



**Finishing Solutions for the Manufacture and Repair
of Metal Seated Ball Valves and Mechanical Seals**

CASE STUDY

REPAIR OF SEVERE SERVICE BALL VALVES COATED WITH TUNGSTEN CARBIDE

GOAL: Increase throughput and decrease leak test failures. Finish below 4 Ra required to pass leak test.



PREVIOUS PROCESS:

- Poorly graded diamond compound.
- Frequent scratches during progressions resulting in repeating steps, scrap of some balls/seats due to depth of scratch or lack of coating thickness.
- Compounds dried out quickly, excess application, repeat each step numerous times.
- Excessive force required to get cutting action.
- Up to 15% failure rate at test stand.

NEW PROCESS RESULTS:

- Using Engis Hyprez Diamond Gel errant scratches were eliminated during progressions.
- Longer useful life per charge (no drying out) with faster cut rates, and less pressure.
- Doubled run time between charges reducing charges by 20% and 15%.
- Improved operator ergonomics.
- 25% reduction in lapping time.
- Test stand failures below 1%.
- Increased plant capacity for repairs due to less rework.

DIAMOND COMPOUNDS TYPES

DIAMOND GELS—thinner than pastes, but still thick enough to be applied with a syringe. The thinner consistency results in slower drying, reducing scratching while maintaining good adhesion to lapping tools and parts.

DIAMOND PASTES—thick formulations dispensed from a syringe or jar manually spread across the part. Pastes are the most common form of diamond compound for hand polishing and typically used with a companion lubricant.

REDUCE OVERALL LAPPING TIME UP TO 40%

With precision cutting action, less time and pressure is needed per lapping stage reducing scratching and operator fatigue.

- Elimination of Errant Scratches
- Reduced Compound Usage & Cost
- Improved Cut Rates
- Achieve Desired Surface Finishes Faster



Significant benefits of Engis diamond gels and compounds include superior surface finishes in less time with no scratches. Our slow drying formulations allow for fewer charging cycles, with increased cut rates compared to other compounds.



Hyprez Lapping & Polishing Complete Systems



ENGIS HYPREZ® ADVANTAGES:

Since 1938 the Engis Hyprez® brand name has been synonymous with high precision, high quality lapping systems.

Our goal then, as it is today, is to provide solutions to the most challenging surface finishing applications by offering customers unsurpassed expertise in diamond, including a full R&D department, unique diamond micronizing capabilities, and three process development laboratories.

Engis diamond engineers can assist you in the proper selection of our specially formulated compounds and gels to match your application, operating parameters, and materials – Stainless Steel, Titanium, Inconel, Carbon Steel with Tungsten or Chromium Carbide Coatings.



CASE STUDY



PART:
Mechanical Seal

MATERIAL:
Alloy Steel 52100 heat treated HRc 58 – 62

REQUIREMENTS:
Customer was currently processing these parts on a cast iron plate using aluminum oxide. They were having issues with inconsistent flatness values and very slow material removal rates.

PROCESS:
Engis 28FL230VP single-side lapping system with a HY Copper composite plate and 6(S1313-T4)STD-MA diamond slurry.

RESULTS:
Flatness of 2-3 lightbands was achieved in a single-step process, far exceeding the customer's expectation. The stock removal rate of .00005" per minute provided a 5-15 minute cycle time and surface finish values of $<1\mu$ " were reached.

TRUST ENGIS TO UNDERSTAND YOUR PROCESS CHALLENGES

Valve Manufacturers

Valve manufacturers throughout the world have benefited from improved lapping processes and reduced cycle times once they converted to lapping with diamond; in particular, success has been seen on flow port hydraulic pressure regulators.

Our range of precision diamond compounds has proven very effective in lapping the ball into the seat of ball valves, and our slurries and diamond powders have found great utility in the production of the balls themselves. Moving to the Engis Hyprez system does not always necessitate the purchase of new capital equipment as we have the technical expertise to retrofit our composite plate and diamond slurry technology to existing Lapmaster, Speedfam or Spitfire machines.

Mechanical Seals

Hyprez lapping technology has been serving the mechanical seal market for decades. Engis provides many large OEMs with composite plates, conditioning rings and precision slurries. We are also the leader in the repair market as well. A wide variety of materials can be processed with diamond; tungsten carbide, Ni-resist and ceramic seals show particular success.

Packing Case Manufacturing and Repair for Reciprocating Compressors

A number of large repair and rebuild facilities have upgraded their current lapping processes to diamond utilizing the Engis system. In some cases these users were able to reduce lapping time on large components from hours to just 30 minutes. Not only were the cycle times reduced, but they also saw substantial improvement in quality and finish of the component.

HAND LAPPING KITS FOR ON-SITE REPAIRS

Engis offers a number of hand lapping kits for in-the-field repair of mechanical seals and worn valve components. We have a kit designed for every application and budget.

Hand lapping of the seal can be the best solution, not only to keep your seal in top condition, but also as a preventative maintenance step to extend the life of the component. The Engis Hand Lapping Kit has everything needed to quickly and efficiently repair seals right at the job site, thus avoiding expensive downtime and repair costs. Whether the seal is silicon carbide, Ni-resist, tungsten carbide or ceramic, this kit contains a complete set of high quality hand lap blocks designed with an iron composite side for rough lap and a copper composite side for fine lap, as well as precision diamond lapping compound.



Engis LAP.Kit.002 is shown in a light weight case designed for easy transport to the job site.



World Leader in Superabrasive Finishing Systems

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