Wear-Resistant Overlays for Pumps and Compressors

Problem
Reciprocating pumps and compressors are widely used in pipeline transportation, refining, chemical processing, coal gasification, polyethylene manufacturing and high-pressure cleaning operations. Rods and plungers in these pumps and compressors show accelerated wear in the packaging seal areas.

Wear is due primarily to the presence of the following conditions: corrosive environment, wet and dry particle abrasion, high pressures, high friction, temperature excursions and inadequate lubrication.

Solution
Praxair tungsten carbide overlays are applied in the packing seal area of rods and plungers by the exclusive detonation gun process. Praxair LW-1N30 and LW-3N30 tungsten carbide overlays are used to combat wear in non-corrosive environments and temperatures up to 1,000°F. LW-15 tungsten carbide overlays are used in corrosive environments.

Praxair overlays are used both to repair worn parts and to extend the wear life of new parts. In the case of worn parts, depending on operating environment and pressures, rods up to .030-inch undersize in diameter can be restored to original dimensions and, in most cases, provide significantly improved performance. On new parts, the overlay is applied .003 to .005 inches thick and is finished to blueprint specifications or as low as 2 Ra if required. Normally, no special lubricants or packing materials are needed.

Result
Praxair tungsten carbide overlays are also cost-effective. Downtime is saved, and rods and plungers need rework or replacement less often. When wear does eventually occur, parts can be overlaid again, further increasing the wear life of the same rods and plungers. Praxair tungsten carbide overlays have proven cost-effective in applications found in the following areas: Sour gas environments, synthesis gas and hydrogen services, ethylene and polyethylene processes, coal slurry pumping, coal gasification, oxygen services, nitrogen services, high-pressure water blasters and pipeline services.

Related Applications
Praxair tungsten carbide overlays have also been used effectively to extend the wear life of rotors shafts in turbines, centrifugal compressors and pumps.
**Compressor Piston Rods**

**Typical Properties of D-Gun™ Applied Tungsten Carbide Overlays**

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<thead>
<tr>
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<th>LW-1N30</th>
<th>LW-3N30</th>
<th>LW-15</th>
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<tbody>
<tr>
<td>Hardness, kg/mm²</td>
<td>1150 HV</td>
<td>1125 HV</td>
<td>1000 HV</td>
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<tr>
<td>Maximum recommended Operating temperature</td>
<td>1,000˚ F</td>
<td>1,000˚ F</td>
<td>800˚ F</td>
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