workshops, automated warehouse, CNAS lab, 5G+MES live
- Furnace #7 already melting; #8–9 completed bake-out; full ramp-up Q1-2026
- Post-expansion revenue target: CNY 10 B/a – the world's largest single-site pharma-glass complex

3. **Intelligence & Green**
- 56 lines, 744 machines, 12k data points – OEE +25 %, downtime decreasing 15%, energy down 5%
- 20 MW rooftop PV online. 24 GWh green power/a trims CO_2e by another 5%

4. **Order Book**
- Tubing stock <7 days; 40 countries served, exports account for 42% of sales
- PFS long-term contracts signed with domestic vaccine/mAb makers. 2 B pcs and CNY 4 B added sales within five years

Put simply, our old plant is flat-out, while our new mega factory is rising. When fully on stream in 2026, Four Star will be the biggest and broadest single-campus pharma-glass producer on the planet.

Four Star Glass are hosting a pavilion at CPHI this year. Please can you explain what that is going to look like?

Four Star Glass is Hebei's only company on MIIT's first 'Bio-medical Materials Innovation Mission' list, providing a fully localised pre-fillable syringe (PFS) line.

Together with Shanghai Tofflon & Shijiazhuang Royal, we built China's first 100% home-made PFS line, breaking the European-U.S. choke-hold on equipment and the process.

The cost of this was RMB 50 M vs. €170 M for an imported line, while the output is 100 M pcs/yr vs. 30 M pcs/year. In terms of payment, it's the difference between spot delivery and a 26-month advance. We are already in routine production and are targeting 2 B pcs/yr and RMB 4 B annual output within five years.

What is the core aim of the matchmaking event at CPHI?

We want to deliver to Europe and neighbouring pharma markets as a one-stop China Green Tube–Vial–Fill solution, backed by verifiable carbon-cut data, EU certification and two-week lead times, to move Four Star from alternative to preferred supplier. In parallel, we can also roll out the smart, end-to-end CDMO model of our pharma park on a global scale.

What is next to come for Four Star Glass?

We are looking at 2025–2029 in three key moves: capacity, capital and tech.

1. **Capacity**
- Q4 2025: Furnaces #8–9 on stream → 110 kt tubing + 11 B vials
- Q2 2026: 20 China-made PFS lines → +2 B pcs/yr

2. **Capital**
- 2025 file for Shenzhen IPO, raise RMB 1.08 B
- 2026–2027 build bonded warehouse and fill-finish hubs in the Netherlands and Mexico, resulting in 48-hour Europe/U.S. delivery

3. **Tech**
- 2026–2027 Medical device R&D, pen injectors
- 2029 net-zero plant, resulting in 100% green power and reducing carbon intensity by 25%.

Our target is 2029 revenue RMB 15B, 50% export, market cap more than RMB 50B and becoming number one globally.

Huanyi Wang

Mr. Huanyi Wang is the present chairman of board, of CANGZHOU FOUR STARS GLASS CO., LTD. He possesses rich experiences over operation management and research of pharmaceutical package material and have devoted himself to the research of pharmaceutical glass. He was instrumental in developing the best energy-saving and sustainable production technology of Type I pharmaceutical neutral borosilicate glass tubes with 5.0 expansion coefficient, becoming a leader in the production of 5.0 glass tubes in China. Due to his unparallel achievements, Mr. Huangyi WangMr. Wang had been elected as a member of the standing commission of NPC in Cangzhou county and NPC member of Cangzhou City.