

INDUSTRIAL CASE STUDY

Case-Hardened Automotive Transmission Gears

Continuous Industrial-Scale Carburizing & Hardening System — 800 kg/hr Capacity

Designed, Engineered & Validated by KERONE Engineering Solutions Limited

800 kg/hr PLANT CAPACITY Gear Blank Input	930°C PROCESS TEMP. Carburizing Zone	4 hrs CYCLE TIME Carburize + Quench + Temper
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98.5% FIRST-PASS YIELD ISO 6336 Grade A	±0.05mm CASE DEPTH UNIFORMITY Across Full Batch	~2.0 Yrs PAYBACK PERIOD Quality-Upgrade Benefit
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Project Reference Detail

Field	Detail
Client Organisation	AutoDrive Transmissions Ltd. — Leading Indian automotive gear & transmission component manufacturer
KERONE Reference	KRDC/ICS/AutoGear/2025-02 Based on KRDC Lab Report 62/KRDC/LAB/09
Technology	Continuous Mesh-Belt Carburizing Furnace with Controlled Atmosphere, Oil Quench & Tempering Line
Feedstock	Automotive Transmission Gears (20MnCr5 alloy steel, machined blanks) — pre-heat-treatment
Product Output	Case-Hardened Transmission Gears — 58-62 HRC surface hardness, ISO 6336 Grade A
Plant Location	Client facility (Pune, Maharashtra) — inline with existing machining line
Document Date	July 2026 Validated on KRDC Lab Data — April 2026

Automotive Components | Gear & Transmission Heat Treatment | Carburizing & Hardening | Metallurgical Quality Upgrade | Industrial Sustainability

Executive Summary

AutoDrive Transmissions Ltd., one of India's leading manufacturers of automotive transmission gears and shafts, faced a commercially significant challenge: their in-house batch-type carburizing furnaces produced inconsistent case depth (0.6mm to 1.6mm variation) and surface hardness scatter across gear batches, which elevated rejection and rework rates and restricted a meaningful share of production to non-critical, lower-value applications.

KERONE Engineering Solutions Limited was engaged to design, validate, and specify an industrial-scale continuous carburizing and hardening system capable of delivering OEM-grade metallurgical consistency at a throughput of 800 kg/hr.

Following rigorous laboratory validation at KRDC (Kerone Research & Development Centre) using a controlled-atmosphere pit furnace across multiple carburizing durations (1.5 hr, 2 hr, 3 hr, 4 hr), the optimal industrial process parameters were established. The KERONE continuous mesh-belt furnace system — operating at 930 degrees C carburizing-zone temperature with a 3-hour carburizing cycle, agitated oil quench, and continuous 180 degree C temper under endothermic gas atmosphere — delivers a case depth of 0.95mm ± 0.05mm and surface hardness of 58-62 HRC consistently across the full production batch.

CHALLENGE	KERONE SOLUTION	OUTCOME ACHIEVED
Inconsistent batch carburizing producing case-depth variation of ±0.35mm and hardness scatter — 13.5% rejection/rework rate, restricting output to Grade B / non-critical applications at 35-40% lower realised value.	Continuous 800 kg/hr mesh-belt furnace with automated carbon-potential control, 3-zone carburizing, integrated agitated oil quench and walking-beam temper line — validated from KRDC lab trials.	Case-hardened gears at 0.95mm ±0.05mm case depth, 58-62 HRC surface hardness — 98.5% first-pass ISO 6336 Grade A yield, qualifying for premium Tier-1 supply contracts.

Key Performance Summary

KPI	Raw Process (Baseline Batch Furnace)	After KERONE Processing (Continuous 800 kg/hr)	Improvement
Case Depth Variation	±0.35 mm	±0.05 mm	86% reduction
Surface Hardness Consistency (Cv%)	8.2%	1.4%	83% reduction
First-Pass Yield (ISO 6336 Grade A)	78%	98.5%	+26% increase
Core Hardness	28-38 HRC (variable)	35-42 HRC (controlled)	Within OEM spec band
Rejection / Rework Rate	13.5%	1.2%	91% reduction
Product Classification	Grade B / rework stock	ISO 6336 Grade A (OEM-certified)	Grade uplift
Net Annual Benefit	—	~INR 1.6 Cr/yr	Cost avoidance + grade premium

Industry Context & The Business Challenge

India's automotive component and gear manufacturing sector produces an estimated 850,000 tonnes of transmission-grade forged and machined gear components annually, of which heat treatment (carburizing and hardening) is a mandatory finishing process for roughly 60-65% by volume — around 500,000-550,000 tonnes per year requiring case-hardening.

The global automotive gear heat-treatment services market is valued at approximately USD 3.8 billion and is projected to reach USD 5.5 billion by 2030, driven by OEM tightening of NVH (noise-vibration-harshness) and durability tolerances — especially for EV and hybrid transmissions, where gear-whine sensitivity is materially higher than in conventional ICE drivetrains. However, the critical barrier for many Indian Tier-1 and Tier-2 suppliers is metallurgical consistency: batch-furnace processes struggle to hold case-depth and hardness tolerances tight enough to meet OEM PPAP requirements without high scrap or rework.

The Commercial Problem — Why Inconsistent Heat Treatment Erodes Value

Quality Parameter	Raw / Batch Process (AutoDrive)	OEM Requirement (ISO 6336 Grade A)	Gap
Case Depth Variation	±0.35 mm	±0.10 mm max	FAIL — 3.5x over tolerance
Surface Hardness Range	54-64 HRC (wide)	58-62 HRC (tight)	FAIL — ~18% of parts out of band
Core Hardness	28-38 HRC	33-42 HRC	FAIL — marginal on low end
First-Pass Yield	78%	> 97% for Tier-1 status	FAIL — below OEM threshold
Realised Price (finished gear)	INR 95,000-1,10,000/tonne (Grade B)	INR 1,55,000-1,80,000/tonne (Grade A)	40-60% revenue gap

Table 1: Raw/batch heat-treatment quality parameters vs OEM specification for Grade A gears | Source: KRDC Analysis & ISO 6336 Requirements

Revenue Opportunity — Upgrading an Existing Process Line

At 800 kg/hr throughput operating 300 days/year (7,200 hours), the plant processes approximately 5,760 tonnes of transmission gears annually. Under the existing batch process, a first-pass yield of 78% meant a significant share of this volume fell short of ISO 6336 Grade A specification each year, requiring rework or sale as discounted Grade B stock. KERONE's continuous furnace system, by lifting first-pass yield to 98.5% and tightening case-depth and hardness control, recovers the bulk of this shortfall to Grade A specification and eliminates most rework cost — an estimated combined benefit of approximately INR 1.6 Cr per year, against a total project investment of roughly INR 3.2-3.5 Cr.

About AutoDrive Transmissions Ltd.

AutoDrive Transmissions Ltd. is a Tier-1 supplier to leading passenger-vehicle and commercial-vehicle OEMs, with annual gear and transmission-component manufacturing capacity exceeding 40,000 tonnes. Their operations span precision forging, CNC gear hobbing/shaping, and heat treatment — positioning them as an ideal anchor client for KERONE's continuous case-hardening technology. The KRDC trial was conducted on AutoDrive's actual production gear blanks (20 kg sample of 20MnCr5 steel, dispatched 2 April 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 AutoDrive's actual gear blanks over 6 days (10-15 April 2026), using a precision controlled-atmosphere pit furnace to establish the process envelope that informs the 800 kg/hr industrial plant design.

KRDC Experimental Programme — Key Findings

Test Condition	Carburizing Time	Case Depth (mm)	Surface Hardness (HRC)	Assessment
Control (short cycle)	1.5 hr	0.45	54	Insufficient — below OEM minimum case depth
Short hold	2 hr	0.65	57	Marginal — inconsistent core hardness
OPTIMAL	3 hr	0.95	60	Optimal — meets ISO 6336 Grade A
Extended hold	4 hr	1.25	61	Over-carburized — excess distortion risk

Table 2: KRDC Laboratory Results — 930 degrees C pit furnace trials on AutoDrive 20MnCr5 gear blanks | KRDC Test Report 62/KRDC/LAB/09 | Case depth per ASTM E384 micro-hardness traverse

Scale-Up Methodology — Lab to 800 kg/hr

KERONE's scale-up process follows a structured engineering framework where laboratory parameters are translated to industrial equipment specifications using validated thermal and metallurgical models. The key translation factors for this project are:

Parameter	KRDC Lab (Pit Furnace)	Industrial Plant (Mesh-Belt Furnace)	Scale-Up Factor
Carburizing Temperature	930 degrees C	930 degrees C	1:1 (direct)
Optimal Carburizing Time	3 hr	3 hr (belt-speed controlled)	1:1 (direct)
Throughput	~20 kg/batch	800 kg/hr	Continuous, ~40:1 per cycle
Atmosphere	Endothermic gas (lab generator)	Endothermic gas, continuous generation	Direct
Carbon Potential	0.85-0.95% Cp (manual O2 probe)	0.90% Cp ± 0.02 (auto PID control)	Automated
Quenching	Oil quench, static bath	Oil quench, agitated + conveyORIZED	Enhanced
Tempering	Batch furnace, 2 hr hold	Continuous walking-beam, 180 degrees C, 90 min	Configuration change
Loading	Manual tray loading	Robotic loader + mesh-belt conveyor	Automated

Industrial Plant Design — 800 kg/hr Continuous Processing System

Process Flow

Feedstock Intake → Pre-Wash & Degrease → Robotic Loading → Continuous Mesh-Belt Carburizing Furnace → Agitated Oil Quench → Multi-Stage Rinse → Continuous Tempering Furnace → Shot Blast & Inline Inspection → Quality Analysis → Product Storage & Dispatch.

Fig. 1: KERONE 800 kg/hr Automotive Gear Case-Hardening — Continuous Industrial Process Flow

System Architecture — Major Process Units

Unit / Section	Equipment	Design Parameters	Function
U-01: Feed Preparation	Vibratory Washer + Degreaser	Aqueous alkaline wash, 60 degrees C	Remove machining oil/coolant residue before heat treatment
U-02: Loading System	Robotic Loader + Mesh-Belt Conveyor	850 kg/hr rated, SS 310 belt	Uniform, automated component loading into furnace
U-03: Carburizing Furnace (Primary Process Unit)	KERONE Continuous Mesh-Belt Furnace	930 degrees C 3-hr effective carburizing zone 5-zone heating endothermic atmosphere	Core thermal processing — carbon diffusion & case formation
U-04: Atmosphere System	Endothermic (RX) Gas Generator + O2 Probe	Cp 0.90% ± 0.02 Flow 25 Nm3/hr	Maintain precise carbon potential; prevent decarburization/sooting
U-05: Quench System	Agitated Oil Quench Tank	60-80 degrees C oil conveyORIZED transfer <15 sec transfer	Rapid, uniform quench to achieve martensitic case
U-06: Wash & Rinse	Multi-Stage Aqueous Washer	3-stage rinse rust-preventive dip	Remove residual quench oil; corrosion protection
U-07: Tempering Furnace	Continuous Walking-Beam Furnace	180 degrees C 90-min residence forced air	Relieve quench stresses; stabilise hardness
U-08: Quality Analysis	Inline Hardness Tester + Metallurgical Lab	Rockwell + micro-hardness traverse case-depth etch test	Batch-wise verification of case depth & hardness
U-09: Process Control	PLC/SCADA Control Panel	Siemens S7 / Allen Bradley data logging	Automated atmosphere, temperature & belt-speed control

Table 3: Process Unit Descriptions — KERONE 800 kg/hr Continuous Gear Case-Hardening Plant | U-03 (Carburizing Furnace) is the primary process unit; all others are ancillary

Core Equipment Specification — KERONE Mesh-Belt Furnace

The KERONE Continuous Mesh-Belt Carburizing Furnace is the heart of the gear case-hardening system. Designed and manufactured in-house at KERONE's Ambernath facility, it directly scales the validated laboratory parameters from KRDC trial 62/KRDC/LAB/09 to industrial throughput while maintaining the identical thermal profile, carbon potential, and quench sequence that produced the 0.95mm case-depth / 58-62 HRC result.

ROTARY / MESH-BELT FURNACE — CORE SPECIFICATIONS	
Design Throughput	850 kg/hr (gear component input)
Operating Temperature	930 degrees C (carburizing); max design 950 degrees C
Carburizing Time	3 hr (adjustable 2-4 hr via belt speed)
Belt Width x Furnace Length	600 mm x 18,000 mm (Ni-Cr alloy mesh belt)
Heating Zones	5 independent electric heating zones
Atmosphere	Endothermic gas (RX), Cp 0.90% ± 0.02
Drive System	VFD-controlled belt drive, 5.5 kW
Installed Power	~210 kW (total connected load)
Muffle Material	Heat-resistant alloy (RA330) muffle
Insulation	Ceramic fibre + firebrick composite — 200 mm
Sealing	Gas curtain entry/exit, nitrogen purge doors

KERONE Mesh-Belt Furnace (KRDC laboratory-scale pit furnace used for trials) — industrial unit scaled to 600 mm belt width x 18,000 mm length

Utilities & Ancillary Requirements

Utility	Specification	Consumption (at 800 kg/hr)	Source
Electrical Power	415V, 3-phase, 50Hz	~210 kW connected ~165 kW avg demand	Site utility
Endothermic Gas (RX)	Methanol/LPG-based generation	25 Nm3/hr	Onsite RX generator
Quench Oil	Fast/martempering grade	Topped up ~50 L/month	Bulk supply
Compressed Air	6 bar dry instrument grade	12 Nm3/hr	Air compressor (site)
Cooling Water	25 degrees C supply closed loop	8 m3/hr	Cooling tower
Space Requirement	Building / covered area	L 35m x W 10m x H 6m	Existing bay or new shed

Emission Compliance

Emission Point	Pollutant	Expected Level	CPCB / MoEF Limit	Status
Furnace exhaust (RX gas vent)	CO / VOC	< 15 mg/Nm3	20 mg/Nm3	COMPLIANT
Quench tank vent	Oil mist	< 10 mg/Nm3	20 mg/Nm3	COMPLIANT
Wash line effluent	Oil & grease	< 8 mg/L	10 mg/L	COMPLIANT

Mass Balance & Energy Analysis — 800 kg/hr Operation

Detailed Mass Balance — Per Hour at Full Load

Stream	Material	Flow Rate (kg/hr)	Notes
Feed (IN)	Machined gear blanks (20MnCr5)	800	Pre-cleaned, machining allowance ~0.3mm
Surface Scale Loss	Oxide scale removed pre-treatment	~4	Removed in wash/degrease stage
Product (OUT)	Case-hardened, tempered gears	~790	0.95mm case depth; 58-62 HRC; ISO 6336 Grade A
Quench Oil Drag-out	Oil retained on parts (recovered in wash)	~4	Recovered via rinse/skimmer, recycled
Rejects / Rework	Out-of-spec parts (residual)	~12	<1.5% of throughput; sent for rework or downgrade
Emission products	CO2, H2O, trace CO	Stack	Meets CPCB emission limits after treatment

Table 4: Mass balance — 800 kg/hr continuous gear case-hardening plant | Based on validated KRDC lab data scaled to industrial throughput

Energy Consumption Estimates

Energy Category	Equipment / Unit	Power (kW)	Load Factor	Consumption (kWh/tonne)
Furnace Heating (Carburize + Diffusion)	Electric resistance heaters, 5-zone	165	78%	~161
Quench & Agitation	Oil pump, agitators, cooling	18	85%	~19
Tempering Furnace	Walking-beam furnace heaters	15	70%	~13
Material Handling	Conveyor, robotic loader drives	8	80%	~8
RX Gas Generator	Electric heater + blower	6	90%	~7
Wash / Rinse System	Pump, heater	5	75%	~5
Utilities & Controls	SCADA, lighting, misc	5	60%	~4
TOTAL		~222 kW		~217 kWh/tonne

Table 5: Energy consumption estimate — 800 kg/hr gear case-hardening plant | Based on KERONE engineering estimates; actual values to be confirmed during detailed engineering

Product Quality Specification & Market Applications

Expected Product Specification — KERONE Processed Gears

Parameter	Test Method	Raw Blank (Input)	Batch Furnace (Baseline)	KERONE Continuous	OEM Spec (Grade A)
Case Depth	ASTM E384 (micro-hardness)	N/A (no case)	0.6-1.6 mm (variable)	0.90-1.00 mm	0.85-1.05 mm
Surface Hardness	Rockwell C (ASTM E18)	~20-25 HRC	54-64 HRC (scatter)	58-62 HRC	58-62 HRC
Core Hardness	Rockwell C	~20 HRC	28-38 HRC	35-42 HRC	33-42 HRC
Retained Austenite	X-ray diffraction	N/A	12-18% (variable)	6-8%	< 10%
Distortion (bore ovality)	CMM measurement	N/A	0.06-0.12 mm/25mm	< 0.05 mm/25mm	< 0.05 mm/25mm
Product Grade	Classification	Unhardened blank	Grade B / rework	ISO 6336 Grade A	Grade A (OEM-certified)

Table 6: Product quality specification — raw blank vs baseline batch process vs KERONE continuous process vs OEM Grade A requirement

Market Applications for Case-Hardened Gears

- **Passenger Vehicle Transmissions** — Manual and automatic transmission gear sets require tight case-depth and hardness control for gear-mesh durability and NVH performance across the vehicle warranty period.
- **Commercial Vehicle Drivetrains** — Differential and transfer-case gears see higher torque loading and benefit from the improved core-hardness consistency delivered by continuous processing.
- **Two-Wheeler Gearboxes** — High-volume, cost-sensitive two-wheeler gearbox components benefit from the yield improvement and reduced rework cost of continuous processing.
- **EV / Hybrid Reduction Gears** — EV and hybrid reduction gear sets are especially NVH-critical, since the absence of engine masking noise makes gear whine far more noticeable to occupants; tight case-depth uniformity is essential.
- **Off-Highway & Tractor Gears** — Tractor PTO and implement gears operate in a less quality-sensitive segment and suit 2-hr treated material as an entry-level application.
- **Export & Aftermarket Supply** — Consistent ISO 6336 Grade A certification supports qualification for export OEM and aftermarket supply programmes with stricter PPAP documentation requirements.

Financial Analysis & Return on Investment

The financial case for the upgrade rests on two incremental benefit streams: (a) recovery of gear tonnage previously downgraded to Grade B or sent for rework, now qualifying directly as OEM-certified Grade A output, and (b) avoidance of rework labour, energy, and warranty/field-return costs associated with inconsistent batch-furnace metallurgy.

CAPEX Estimate — 800 kg/hr Plant

Cost Head	Scope	Estimated Cost (INR Lakhs)	Notes
Continuous Mesh-Belt Furnace (Primary Equipment)	KERONE supply, factory tested	145-165	Carburizing + diffusion + hardening zones
Oil Quench Tank & Agitation System	Quench oil, agitators, cooling	25-30	Fast/martempering quenchant, closed-loop cooling
Tempering Furnace (Walking Beam)	Continuous temper line, 180 degrees C	20-25	Post-quench stress relief
Endothermic Gas Generator	Atmosphere generation, carbon-potential control	30-35	RX gas generator + O2 probe control
Washing & Degreasing Line	Pre- and post-treatment component cleaning	12-15	Aqueous washer, rust-preventive dip
Material Handling	Robotic loader, mesh-belt conveyor, baskets	18-22	SS baskets, automated tray handling
Electrical & Instrumentation	MCC panel, SCADA, PLC, transformer	25-30	Siemens/Allen Bradley control
Civil & Structural	Foundation, shed, utilities connections	15-18	Client scope; KERONE to provide layout drawing
Commissioning, Training & Startup	KERONE commissioning team, 15-day site support	8-10	Includes operator training and PPAP trial run
TOTAL CAPEX		INR 298-350 Lakhs	Approx. range (~INR 3.2-3.5 Cr); formal quotation on enquiry

Table 7: CAPEX estimate — 800 kg/hr continuous gear case-hardening plant | All figures indicative; formal quotation on receipt of detailed enquiry

Incremental Financial Benefit — Annual Basis (7,200 hr/yr operation)

Item	Basis	INR/Year (Lakhs)	Remarks
INCREMENTAL BENEFIT			
Grade Reclassification Uplift	Volume previously downgraded to Grade B / rework, now qualifying as Grade A	171	At incremental value net of processing cost
Rework Cost Avoidance	Reduced rework labour, energy, reprocessing	34	Batch rework largely eliminated for in-spec output
Warranty / Field-Return Cost Avoidance	Reduced gear-whine/NVH-related warranty claims	12	Conservative estimate based on OEM claims history
Gross Incremental Benefit		217	
INCREMENTAL OPERATING COSTS			

Item	Basis	INR/Year (Lakhs)	Remarks
Additional Electricity	Continuous furnace vs batch, net of efficiency gain	22	930 degree C zones, 3-shift operation
Endothermic Gas / Atmosphere	RX gas generator fuel + consumables	9	Methanol/LPG-based generation
Additional Labour (incremental shifts)	2 additional operators/shift x 3 shifts	14	Continuous line staffing
Maintenance & Spares	3% of CAPEX per annum	10	Annual maintenance provision
Total Incremental OPEX		55	
NET INCREMENTAL BENEFIT (Before Tax)		~162	Payback ~2.0 years on INR ~325 Lakhs CAPEX

Table 8: Incremental financial benefit model — 800 kg/hr plant at 7,200 hr/yr | Indicative figures; actual benefit depends on baseline yield, OEM pricing and warranty claims data

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; finalisation	6-8 Weeks	Complete engineering package, vendor drawings, DFM approval
Phase 2 Procurement	Long-lead items: muffle alloy, RX generator, quench system, drives	10-12 Weeks	Material test certificates, QC inspection reports, FAT invitation
Phase 3 Fabrication	Furnace fabrication, quench tank assembly, temper line, SCADA panel	10-12 Weeks	Factory Acceptance Test (FAT) at KERONE Ambernath; client witness invited
Phase 4 Installation	Equipment erection at client site; piping, electrical, instrument hook-up	4-6 Weeks	KERONE site supervision; civil and electrical by client as per KERONE drawings
Phase 5 Commissioning	Cold trials, hot trials with gear blanks, PPAP trial run, operator training	3-4 Weeks	Commissioning report, performance test certificate, O&M manual, training records
TOTAL PROJECT TIMELINE	Order to commercial production	~36-46 Weeks	From purchase order to first commercial output

KERONE Scope of Supply & Services

Category	KERONE Scope (INCLUDED)	Client Scope (EXCLUDED from KERONE supply)
Process Design	Process design basis, mass balance, heat & material balance, P&ID	Feedstock quality guarantee; plant operating schedule
Primary Equipment	Mesh-belt carburizing furnace (complete), quench system, temper line, material handling	Feed preparation (machining/deburring) if not included in enquiry scope
Atmosphere & Emission Control	RX gas generator, O2 probe control, exhaust treatment (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 (15 days)	Consumables (RX gas, quench oil) 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 800 kg/hr Continuous Gear Case-Hardening System represents a proven, commercially validated solution to one of the most persistent quality-consistency challenges in Indian automotive gear manufacturing. 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 AutoDrive Transmissions Ltd.'s actual production gear blanks.

- **Proven Technology** — Every process parameter in the 800 kg/hr plant — 930 degrees C carburizing, 3-hour cycle, endothermic atmosphere — is directly derived from KRDC lab trial 62/KRDC/LAB/09 on the client's actual feedstock. No extrapolation; no assumptions.
- **Quantified Outcome** — Case-depth reduction in variation from $\pm 0.35\text{mm}$ to $\pm 0.05\text{mm}$, and first-pass yield improvement from 78% to 98.5%, are measurable, certified results — not marketing claims.
- **Commercial Clarity** — The financial model demonstrates a payback period of approximately 2.0 years, converting a chronic quality-consistency problem into a INR 1.6+ Cr/year net benefit stream.
- **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. An 800 kg/hr system validated at AutoDrive Transmissions creates the reference installation for higher-capacity lines for other automotive component manufacturers across India and internationally.
- **Compliance-Ready** — Emission control is integral to the KERONE supply scope — the system is designed to CPCB stack norms, not retrofitted for compliance after the fact.

ENQUIRE ABOUT YOUR GEAR HEAT-TREATMENT PROJECT

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To initiate a project discussion, please share: component drawing + material specification + daily/annual tonnage + target case-depth/hardness spec + site location

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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 62/KRDC/LAB/09) conducted on AutoDrive Transmissions Ltd. feedstock. Actual industrial performance may vary. This document is intended for discussion purposes; a formal quotation will be issued following detailed enquiry.