



TURNKEY EPC PHARMACEUTICAL ENGINEERING PROPOSAL
PROJECT: 24 TPD NEUTRAL BOROSILICATE PHARMACEUTICAL GLASS TUBING COMPLEX
SCOPE: ALL-ELECTRIC COLD-TOP MELTING FURNACE & DUAL DANNER TUBING DRAWING LINES (CLEAR & AMBER)

Proposal Reference:	Q-1809-GLS-R.0	Date of Issue:	18 September 2026
Project Capacity:	24 Tons / Day (12 TPD Clear + 12 TPD Amber)	Glass Standard:	7.0 Low/Neutral Borosilicate (USP Type I / EP 3.2.1)
Client Designation:	Pakistan Pharmaceutical Glass Consortium	Executing EPC Contractor:	Business Tacts International (Pvt.) Ltd.
Process Technology:	Cold-Top All-Electric Furnace + Danner Process	Execution Model:	Turnkey EPC Design, Supply, Installation & SAT

Business Tacts International (Pvt.) Ltd. (BTI) is pleased to submit this comprehensive, bankable Turnkey EPC Engineering Proposal for the establishment of a state-of-the-art **24 Tons Per Day (TPD) Pharmaceutical Glass Tubing Manufacturing Facility** in Pakistan. The plant is engineered with an advanced **Cold-Top All-Electric Melting Furnace (24 TPD)** coupled with **One Furnace Two Lines Danner Tubing Technology (One Furnace Two Lines Danner Process)** to produce high-precision neutral borosilicate (7.0 expansion class) glass tubes for ampoules (1ml to 10ml) and tubular injection vials (2ml to 20ml). This project establishes domestic self-reliance for Pakistan's pharmaceutical primary packaging sector, eliminating reliance on imported tubing from China and Europe, and complying strictly with US FDA 21 CFR Part 11, USP <660> Type I, and European Pharmacopoeia EP 3.2.1.

RATED MELTING CAPACITY 24.0 TPD 100% All-Electric	ANNUAL TUBING YIELD ~7,200 Tons 180M+ Ampoules/Yr	THERMAL EXPANSION 7.0 x 10⁻⁶ / K Low/Neutral Boron	TURNKEY EPC BUDGET RMB 10,620,000 USD \$1,582,712
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1. CORE PROCESS TECHNOLOGY & ENGINEERING HIGHLIGHTS

A. All-Electric Cold-Top Melting Advantages: Borosilicate glass formulation contains high boron trioxide (B2O3, 8.5% - 10.5%). In conventional fuel-fired furnaces, volatile boron evaporates rapidly at >1500°C, causing surface cording, silica enrichment, and severe wall-thickness variations. BTI's all-electric cold-top design submerges 24 sets of heavy-duty molybdenum electrodes directly into the glass bath beneath an insulating blanket of raw batch. This prevents boron volatilization, ensures a uniform temperature gradient (>1600°C core melting), achieves pristine optical clarity, and lowers energy consumption to 0.85 - 0.95 kWh/kg glass.

B. Danner Mandrel Tubing Precision: Molten glass discharges from the forehearth onto a motorized revolving ceramic mandrel (ø132 × 3270mm) enclosed in an electric muffle furnace (680-type). Low-pressure compressed air blown through the hollow mandrel core inflates the glass tube as it is pulled horizontally along a 50-meter roller runway by the DBG tractive machine. Dual-axis high-frequency laser gauges dynamically regulate tractive speed and air pressure, holding outer diameter (OD) tolerance within ±0.03mm and wall thickness within ±0.02mm.

2. TURNKEY EPC CAPITAL INVESTMENT SCHEDULE (MASTER BOQ)

Div	Capital Equipment Division / Engineering Scope	Capacity / Spec	Qty	Amount (RMB Wan / 10k)	Amount (USD Equiv.)
01	Automated Raw Material Batching System Siemens S7 PLC, 9 Storage Silos, 750L Mixer, Dust Collectors	30 TPD Tower	1 Set	136.88 Wan	\$204,000
02	24 TPD All-Electric Glass Melting Furnace & Skid Fused Cast AZS (65T), 24 Main Electrodes, 2x700kVA Transformers	24 TPD Melt	1 Set	613.00 Wan	\$913,500
03	Dual Danner Tubing Drawing Lines (Clear & Amber) DBG Pullers, DJB-1 Heads, BJY-1 Cutters, 50m Runway, Laser Gauges	2 Complete Lines	2 Sets	240.09 Wan	\$358,000
04	680-Type Electric Muffle Annealing Furnaces Silicon Nitride Sleeves, 35kVA Transformers, Temperature Controls	Model 680 Muffle	2 Sets	60.00 Wan	\$89,500
05	Export Heavy Plywood Packing & Logistics Handling Seaworthy export crating, moisture-proof barrier, 20 HQ containers	20 Containers	1 Lot	13.00 Wan	\$19,400
	TOTAL TURNKEY EPC CONTRACT VALUE (EXW / FOB PORT)	24 TPD Plant	Complete	1,062.00 Wan	USD \$1,584,400



3. DIVISIONAL ENGINEERING SPECIFICATIONS & BILL OF QUANTITIES

Item	Division 02: 24 TPD Electric Furnace Component	Engineering Specifications	Qty	Amount (RMB)
2.1	AZS Fused Cast Zircon Corundum Bricks	33# WS (35 Tons) & 41# WS (30 Tons) high-density void-free	65 Tons	2,250,000
2.2	High Alumina & Sillimanite Refractories	High Al bricks (29T), Sillimanite (4.8T), Light Mullite (4.5T)	38.3 Tons	187,250
2.3	Main Melting Bottom Molybdenum Electrodes	Water-jacketed flat-inserted electrode assemblies with cables	24 Sets	720,000
2.4	Homogenization & Forehearth Electrodes	Homogenization (6 sets), Throat (2 sets), Riser (4 sets), Forehearth (12 sets)	24 Sets	264,000
2.5	Main Melting Voltage Transformers	Layer A & B 3-Phase 700 kVA (2 Units) heavy-duty step-down	1,400 kVA	350,000
2.6	Forehearth & Space Transformers	Homogenization 200 kVA (1), Forehearth 150 kVA (5), Space 180 kVA (6)	12 Units	445,000
2.7	Main Melting Central Control Cabinets	Siemens S7-1500 PLC, DCS Central Parameter Alarm Cabinet	2 Sets	160,000
2.8	Siemens Servo Automatic Batch Charger	Precision servo-driven cold-top oscillating glass batch charger	1 Unit	220,000
2.9	Air/Water Cooling & Air-Blow Level Gauge	High-volume forced draft air cooling, 40m ³ circulation loop integration	1 Lot	158,500
2.10	Technical Services, Heat-Up & Hot Commissioning	Design (100k), Installation (300k), Heat-Up / Curing (100k), Commission (100k)	Complete	600,000
	SUBTOTAL: DIVISION 02 ALL-ELECTRIC FURNACE	24 TPD Molten Glass Core Complex	1 Set	6,130,000

Item	Division 03: Dual Danner Tubing Lines (Clear & Amber)	Technical Specifications	Qty	Amount (RMB)
3.1	DBG Heavy-Duty Drawing Tractor Pullers	Precision servo-driven dual caterpillar rubber track puller unit	2 Units	600,000
3.2	DJB-1 Drawing Drive Machine Heads	Heavy-duty headstock transmission with variable frequency drive	2 Units	400,000
3.3	BJY-1 Front Combing & Precision Cutters	High-speed automatic thermal scoring, cracking & end-rounding	2 Sets	360,000
3.4	Danner Mandrels (Main Shafts & Sleeves)	φ132 × 3270mm high-nickel alloy shaft + silicon nitride sleeve	2 Sets	284,000
3.5	50-Meter Precision Roller Runway & Wheels	50m heat-resistant roller conveyor track, 45 runway wheel sets	2 Lines	103,600
3.6	Dual-Axis High-Frequency Laser Diameter Gauges	Real-time continuous OD and ovality monitoring (accuracy ±0.01mm)	2 Sets	100,000
3.7	Camber / Straightness Monitor Cabinets	Continuous laser straightness inspection for high-speed ampoule lines	2 Sets	104,000
3.8	Main Shaft Straightening & Auxiliary Carts	Shaft straightening machine (42k), sleeve changing & transport carts	1 Lot	57,400
3.9	Broken Tube Recycler & Central Power Cabinet	Automated glass cullet crushing chute + central electrical power cabinet	2 Sets	56,000
	SUBTOTAL: DIVISION 03 DUAL DANNER LINES	1 Furnace 2 Lines Complete Danner Complex	2 Lines	2,400,900



4. PROCESS UTILITIES, CIVIL BATTERY LIMITS & CLIENT OBLIGATIONS

Utility Parameter	Operating Requirement	Equipment Load & Source	Client Battery Limits
Electrical Power	1,600 kVA Installed Substation 380V ±5%, 50Hz, 3-Phase 4-Wire	Main Melting Transformers (1400kVA), Forehearth, Muffle, Drives	High/Low voltage transformer station, aluminum busbars & main supply cables to furnace
Cooling Water	Circulation Rate: 80 - 120 m³/h Pressure: 0.25 - 0.35 MPa, <32°C	Electrode water cooling jackets, muffle cooling, laser gauges	On-site 40 m³ reinforced concrete cooling pool or reservoir, pumps & piping to plant boundary
Compressed Air	Clean dry oil-free air Pressure: 0.40 - 0.60 MPa	Danner mandrel tube blow air, pneumatic cylinders, dust collector pulses	Dedicated air compressor station with desiccant air dryer & receiver tank
Civil Infrastructure	13m Height for Batching Tower 65m Runway Bay Length	Heavy reinforced concrete foundation for 24 TPD furnace bath and batching silos	Complete civil construction, reinforced floor slabs, control room, overhead cranes & 35T steel

5. 28-WEEK TURNKEY IMPLEMENTATION GANTT TIMELINE

Phase	Milestone & Work Division Description	Duration	Execution Lead
Phase 1	Engineering Design & Civil Foundations: GA layouts, furnace foundation drawings, electrical busbar calculations & client civil excavation	Weeks 01 - 06	BTI EPC & Client Civil Team
Phase 2	Equipment Fabrication & Refractory Pre-Assembly: AZS Corundum brick pre-cutting, Danner mandrels, pullers, transformers & PLC cabinets	Weeks 04 - 16	BTI China OEM Directorate
Phase 3	Ocean Shipping & Port Customs Clearance: 20 HQ seaworthy containers dispatched to Karachi, customs clearance & transport to factory site	Weeks 16 - 20	BTI Logistics & Clearing Wing
Phase 4	On-Site Masonry & Mechanical Erection: Furnace refractory laying, molybdenum electrode insertion, batching tower & 50m runway setup	Weeks 18 - 24	BTI On-Site Engineering Team
Phase 5	Furnace Heat-Up & Thermal Curing & Cold Commissioning: Controlled 14-day refractory thermal expansion schedule, transformer dry testing	Weeks 24 - 26	Senior Furnace Specialists
Phase 6	Hot Commissioning & Commercial Glass Pull: Raw batch melting, Danner mandrel rotation, tube drawing pull, laser calibration & SAT	Weeks 26 - 28	BTI Technical Directorate

6. COMMERCIAL TERMS & BILATERAL EXECUTIVE SIGN-OFF

COMMERCIAL PAYMENT TERMS: • 30% Advance T/T: Upon contract execution and civil layout release. • 60% Progressive T/T: Against equipment FAT running inspection & BL dispatch. • 10% SAT Commissioning: Upon successful 24 TPD glass tube drawing milestone.	WARRANTY & PERFORMANCE GUARANTEE: • Furnace Campaign Life: 5 to 7 years continuous operation. • Tubing Dimensional Tolerance: OD ±0.03mm, Wall ±0.02mm. • BTI Engineering Residency: 6 months on-site operations guidance.
ISSUED ON BEHALF OF CONTRACTOR: Business Tacts International (Pvt.) Ltd. Authorized Signatory: _____ Name: Mian Usman / Fahad Javaid Title: Directorate of Turnkey EPC Engineering Date: 18 September 2026	ACCEPTED ON BEHALF OF CLIENT: Pakistan Pharmaceutical Glass Consortium Authorized Signatory: _____ Name: Managing Director / Chief Executive Title: Directorate of Capital Procurement Date: _____ 2026