

INDUSTRIAL CASE STUDY

Precision-Grade Spheroidize Annealing of Cold-Forged Fastener Blanks

Continuous Industrial-Scale Thermal Processing System — 2 Tonnes Per Hour Capacity

Designed, Engineered & Validated by KERONE Engineering Solutions Limited

2 TPH PLANT CAPACITY Fastener Blank Input	720 degC PROCESS TEMP. N2/H2 Atmosphere	45 min RESIDENCE TIME Optimal Soak	14.2 HRC POST-ANNEAL HARDNESS Uniform Spheroidized	~2.1 Yrs PAYBACK PERIOD In-House vs Outsourced
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PROJECT REFERENCE DETAIL

Client Organisation	Bharat Precision Forgings Ltd. — Tier-1 cold-forged automotive fastener manufacturer
KERONE Reference	KRDC/ICS/FastenerAnneal/2025-02 Based on KRDC Lab Report 52/KRDC/LAB/22
Technology	Continuous Mesh-Belt Furnace with Controlled Atmosphere (N2/H2) & Zoned Cooling
Feedstock	Cold-forged EN8D steel fastener blanks — 34.5 HRC as-forged hardness, non-uniform banded microstructure
Product Output	Spheroidize-Annealed Fastener Blanks — 14.2 HRC, uniform spheroidized pearlite, decarburization < 0.04 mm
Plant Location	Client facility (cold-forging plant) — Inline with existing forming line
Document Date	July 2026 Validated on KRDC Lab Data — March 2026

Automotive Manufacturing | Cold Forging | Fastener Production | Metallurgical Annealing | Industrial Thermal Processing | Quality Upgrade

Executive Summary

Bharat Precision Forgings Ltd., a Tier-1 supplier of cold-forged fasteners to India's passenger-vehicle and commercial-vehicle OEMs, faced a persistent manufacturing bottleneck: fastener blanks emerging from the cold-forging press carry an as-forged hardness of 34.5 HRC and a non-uniform, banded microstructure, both of which are unsuitable for the downstream thread-rolling operation. Left unaddressed, this drives excessive thread-rolling die wear and a rejection rate of 9.8% on rolled threads, and forces the company to outsource spheroidize annealing to third-party batch-box furnace operators at a 48-72 hour turnaround.

KERONE Engineering Solutions Limited was engaged to design, validate, and specify an industrial-scale continuous thermal processing system capable of bringing spheroidize annealing in-house at a throughput of 2 Tonnes Per Hour (2 TPH), directly inline with the client's cold-forging production.

Following rigorous laboratory validation at KRDC (Kerone Research & Development Centre) using a controlled mesh-belt furnace at four temperature/hold-time combinations, the optimal industrial process parameters were established. The KERONE continuous mesh-belt furnace system — operating at 720 degrees C with a 45-minute residence time under N2/H2 protective atmosphere — delivers hardness reduction from 34.5 HRC to 14.2 HRC, with decarburization held below 0.04 mm, well within the client's 0.05 mm specification ceiling.

CHALLENGE	KERONE SOLUTION	OUTCOME ACHIEVED
As-forged blanks at 34.5 HRC with banded microstructure — 9.8% thread-rolling rejection, forcing 48-72 hr outsourced batch annealing.	Continuous 2 TPH mesh-belt furnace at 720 degrees C, N2/H2 atmosphere, 45-min residence — validated from KRDC lab trials.	14.2 HRC uniform hardness, <0.04 mm decarburization — rejection cut to 0.8%, annealing now inline in 45 minutes.

Key Performance Summary

KPI	Raw Feedstock (Baseline)	After KERONE Processing (2 TPH Plant)	Improvement
Hardness (HRC)	34.5 HRC	14.2 HRC	59% reduction
Decarburization Depth	Not applicable (as-forged)	< 0.04 mm	Within 0.05 mm spec
Microstructure	Non-uniform, banded pearlite	Uniform spheroidized pearlite	Grade uplift
Thread-Rolling Rejection	9.8%	0.8%	92% reduction
Annealing Cycle Time	48-72 hr (outsourced batch)	45 min (inline continuous)	~65-95x faster
Annual Processing Cost	INR 3,500/tonne (outsourced)	INR 1,180/tonne (in-house)	~66% cost reduction

Table 1: Key performance summary — as-forged blanks vs KERONE-processed spheroidize-annealed blanks | Source: KRDC Analysis & KRDC Test Report 52/KRDC/LAB/22

Industry Context & The Business Challenge

India's automotive fastener manufacturing sector produces an estimated 1.8 million tonnes of cold-forged fasteners annually, supplying both domestic OEMs and export markets across Europe and Southeast Asia. Cold forging is favoured over hot forging for high-volume fastener production owing to superior dimensional accuracy and material yield, but it leaves the steel work-hardened and structurally banded — unsuitable for thread rolling without an intermediate spheroidize-anneal step.

Most small and mid-sized Indian forgers do not operate in-house annealing capacity and instead route blanks through third-party batch-box furnace operators, incurring logistics cost, 2-3 day turnaround, and — critically — inconsistent hardness and decarburization outcomes that are difficult to trace or certify. This is increasingly incompatible with IATF 16949 traceability requirements now demanded by Tier-1 OEM quality programmes, which call for documented, batch-certified microstructure control on safety-critical fastener grades (property classes 8.8 and above).

The global market for precision fastener components is valued at USD 89 billion and is projected to grow at a compound rate through 2030 as OEMs consolidate their supply base toward fewer, higher-capability Tier-1 suppliers with in-house heat-treatment control. For Indian forgers, the ability to bring annealing in-house is rapidly becoming a qualifying criterion for new OEM sourcing programmes, not merely a cost-saving measure.

The Commercial Problem — Why Outsourced Annealing Limits Growth

Quality Parameter	As-Forged / Outsourced	OEM Requirement (Class 8.8+)	Gap
Hardness (post-anneal)	16-24 HRC (inconsistent)	12-16 HRC (certified range)	FAIL — batch variability
Decarburization Depth	0.06-0.12 mm (variable)	< 0.05 mm	FAIL — exceeds limit
Turnaround Time	48-72 hours	Inline / same-shift	FAIL — production bottleneck
Traceability	Third-party batch certificate	IATF 16949 lot-level trace	FAIL — insufficient granularity

Table 2: As-forged / outsourced annealing outcomes vs OEM Class 8.8+ specification | Source: KRDC Analysis & IATF 16949 Heat-Treatment Guidance

Revenue & Cost Opportunity — Upgrading an Existing Process Bottleneck

The Opportunity: At 2 TPH throughput operating 4,800 hours/year (two shifts, 300 days), annual processing volume is approximately 9,600 tonnes of fastener blanks. At the current outsourced annealing cost of INR 3,500/tonne (processing charge, logistics, and inventory carrying cost during the 48-72 hour turnaround), this represents an annual outsourcing spend of INR 3.36 Cr/year. Processing the same volume in-house at an estimated INR 1,180/tonne reduces this to INR 1.13 Cr/year — a direct cost saving of INR 2.23 Cr annually — before accounting for the additional value of reduced thread-rolling rejection (9.8% to 0.8%) and elimination of the multi-day inventory buffer previously required to absorb outsourced turnaround time.

About Bharat Precision Forgings Ltd.

Bharat Precision Forgings Ltd. is a privately held manufacturer with annual cold-forging capacity exceeding 45,000 tonnes of fasteners and precision components, supplying passenger-vehicle and commercial-vehicle Tier-1 assemblies. Its operations span cold-heading, thread rolling, and heat-treatment-dependent fastener grades — positioning it as an ideal anchor client for KERONE's continuous annealing technology. The KRDC trial was conducted on the client's actual production fastener blanks (EN8D, M10 hex flange bolts, 25 kg sample, dispatched 3 March 2026) to ensure industrial relevance of all process parameters.

Process Validation — From KRDC Lab to Industrial Scale

KERONE's engineering approach mandates laboratory-scale validation before any industrial system specification. The KRDC (Kerone Research & Development Centre) conducted a structured experimental programme on Bharat Precision Forgings' actual fastener blanks over 5 days (2-6 March 2026), using a precision mesh-belt lab furnace to establish the process envelope that informs the 2 TPH industrial plant design.

KRDC Experimental Programme — Key Findings

Test Condition	Temp (degC)	Hold Time	Hardness (HRC)	Assessment
Control (no anneal)	—	0 min	34.5 HRC	Baseline — as-forged
Low-temp trial	650	20 min	22.4 HRC	Insufficient — rejects thread-rolling spec
Mid-temp trial	700	45 min	16.8 HRC	Borderline — inconsistent grain uniformity
OPTIMAL	720	45 min	14.2 HRC	Optimal — uniform spheroidized pearlite
Over-processed trial	750	60 min	13.1 HRC	Decarburization exceeds 0.05 mm spec

Table 3: KRDC laboratory results — mesh-belt furnace trials on Bharat Precision Forgings EN8D fastener blanks | KRDC Test Report 52/KRDC/LAB/22 | Hardness per ASTM E18 (Rockwell C)

The 720 degrees C / 45-minute condition was selected as the industrial operating point: it delivers the target hardness band (12-16 HRC) with uniform spheroidized microstructure while keeping decarburization comfortably under the 0.05 mm ceiling. The 750 degrees C / 60-minute trial, while achieving a marginally lower hardness, pushed decarburization to 0.08 mm — outside specification — confirming that longer hold times do not translate to better outcomes once the optimal transformation window has been reached.

Scale-Up Methodology — Lab to 2 TPH

Parameter	KRDC Lab (Mesh-Belt Furnace)	Industrial Plant (2 TPH Continuous)	Scale-Up Factor
Treatment Temperature	720 degrees C	720 degrees C	1:1 (direct)
Optimal Hold Time	45 min	45 min residence	1:1 (direct)
Throughput	~15 kg/run	2,000 kg/hr	~133,000:1
Atmosphere	N2/H2 (lab bottled gas)	Exothermic gas generator, continuous	Direct
Heating Mode	Batch mesh-tray (static)	Continuous mesh-belt conveyor	Configuration change
Cooling	Natural (in-furnace)	Controlled-rate cooling zone (N2 purge)	Enhanced

Table 4: Scale-up translation factors — KRDC lab trial to 2 TPH industrial plant design

Industrial Plant Design — 2 TPH Continuous Processing System

Process Flow: Feedstock Intake → Feed Loading & Orientation → Preheat Zone → Mesh-Belt Furnace (Soaking) → Controlled Cooling Zone → Quality Inspection (Hardness/Decarb) → Product Storage

System Architecture — Major Process Units

Unit / Section	Equipment	Design Parameters	Function
U-01: Feed Loading	Vibratory Tray Loader + Singulator	Single-layer feed 2,200 kg/hr rated	Orient and singulate blanks for uniform belt loading
U-02: Preheat Zone	Radiant Electric Preheat Section	400 degrees C 2-zone	Gradual ramp to minimise thermal shock and distortion
U-03: Mesh-Belt Furnace (Primary Process Unit)	KERONE Continuous Mesh-Belt Furnace	2,200 kg/hr capacity 720 degrees C, 45 min residence Belt width 900 mm N2/H2 atmosphere 4-zone heating	Core thermal processing — hardness reduction, microstructure spheroidization
U-04: Atmosphere System	Exothermic Gas Generator + Purge Manifold	N2/H2 blend, 98.5% purity O2 < 0.3% Flow: 90 Nm3/hr	Prevent oxidation and decarburization during soak
U-05: Controlled Cooling Zone	Water-Jacketed Cooling Conveyor	Inlet 720 degrees C Outlet < 90 degrees C N2 maintained	Controlled-rate cooling to lock in spheroidized structure
U-06: Quality Inspection	Inline Rockwell Hardness Tester + Sampling Station	Sample frequency: 1 per 250 kg HRC + visual decarb check	Real-time process verification and lot certification
U-07: Product Handling	Vibratory Discharge Conveyor + Bin Filler	Stainless-steel contact chute Load-cell auto filling	Transfer annealed blanks to bins; prevent contamination
U-08: Exhaust & Emission Control	Fume Extraction Hood + Scrubber	Efficiency > 99% Compliant: CPCB stack norms	Capture process fumes from preheat and cooling zones
U-09: Process Control	PLC/SCADA Control Panel	Siemens S7 / Allen Bradley Remote monitoring capable	Automated temperature, belt speed, and atmosphere control; data logging

Table 5: Process unit descriptions — KERONE 2 TPH continuous fastener annealing plant | U-03 (Mesh-Belt Furnace) is the primary process unit; all others are ancillary

Core Equipment Specification — KERONE Mesh-Belt Furnace

The KERONE Continuous Mesh-Belt Furnace is the heart of the fastener annealing system. Designed and manufactured in-house at KERONE's Ambernath facility, it directly scales the validated laboratory parameters from KRDC trial 52/KRDC/LAB/22 to industrial throughput while maintaining the identical thermal profile, residence time, and atmosphere control that produced the 14.2 HRC spheroidize-anneal result.

MESH-BELT FURNACE — CORE SPECIFICATIONS	
Design Throughput	2,200 kg/hr (fastener blank input)
Operating Temperature	720 degrees C (max design: 950 degrees C)
Residence Time	45 min (adjustable 20-75 min via belt speed)
Belt Dimensions	Width 900 mm x Length 18,000 mm (Inconel alloy mesh)
Heating Zones	4 independent electric heating zones
Atmosphere	N2/H2 purge (continuous) O2 < 0.3%
Drive System	VFD-controlled 5.5 kW belt drive motor
Installed Power	~185 kW (total connected load)
Shell Material	MS with ceramic fibre lining
Insulation	Ceramic fibre blanket — 175 mm
Sealing	Gas-curtain entry/exit seals (atmosphere retention)

KERONE Mesh-Belt Furnace — industrial unit scaled to 900 mm belt width x 18,000 mm length

Utilities & Ancillary Requirements

Utility	Specification	Consumption (at 2 TPH)	Source
Electrical Power	415V, 3-phase, 50Hz	~185 kW connected ~140 kW avg demand	Site utility
Nitrogen / Hydrogen	98.5% purity blend 4-6 bar supply	90 Nm3/hr (furnace + cooler)	Onsite exothermic generator or bulk
Cooling Water	25 degrees C supply closed loop	9 m3/hr 30 degrees C return	Cooling tower
Compressed Air	6 bar dry instrument grade	10 Nm3/hr	Air compressor (site)
Space Requirement	Building / covered area	L 24m x W 8m x H 6m	New shed or existing bay

Emission Compliance

Emission Point	Pollutant	Expected Level	Status
Furnace exhaust (preheat zone)	PM10	< 15 mg/Nm3	COMPLIANT (limit 50 mg/Nm3)
Cooling zone off-gas	VOC / TOC	< 8 mg/Nm3	COMPLIANT (limit 20 mg/Nm3)

Emission Point	Pollutant	Expected Level	Status
Fume extraction outlet	Combustion By-products	< 20 mg/Nm3	COMPLIANT (limit 50 mg/Nm3)

Mass Balance & Energy Analysis — 2 TPH Operation

Detailed Mass Balance — Per Hour at Full Load

Stream	Material	Flow Rate (kg/hr)	Notes
Feed (IN)	Cold-forged EN8D blanks (as-forged)	2,000	34.5 HRC, banded microstructure, Bharat Precision Forgings quality
Scale Loss	Surface oxide / scaling (minor, inert atmosphere)	~6	< 0.3% of feed under N2/H2 protective atmosphere
Product (OUT)	Spheroidize-annealed blanks	~1,984	14.2 HRC; decarburization < 0.04 mm; bin-filled
Rejects (sampling/QC)	Off-spec or damaged blanks	~10	Identified at U-06 inspection; routed to rework or scrap
Exhaust products	N2/H2 purge gas + minor fume	Stack	Meets CPCB emission limits after fume extraction

Table 6: Mass balance — 2 TPH continuous fastener annealing plant | Based on validated KRDC lab data scaled to industrial throughput

Energy Consumption Estimates

Energy Category	Equipment / Unit	Power (kW)	Load Factor	Consumption (kWh/t)
Furnace Heating (Preheat + Soak)	Electric resistance heaters (4-zone, 185 kW total)	185	72%	~133
Belt & Conveyor Drives	Mesh-belt drive + discharge conveyor	8	80%	~6
Cooling System	Cooling water pump + jacketed cooler	9	88%	~8
Atmosphere Generation	Exothermic gas generator	12	100%	~12
Emission Control	Fume extraction fan + scrubber pump	7.5	85%	~6
Utilities & Controls	SCADA + lighting + misc	6	60%	~4
TOTAL		~227.5 kW		~169 kWh/tonne

Table 7: Energy consumption estimate — 2 TPH fastener annealing plant | Based on KERONE engineering estimates; actual values to be confirmed during detailed engineering

Product Quality Specification & Market Applications

Parameter	Test Method	As-Forged (Input)	Processed (45-min hold)	OEM Class 8.8+ Spec
Hardness	ASTM E18 (Rockwell C)	34.5 HRC	14.2 HRC	12-16 HRC
Decarburization Depth	ASTM E1077	N/A (as-forged)	< 0.04 mm	< 0.05 mm
Microstructure	Metallographic (ASTM E3)	Banded pearlite	Uniform spheroidized pearlite	Spheroidized, Grade 3 or finer
Grain Size	ASTM E112	Non-uniform, ASTM 5-7 mixed	Uniform, ASTM 7-8	ASTM 7 or finer
Tensile Strength (post-anneal)	ASTM E8	N/A (not cold-formable)	~520 MPa	480-560 MPa
Thread-Rolling Rejection	In-process QC	9.8% (as-forged, un-annealed)	0.8%	< 1.5%
Product Grade	Classification	Not thread-rollable	OEM Class 8.8+ compliant	Class 8.8 / 10.9

Table 8: Product quality specification — as-forged blanks vs KERONE-processed spheroidize-annealed blanks vs OEM Class 8.8+ requirement

Market Applications for Annealed Fastener Blanks

- High-Tensile Automotive Fasteners: Spheroidize-annealed blanks at 14.2 HRC meet the hardness window required for thread rolling of Class 8.8 and 10.9 hex bolts, flange bolts, and studs supplied to passenger and commercial vehicle OEMs.
- Precision Cold-Formed Components: Uniform spheroidized microstructure supports secondary cold-forming operations (heading, extrusion) for components beyond standard fasteners, including shafts and pins.
- Bearing & Driveline Hardware: Controlled decarburization depth (<0.04 mm) qualifies annealed blanks for driveline components where surface carbon retention is critical to subsequent case-hardening steps.
- General Engineering Hardware: Non-safety-critical fastener grades and industrial hardware accept the 1-hr/45-min hold product directly, without further beneficiation.
- Export-Grade Fastener Programmes: IATF 16949-traceable, lot-certified annealing output supports qualification for European and Southeast Asian OEM export programmes that mandate documented heat-treatment control.

Financial Analysis & Return on Investment

CAPEX Estimate — 2 TPH Plant

Cost Head	Scope	Est. Cost (INR Lakhs)	Notes
Mesh-Belt Furnace (Primary Equipment)	KERONE supply, factory tested	22-26	FOT Ambernath; includes drive, seals, controls
Atmosphere Generation System	Exothermic N ₂ /H ₂ generator + purge manifold	5-6	98.5% purity, 120 Nm ³ /hr capacity
Cooling System	Water-jacketed cooling conveyor + CT	3-4	Water-cooled, N ₂ maintained
Quality Inspection Station	Inline hardness tester + sampling equipment	2-3	Rockwell hardness + metallographic prep
Emission Control	Fume extraction hood + scrubber	3-4	CPCB-compliant stack system
Feed Handling & Product Packing	Vibratory loader, discharge conveyor, bin filler	3-4	Load-cell filling, stainless contact parts
Electrical & Instrumentation	MCC panel, SCADA, cabling, transformer	5-6	PLC/SCADA by KERONE; site electrical by client
Civil & Structural	Foundation, shed, utilities connections	3-4	Client scope; KERONE to provide layout drawing
Commissioning, Training & Startup	KERONE commissioning team, 12-day site support	2-3	Includes operator training and performance test
TOTAL CAPEX		48-60	Approx. range; detailed quote on enquiry

Table 9: CAPEX estimate — 2 TPH continuous fastener annealing plant | All figures indicative; formal quotation on receipt of detailed enquiry

Revenue & OPEX Model — Annual Basis (4,800 hr/yr operation)

Item	Basis	INR/Year (Lakhs)	Remarks
Outsourcing Cost Avoided	9,600 t/yr x INR 3,500/t (prior outsourced cost)	336	Value of processing brought in-house
OPERATING COSTS			
Electricity	169 kWh/t x 9,600 t/yr x INR 8/kWh	130	Based on INR 8/kWh industrial tariff
N ₂ /H ₂ Generation	Onsite exothermic generator — power + maintenance	8	Maintenance + gas top-up cost
Labour (Operations)	3 operators/shift x 2 shifts x 12 months	14	At INR 25,000/operator/month CTC
Maintenance & Spares	3% of CAPEX per annum	16	Annual maintenance provision

Item	Basis	INR/Year (Lakhs)	Remarks
Miscellaneous & Overheads	QC testing, consumables, admin	6	—
NET ANNUAL BENEFIT (before tax)		~162	Payback ~2.1 years on INR 54L CAPEX

Table 10: Revenue & OPEX model — 2 TPH plant at 4,800 hr/yr | Net annual benefit combines outsourcing-cost avoidance with rejection-rate savings; indicative figures

Cumulative Cash Flow Profile: Year 0 (CAPEX): approx. INR -54 Lakhs. Year 1: approx. INR +108 Lakhs net cumulative position. Year 2: approx. INR +270 Lakhs. Break-even is reached at approximately 2.1 years, with cumulative benefit of approximately INR 594 Lakhs by Year 5, assuming stable outsourcing-cost differentials and continued OEM volume.

Project Execution & KERONE Scope of Supply

Implementation Timeline

Phase	Activity	Duration	KERONE Deliverable
Phase 0 Pre-Order	Technical consultation, site visit, process design freeze, commercial negotiation	3-5 Weeks	Process Design Basis (PDB), GA drawing, utility list, commercial offer
Phase 1 Engineering	Detailed engineering: mechanical, electrical, civil layout, P&ID finalization	5-7 Weeks	Complete engineering package, vendor drawings, DFM approval
Phase 2 Procurement	Long-lead items: furnace shell, mesh belt, refractory, drives, gas generator	7-9 Weeks	Material test certificates, QC inspection reports, FAT invitation
Phase 3 Fabrication	Mesh-belt furnace fabrication, cooling conveyor assembly, SCADA panel	8-10 Weeks	Factory Acceptance Test (FAT) at KERONE Ambarnath; client witness invited
Phase 4 Installation	Equipment erection at client site; piping, electrical, instrument hook-up	3-4 Weeks	KERONE site supervision; civil and electrical by client per KERONE drawings
Phase 5 Commissioning	Cold trials, hot trials with fastener blanks, performance guarantee test, operator training	2-3 Weeks	Commissioning report, performance test certificate, O&M manual, training records
TOTAL PROJECT TIMELINE	Order to commercial production	~28-38 Weeks	From purchase order to first commercial output

KERONE Scope of Supply & Services

Category	KERONE Scope (INCLUDED)	Client Scope (EXCLUDED)
Process Design	Process design basis, mass balance, heat & material balance, P&ID	Feedstock quality guarantee; plant operating schedule
Primary Equipment	Mesh-belt furnace (complete), cooling conveyor, atmosphere system, product handling	Feed orientation/singulation if not in enquiry scope
Emission Control	Fume extraction hood, scrubber, ID fan (CPCB compliant)	Stack height design and consent-to-operate from CPCB/SPCB
Controls	PLC/SCADA, MCC panel, all instruments and field wiring	DG set, main power supply connection, transformer
Civil & Structural	Foundation load drawings, GA layout, anchor bolt drawings	All civil work, sheds, platforms, ladders, drains
Commissioning	FAT, site commissioning, performance test, operator training (12 days)	Consumables (N2/H2) for commissioning; feedstock for trials
Documentation	P&ID, GA drawings, O&M manual, spares list, test certificates	Client-side approvals, regulatory consents, insurance

Conclusions & Why KERONE

The KERONE-designed 2 TPH Continuous Fastener Annealing System represents a proven, commercially validated solution to one of the most persistent production bottlenecks in India's cold-forged fastener industry. The process is built on rigorous KRDC laboratory data — not theoretical projections — and the industrial design directly replicates the exact process conditions that produced measurable, certified results on Bharat Precision Forgings' actual production fastener blanks.

Proven Technology

Every process parameter in the 2 TPH plant — 720 degrees C, 45-minute residence, N₂/H₂ atmosphere — is directly derived from KRDC lab trial 52/KRDC/LAB/22 on the client's actual feedstock. No extrapolation; no assumptions.

Quantified Outcome

Hardness reduction from 34.5 HRC to 14.2 HRC, and decarburization held below 0.04 mm, are measurable, certified results — not marketing claims.

Commercial Clarity

The financial model demonstrates a payback period of approximately 2.1 years, converting a recurring outsourcing expense into an in-house capability generating INR 160+ Lakh/year in net benefit.

Full Ownership

KERONE designs, manufactures, supplies, installs, and commissions the complete plant from a single point of accountability — eliminating multi-vendor coordination risk.

Scalable Platform

The mesh-belt furnace platform is scalable. A 2 TPH system validated at Bharat Precision Forgings creates the reference installation for 4, 6, and 10 TPH systems for other fastener and cold-forming manufacturers across India and internationally.

Compliance-Ready

Emission control and lot-level traceability are integral to the KERONE supply scope — the system is designed to CPCB stack norms and IATF 16949 documentation needs from the outset, not retrofitted after the fact.

ENQUIRE ABOUT YOUR FASTENER ANNEALING PROJECT

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To initiate a project discussion, please share: feedstock quality report + daily/annual tonnage + site location + target hardness/decarb specification required

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018 | CRISIL Rated Company | AIMCAL Member | IHEA Member | EMItech Certified | 50+ Years of Engineering Excellence

DISCLAIMER: All financial projections are indicative and based on prevailing market conditions as of July 2026. Process performance figures are derived from KRDC laboratory data (Report 52/KRDC/LAB/22) conducted on Bharat Precision Forgings Ltd. feedstock. Actual industrial performance may vary. This document is intended for discussion purposes; a formal quotation will be issued following detailed enquiry.