

# RE-SHELLING



## HALF THE COST. HALF THE LEADTIME!

Horsburgh & Scott has perfected the process for re-shelling your old integral pinions. Aimed primarily at mining and steel mill applications, re-shelling can provide you with a pinion that meets or exceeds OEM specifications.

New pinions can also be designed and manufactured using this process, providing you with savings on material and heat treating versus an integral shaft. It also allows us to vary the material of the shaft and the shell for different hardness combinations that will best meet your needs. Whether carburized or through hardened, the shell on shaft combination will be an upgrade to your present pinions.

As an added benefit, you can re-shell after the 10 to 15 year working life of a pinion. This will provide cost savings over the long haul as you won't have to buy a new shaft, just the new shell.



**HORSBURGH & SCOTT**  
*DELIVERING THE DIFFERENCE*

### HOW THE RE-SHELLING PROCESS WORKS:

- You provide us the drawing, HP, RPM and service life of your integral pinion and we'll determine if re-shelling is possible.
- Information on the number of teeth in the mating gear and center distance of the set will also be required.
- We will also perform repairs to keyways, bearing and seal journals as necessary. This will be quoted upon inspection after we take delivery of your pinion. (Damaged seal journals can be built up even with .250" wear from seal rubbing in abrasive environments.)
- Magnetic particle testing and dimensional inspection are performed on the shaft to ensure that it is suitable for re-shelling.
- The old teeth are turned off and the shell journal is finish ground.
- The new shell is manufactured with finished grind stock on the teeth.
- The shell is heated to the appropriate temperature to shrink onto the renovated shaft.
- Finally, the teeth are finish ground concentric to the finish bearing journals.



**FOR ADDITIONAL  
INFORMATION OR  
A QUOTE, PLEASE  
CONTACT US AT  
216.431.3900  
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# ADVANCED GEARING CAPABILITIES



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## IN-HOUSE HARDENING FOR IMPROVED DURABILITY AND RELIABILITY

- **THROUGH HARDENING** - Medium to high carbon steel parts (1045, 1137, 1141 1144, 4130, 4140, 4330v, 4340, 8640, etc.) have enough carbon content to harden without addition of carbon to the surface (case hardening). Hardness is usually specified on Rockwell "C" scale with a minimum spread of 5 points.
- **INDUCTION HARDENING** - A form of heat treatment in which a metal part is heated by induction heating and then quenched. The quenched metal undergoes a martensitic transformation.
- **CARBURIZING** - A heat treatment process in which iron or steel absorbs carbon liberated when the metal is heated in the presence of a carbon bearing material, such as charcoal or carbon monoxide, with the intent of making the metal harder. Capability up to 90 in. OD, and 16 ft. L.

## REBUILD, REPAIR, FIELD SERVICE & PREVENTATIVE MAINTENANCE

Rebuilt & Repaired thousands of **gearboxes**, and have a library of drawings across **120 BRANDS**.

- Detailed inspections and evaluations
- Dynamic modeling and optimization recommendations
- Emergency breakdown service and repairs
- Spin and load testing
- Equipment evaluation/analysis
- Gear alignment
- Installation and startup supervision
- Lubrication system evaluation
- Nondestructive testing (NDT)
- On-site machining
- Preservation and long-term storage
- FARO Arm
- Rebuilds of all manufacturers
- Re-ratios and engineered upgrades to gears and housings
- Reverse engineering
- Spare OEM parts

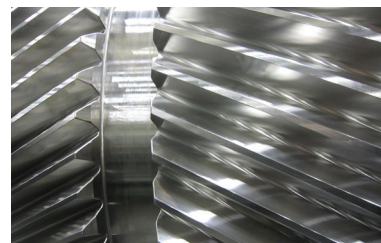
## GEAR TEETH PROFILING EXPERTISE

- **CROWNING** - Helps center the tooth contact in the middle of the facewidth, and helps prevent catastrophic tooth breakage.
- **END RELIEF** - Helps prevent end loading in cases of heavy shock or momentary overloading, and helps to prevent heavy loading at the ends of the teeth which could lead to tooth breakage.
- **TIP RELIEF** - Helps promote smooth engagement and disengagement of the meshing gears, and helps prevent tooth breakage.
- **LEAD AND PROFILE MODIFICATIONS** - Helps to promote contact across the entire tooth facewidth when the gear is under load, and provides major improvements in the life of gearing operating under heavy loads.
- **SHOT PEENING**

## QUALITY ASSURANCE

Quality-centric individuals and teams have positioned Horsburgh & Scott as one of the **HIGHEST-QUALITY DESIGNERS AND MANUFACTURERS OF INDUSTRIAL GEARING**.

- Engineering analysis and upgrades
- Reverse engineering
- Sophisticated tools and practices to follow rigorous standards, including AGMA, ISO 9001:2008, AASHTO and API
- Gear cutting (AGMA class 10)
- Gear grinding (AGMA class 14)
- Zeiss Coordinate Measuring Machine (4 x 4 x 2m) within 2 micron accuracy
- On-board lead & involute checking
- Specialized metallurgical testing for heat treat
- Nondestructive testing (NDT)



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