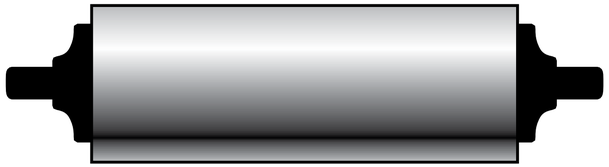
MAXIMIZING YOUR NON-WOVEN QUALITY AND PRODUCTIVITY

PRECISION ROLL GRINDING BRINGS SIGNIFICANT RESULTS

by

PRECISION



ROLL GRINDERS

Over 50 years of value-added service

WEBINAR SERIES

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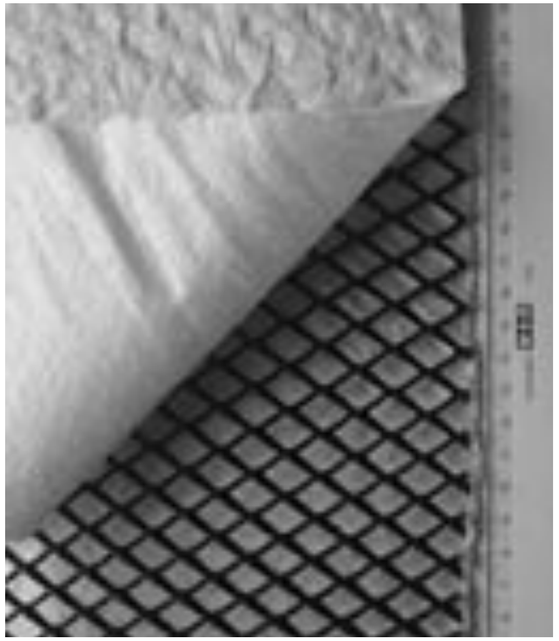
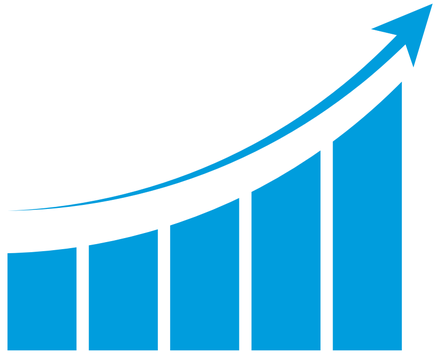
MAXIMIZING QUALITY NON-WOVEN PRODUCTION



- Do you have to slow down your line to achieve tests?
- Are you removing rolls early due to performance?
- Is consistent bond an issue?
- Do you need to change material flow to maintain strength?
- Do you see inconsistent heat transfer?



MAXIMIZING QUALITY NON-WOVEN PRODUCTION

- Calender roll care and maintenance – optimizing thermal point bonding and thermal bonding roll performance
- Precision Roll Grinders services

TYPICAL ROLL TYPES IN NON-WOVEN CALENDERING

- Engraved rolls
- Smooth steel calender rolls
- Nylon calender rolls
- Oil-heated anvil rolls
- Hot S rolls
- Tokuden electrically heated rolls

CRITICAL ROLL SERVICES FOR NON-WOVENS

GRINDING

- Pin condition and geometry
- Roll crowns
- Roll profile, TIR and roundness

INTERNAL CLEANING OF OIL-HEATED ROLLS

- Maintain heat transfer and rebuilding oil-heated rolls as required

REBUILDING HOT S ROLLS AND EAGLEBURGMANN SEALS

REBUILDING AND ELECTRICAL-TESTING TOKUDEN ROLLS

PIN REPAIR ON ENGRAVED ROLLS

BEARING AND HOUSING DISASSEMBLY, INSPECTION AND ASSEMBLY

BALANCING

CRITICAL ROLL SERVICES FOR NON-WOVENS

JOURNAL REPAIRS

OTHER REPAIRS

ENGRAVED ROLLS

- Pin condition and roll geometry is critical for bond and roll life

SMOOTH CALENDER ROLLS

ANVIL ROLLS

- Roll geometry and heat transfer are critical for bond and roll life

HOT S ROLLS

- Roll rebuilds and roll geometry are critical for bond and roll life

TOKUDEN ROLLS – ELECTRICALLY HEATED ROLLS

- Electrical testing
- Roll rebuilds and repairs

NYLON ROLL GRINDING

CRITICAL ROLL SERVICES FOR NON-WOVENS

3-D AND HOT GRINDING ROLL SERVICES

- Necessary to maintain roll shape for optimal performance

INTERNAL ROLL SERVICES

- Hot oil, hot water, hydraulics in proper service

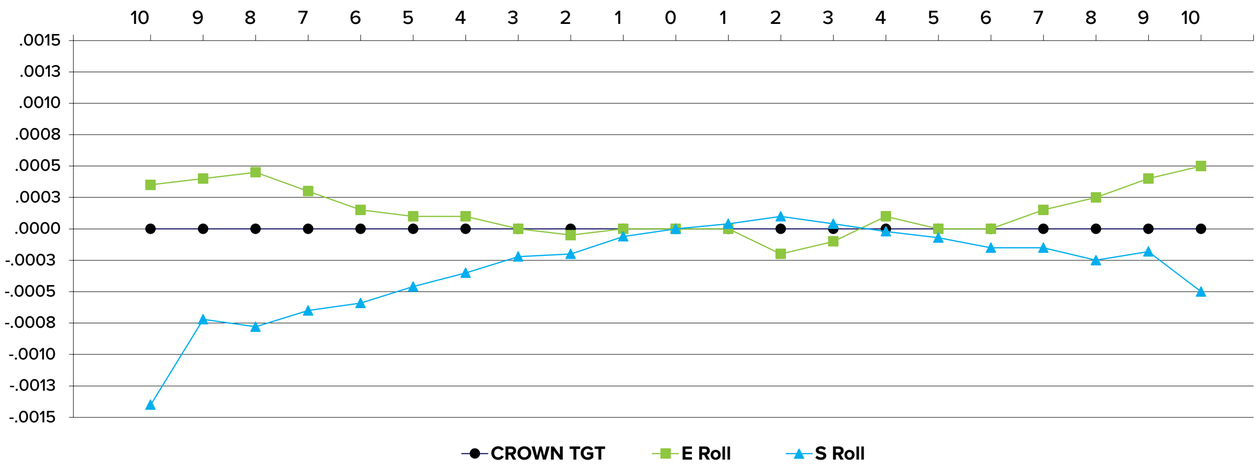
ALL OTHER ROLL SERVICES

- Extended life of roll covers, journal and bearing repair, new rolls

ROLL PERFORMANCE — GRINDING TOLERANCES MATTERS

PROFILE OF TWO ROLLS CREATING THE NIP

- Light contact requires pressure to achieve bonding
- Heavy impact wears/damages pins & may lead to burn through



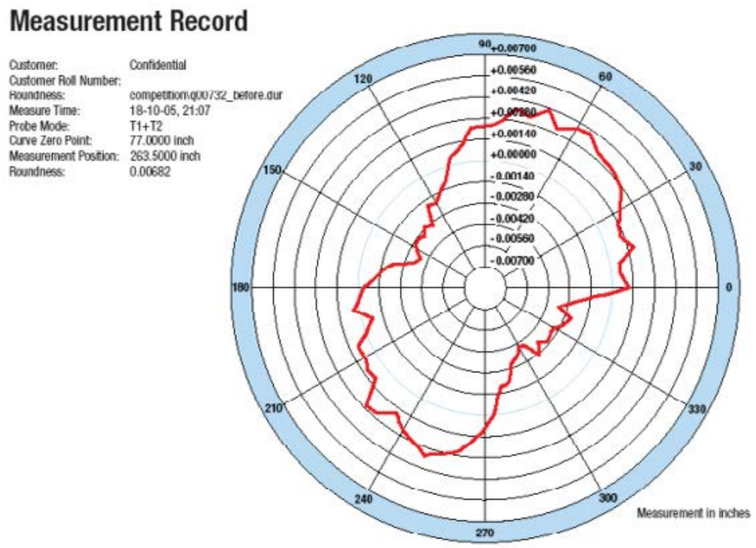
ROLL GRINDING — TONS OF PERFORMANCE DEPENDS ON TENS OF THOUSANDTHS OF AN INCH!

- All rolls – shape, TIR and roundness are critical
- Uniform nip pressure is absolutely necessary for high performance

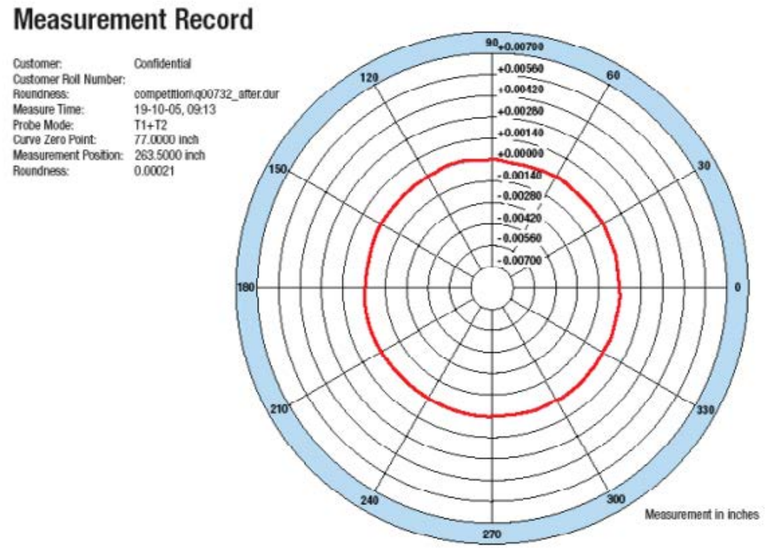
ROLL PERFORMANCE — ROUNDNESS MATTERS

- **Critical Rolls should be 0.0001” – 0.0002”**
- **Most grinding facilities can only achieve 0.0004” to 0.0020”**

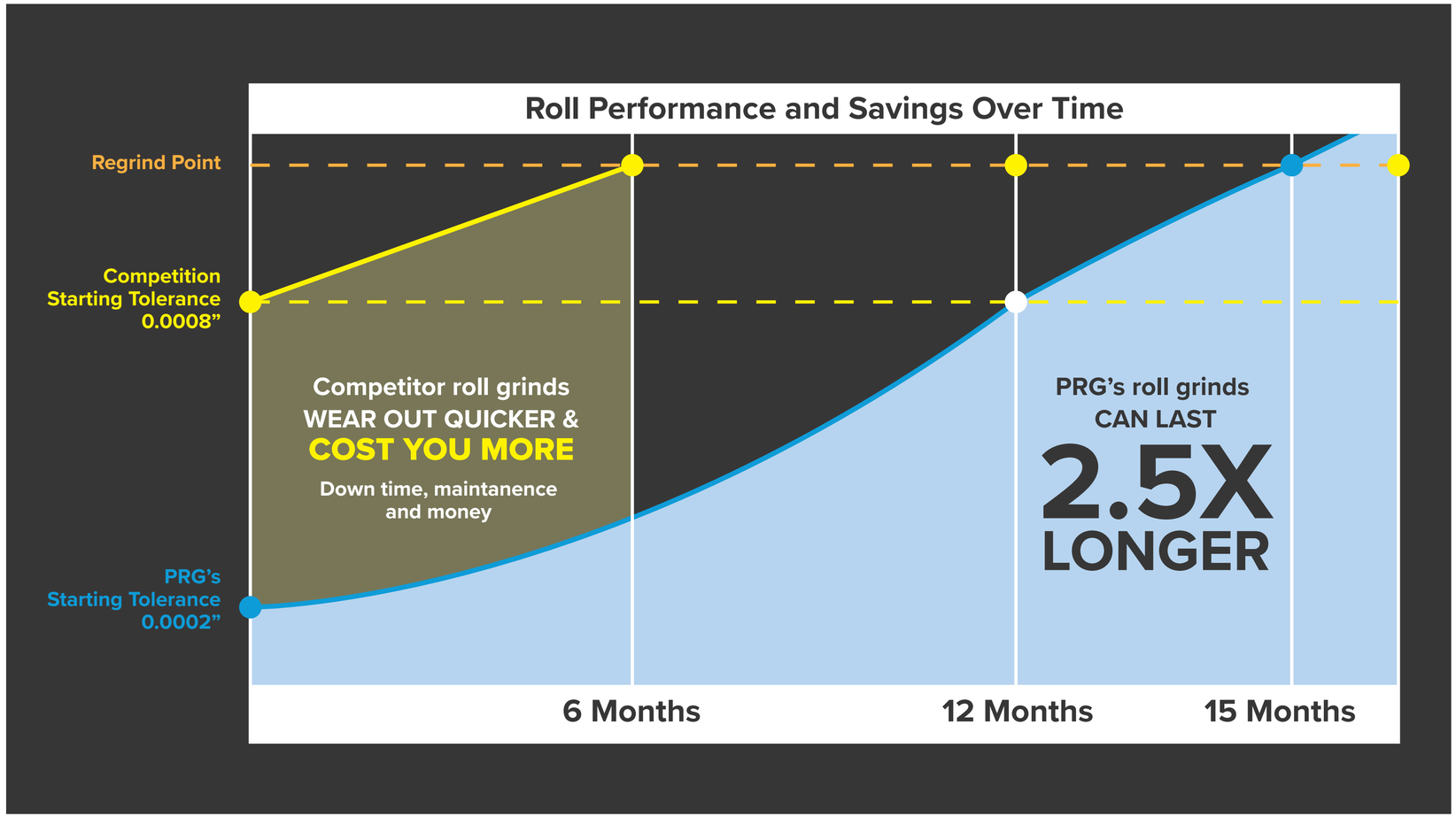
BEFORE PRG



AFTER PRG



ROLL PERFORMANCE — ROUNDNESS MATTERS



ROLLS THAT START CLOSER TO PERFECTLY ROUND, RUN LONGER!

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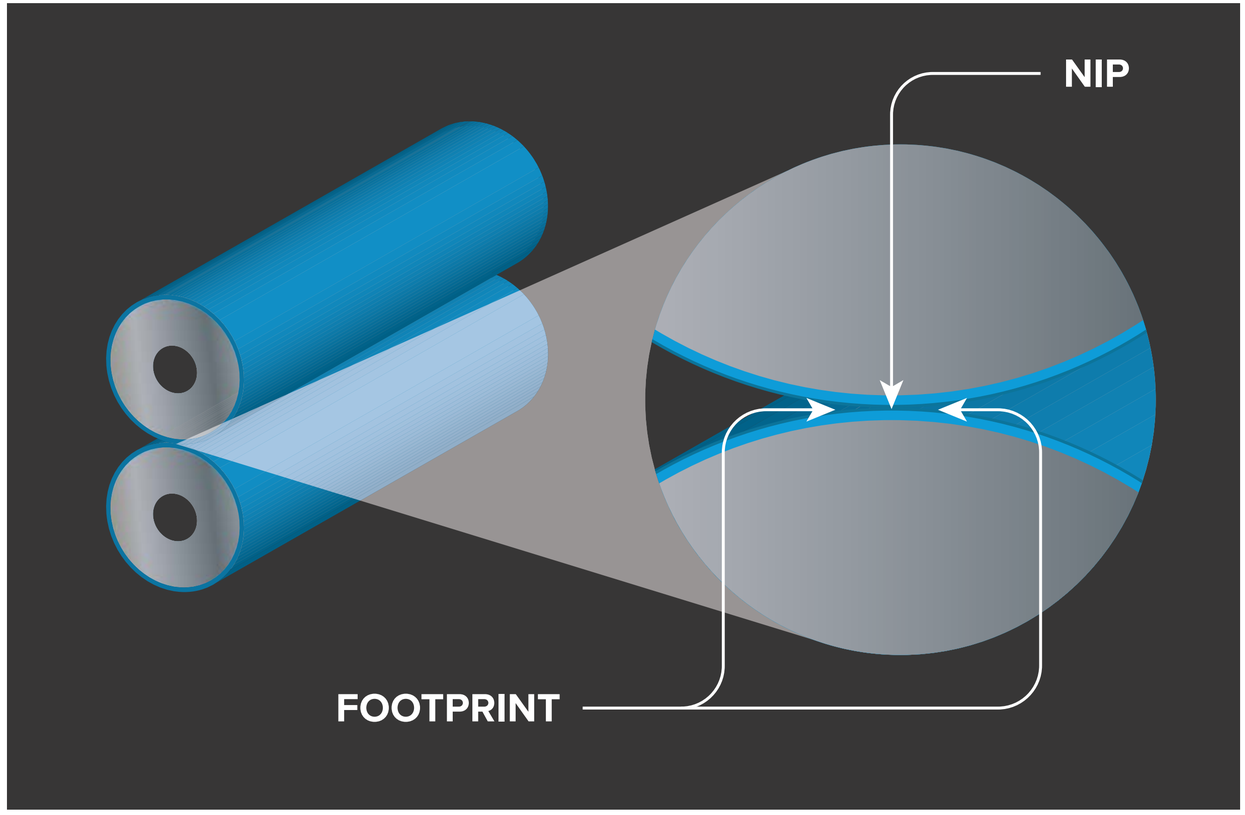
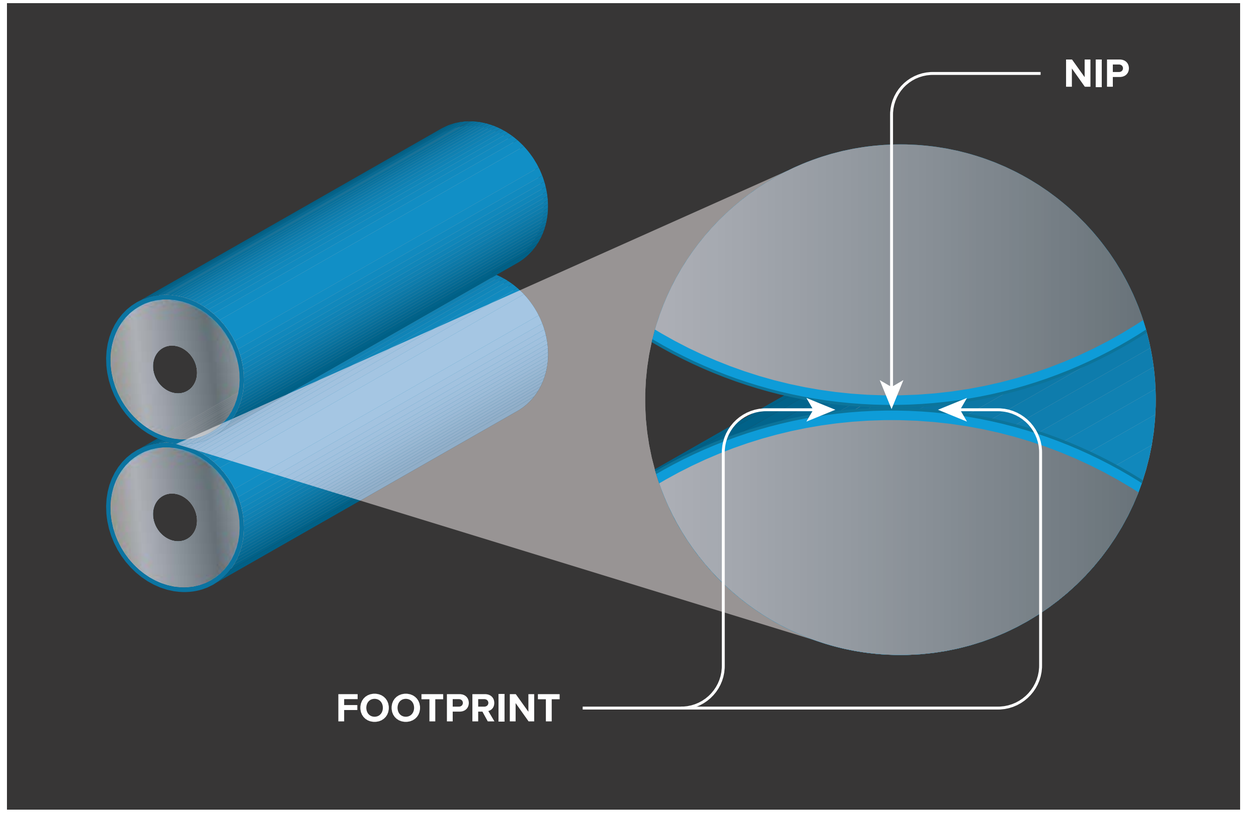
ROLL PERFORMANCE — UNIFORM NIP PRESSURE MATTERS



ROLL PERFORMANCE — UNIFORM NIP PRESSURE MATTERS



THERMAL POINT BONDING/UNIFORM NIP PRESSURE IMPACTS:

- MD and CD bonding
- Pin and roll wear
- Calender speed and vibration
- Burn-through
- Surface abrasions
- Tensile strength
- Damaged fiber
- Debonding
- Density
- Softness

ROLL PERFORMANCE — UNIFORM NIP PRESSURE MATTERS

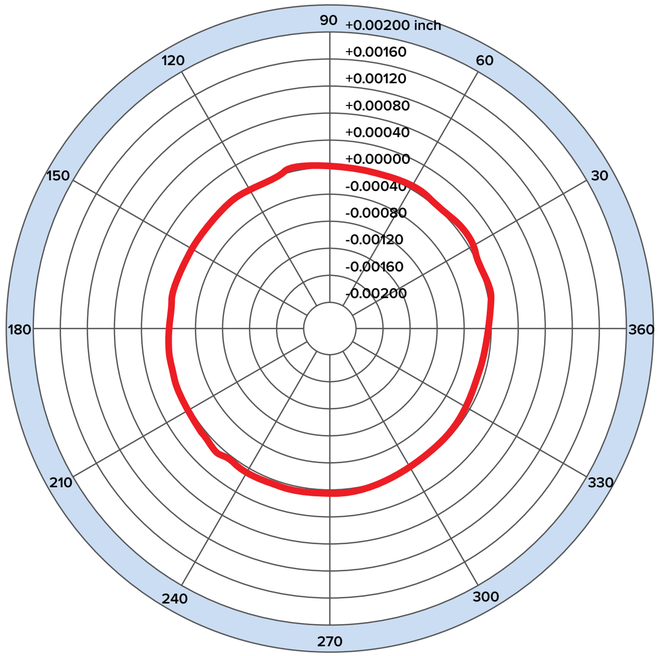
GRINDING ENGRAVED ROLLS TO IMPROVE PERFORMANCE AND EXTEND ROLL LIFE ...

- **Newly engraved rolls — better than OEM tolerances; translate to improved performance**
- **Subsequent roll grinds**
  - **Minimal diameter reduction to extend roll life and number of grinds**
  - **Reestablish pin surface**
  - **Reestablish pin geometry**

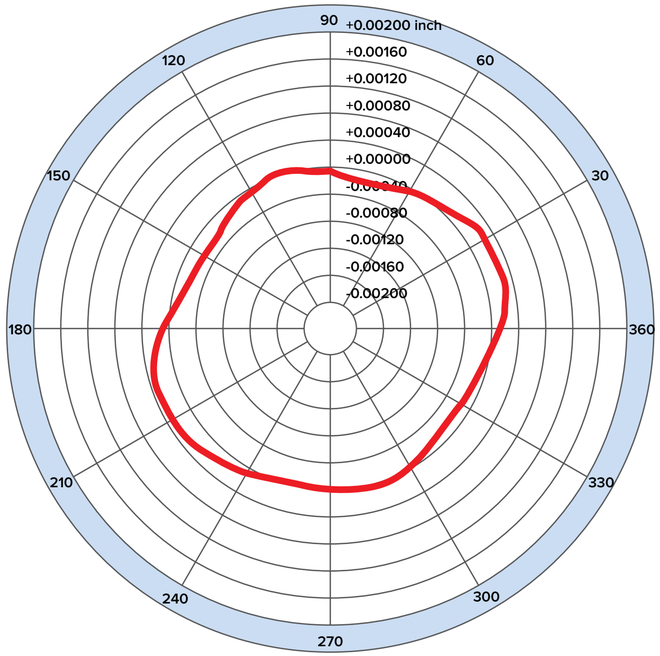
ROLL PERFORMANCE – HEAT MATTERS

- Rolls need to run at designed operating temperatures
- Bonding requires uniform heat transfer
- Roll tolerances require uniform heat transfer
- Are you measuring roll surface temperature?

AMBIENT



350° F



ROLL PERFORMANCE — HEAT MATTERS

PERIODIC CLEANING OF OIL-HEATED ROLLS

- There are different heated roll designs used for engraved, smooth and anvil rolls
  - P-hole (peripheral holes)
  - Can design
  - Spiral can
- All rolls must be cleaned periodically to ensure uniform heat transfer

ROLL PERFORMANCE — HEAT MATTERS

PERIODIC CLEANING OF OIL-HEATED ROLLS

- Removing a can from the shell
- The can design has spiral baffles and is contaminated with sludge

ROLL PERFORMANCE — HEAT MATTERS

PERIODIC CLEANING OF OIL-HEATED ROLLS

BEFORE CLEANING

AFTER CLEANING

ROLL PERFORMANCE — PROPER HOT S ROLL MAINTENANCE MATTERS

- Hot S roll inspection and rebuilds
  - Two basic roll designs
    - Internal bearing design — temperature approximately 170° C
    - External Bearing design — temperature approximately 250°C
  - Open and inspect rolls
  - Troubleshoot roll failure
  - Rebuild roll
  - Test roll
  - Grind

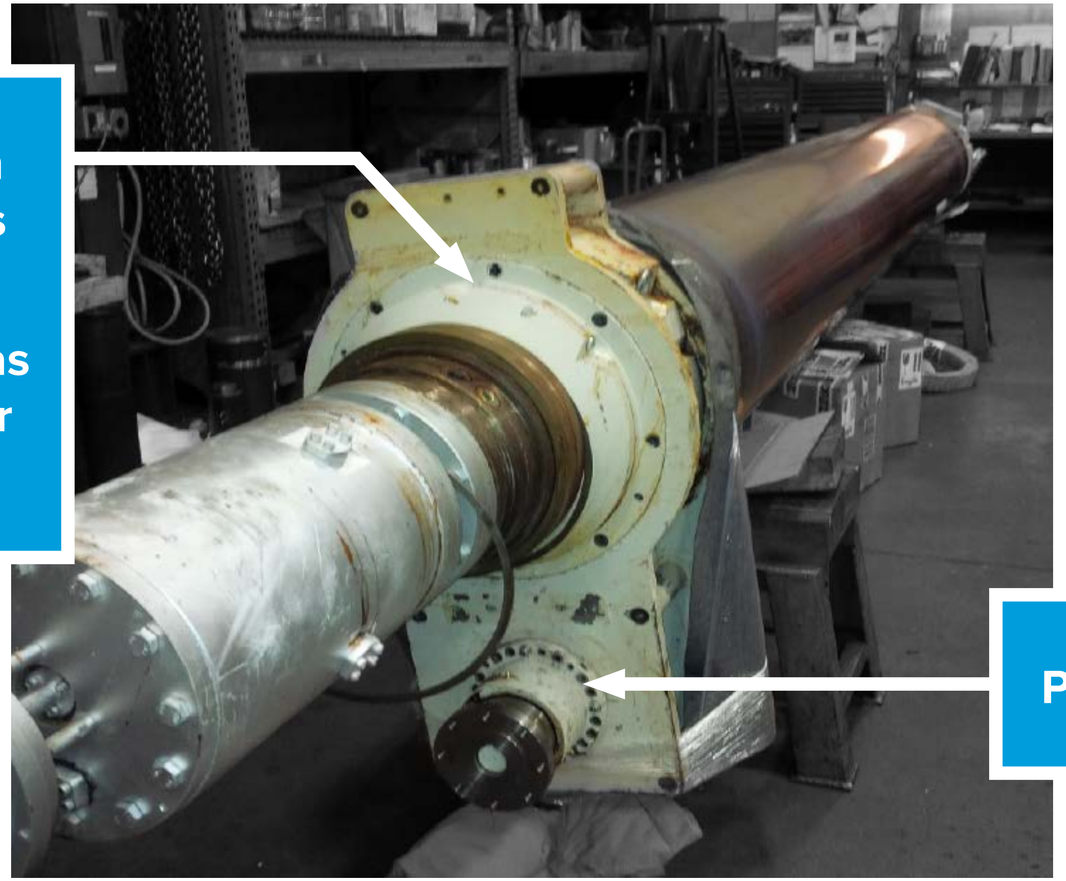
EagleBurgmann (EB) seals

- Two basic designs: bellows and spring pusher
- Working with EB to inspect and rebuild seals
- Saves time
- Saves money

ROLL PERFORMANCE – HOT S 250

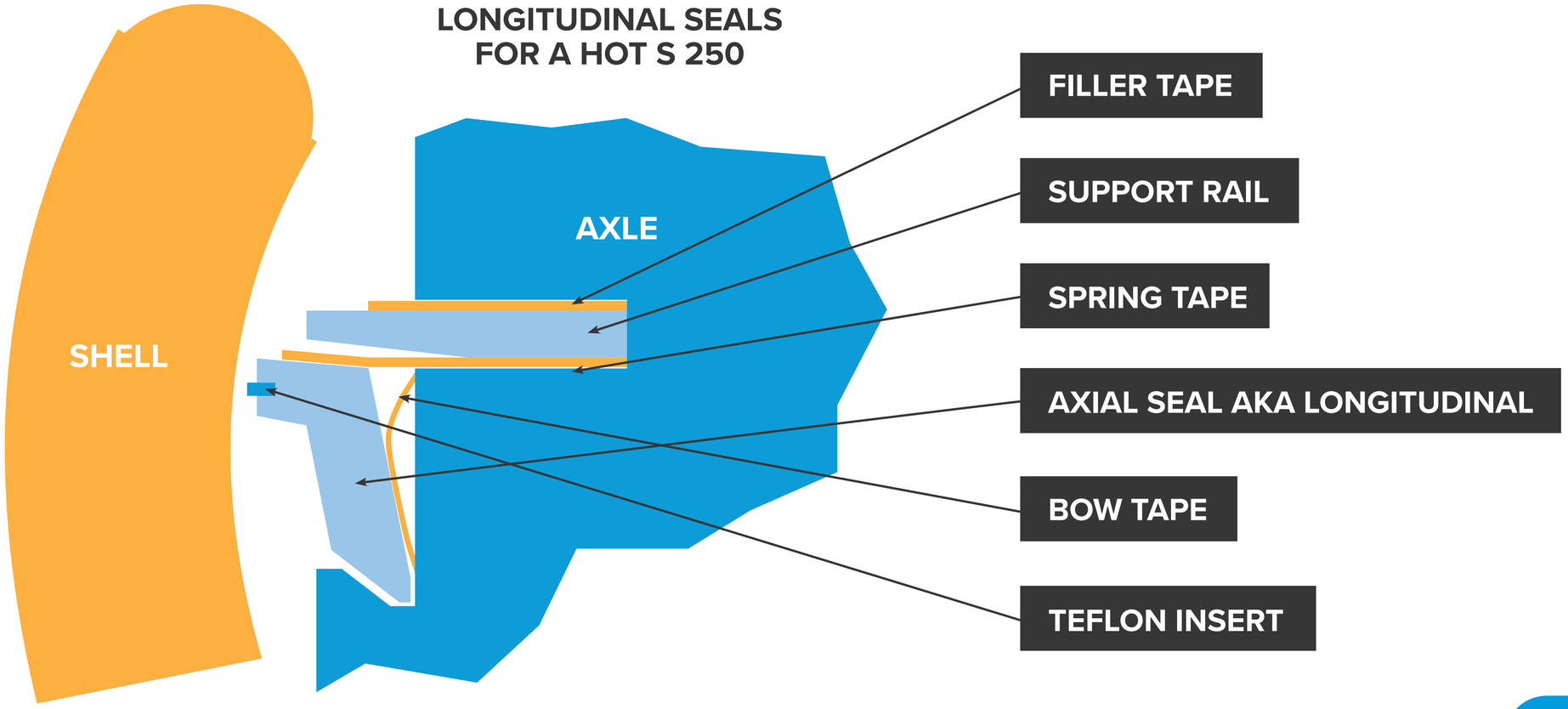
External bearing design for higher temperatures

This is opposed to the Hot S170 design that has internal bearings similar to a normal swim roll

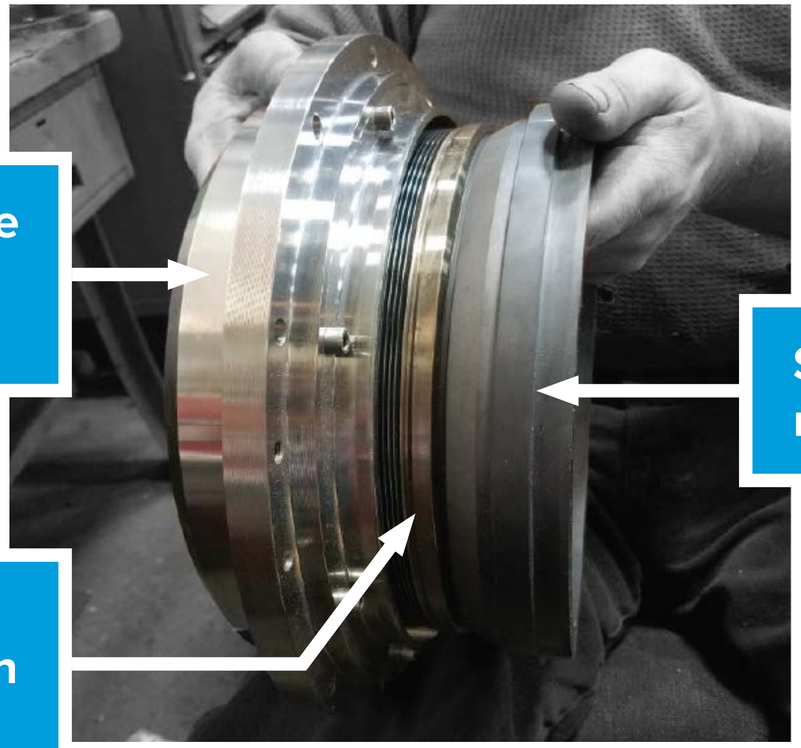


Pedestal drive unit

ROLL PERFORMANCE — REBUILDING THE SEALING SYSTEM

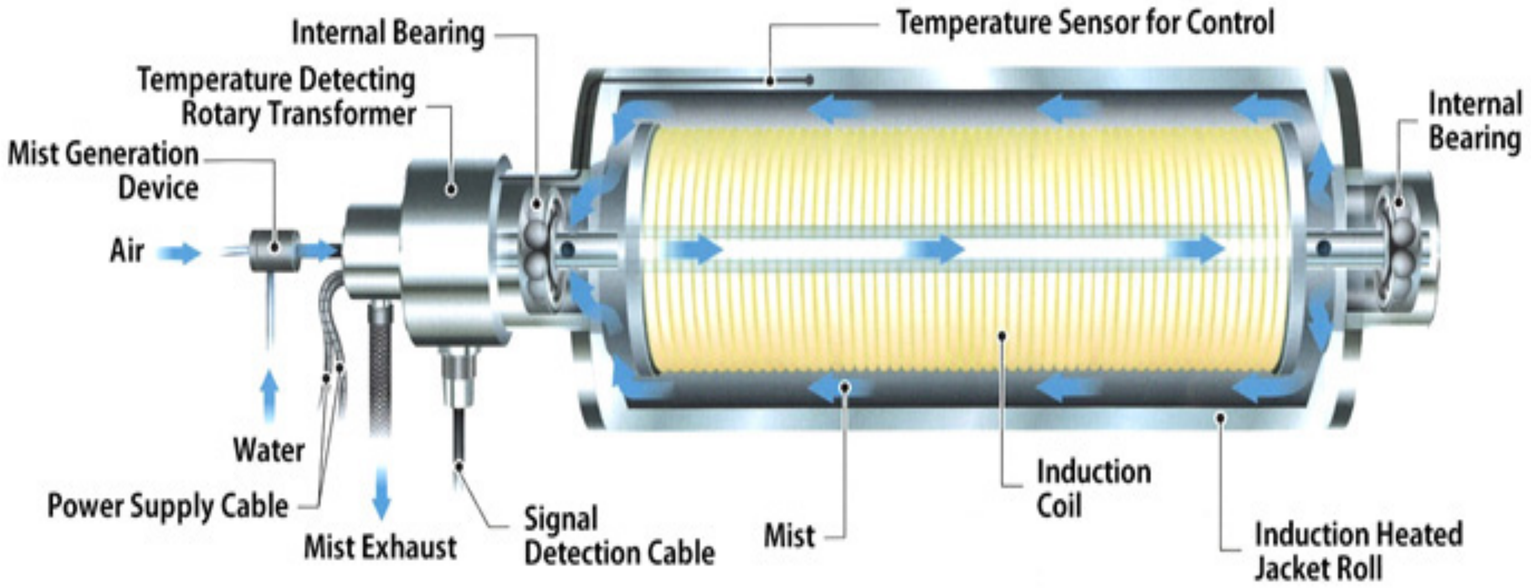


ROLL PERFORMANCE — REBUILDING EAGLEBURGMANN SEALS



ROLL PERFORMANCE — PROPER TOKUDEN MAINTENANCE

TOKUDEN ROLLS ARE ELECTRICALLY HEATED ROLLS



ROLL PERFORMANCE — PROPER TOKUDEN MAINTENANCE

TOKUDEN ROLL SERVICES

- Provider of all Tokuden roll services
- State-of-the-art testing, equipment and processes
- Experienced in proper disassembly and assembly

ROLL PERFORMANCE — PROPER TOKUDEN MAINTENANCE MATTERS

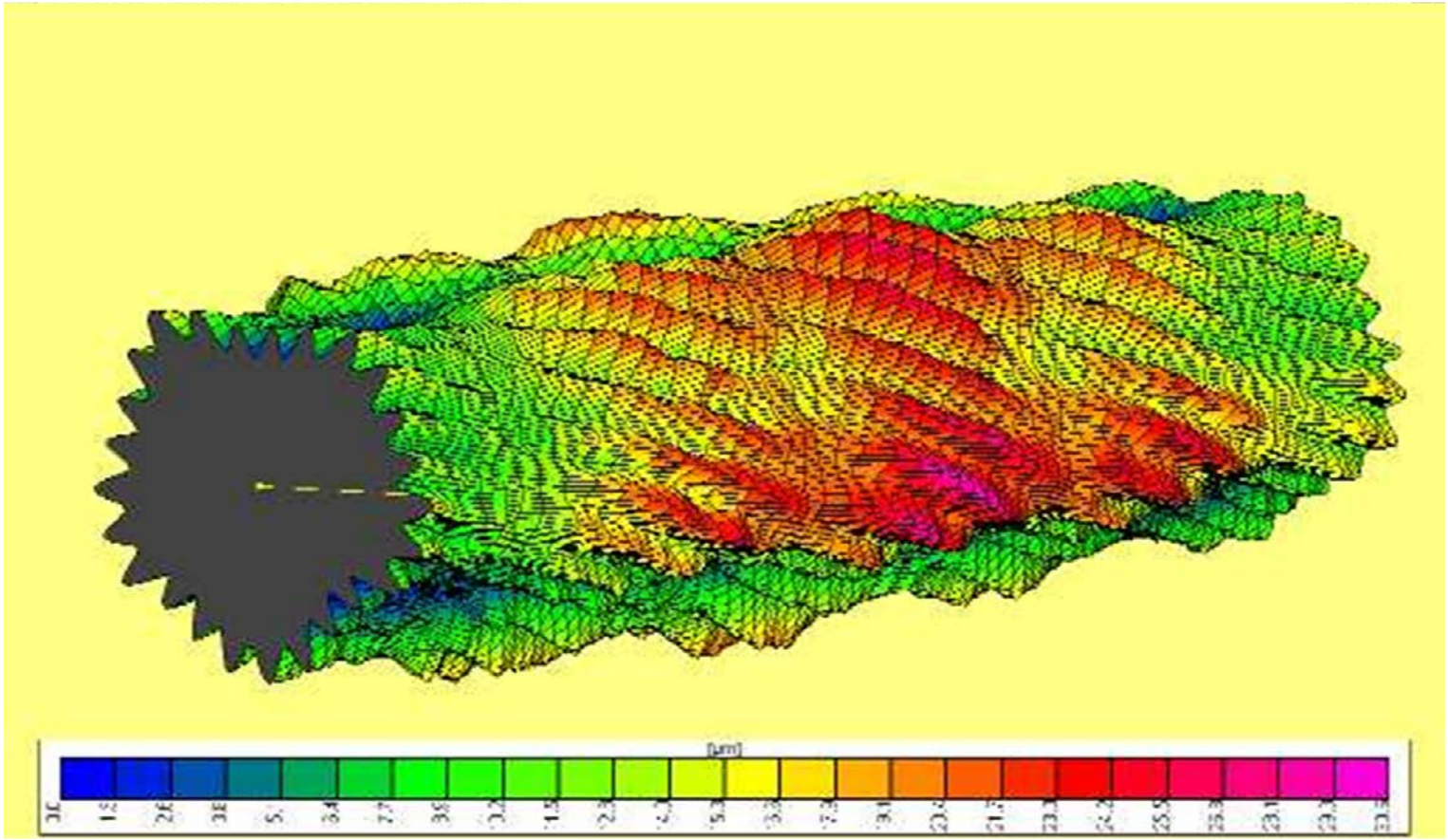
BASIC REPAIR OPERATIONS

- Bearings and housings: assembly and disassembly
- Electrical testing
- Internal bearing replacement
- Remove and install rotary transformer
- Rebuild rotary transformer
- Replace K-thermocouples
- Remove and install coil

ROLL PERFORMANCE — OTHER ROLL SERVICES

- Bearing and housing: disassembly, inspection and assembly
- Pin repair
- Balancing
- Journal and bearing seat repairs
- Hot grinding and 3-D grinding

ROLL PERFORMANCE — 3-D AND HOT GRINDING



3-D AND HOT GRINDING

- Surface mapping of roll geometry
- Hot grinding at operating temperatures

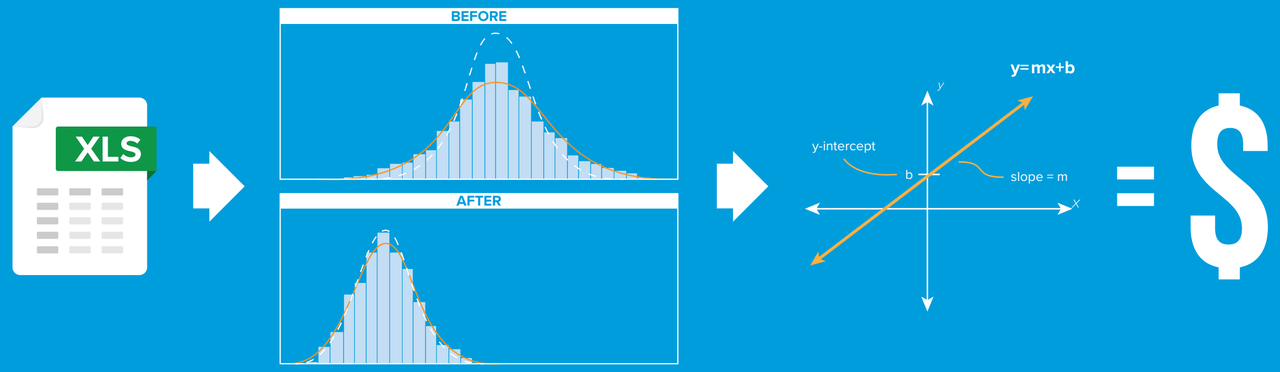
ROLL PERFORMANCE — ONE-STOP SHOPPING

- All internal-roll work (heat passages, hydraulics, Tokuden)
- Mechanical and machining (journal repair/replace, bearings)
- Expertise in cover technology (rubber, chrome, ceramic, T-C)

PRG PROMISE TO PROVIDE VALUE

WE ARE COMMITTED TO HELPING YOU REDUCE PROCESS VARIATION AND INCREASE YOUR PROFITS!

- Any troubleshooting on rotational equipment (video, pics)
- Data analysis on current process
- Joint Design of Experiment to reduce variation



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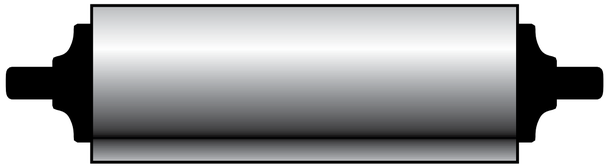
THANK YOU FOR YOUR TIME.

QUESTIONS?

PRECISION



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