Barden SPiN Retainers

The Next Generation of Porous Ball Retainer Material

**Sintered Porous Nylon (SPiN):**
Engineered plastic material formed by cold pressing and sintering polyamide powders. The resulting resilient porous material is capable of absorbing, retaining, and releasing controlled quantities of oil which makes it a very desirable ball retainer, or reservoir material.

**SPiN Applications**

- Navigation systems
- Lubricant reservoir
- Motors

- Turbine flow meters
- Precision land/airborne mechanisms
- Space mechanisms/instruments
- Electro-Optical systems
- Night vision devices

- Deployment devices
- Hinge systems
- Latch systems
- Actuators

**SPiN: Porous Polyamide**

- Manufactured exclusively by Barden
- Highly refined Polyamide powder formulation
- Pressed and sintered Nylon material
- Controlled porosity / bleed rate
- Holds up to 30% volume of oil
- Temperature range of -400 to +600F
- Stable at high temperatures
- Chemically inert
- Compatible with all lubricants
- Resistant to cleaning solvents
- No debris generation
- No leachout
- Low outgassing
- Easily machined
- Available as toroids or slugs.

**SPiN Production Facility**

- 1000 sq ft secured area
- Humidity controlled
- Temperature controlled
- Class 300,000 clean environment
- Raw material inspection
- Powder processing
- Pressing
- QC testing
- Vacuum storage of slugs
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Quality Assurance & Traceability

- Parent batch number assigned to material linked to Purchase order
- Sample sent to independent lab for material analysis and particle size verification
- Child Batch numbers assigned based on material processed on a given day linked to Parent batch number
- Slugs given unique identification number linked to Child batch number
- Slug identification maintained Density
- Tensile strength
- Oil absorption
- Visual inspection
- All information recorded against Slug ID number
- Ball retainers are issued serial numbers linked to the Slug ID number that they were fabricated from.
- Frozen process assures batch to batch consistency

Material Comparison

<table>
<thead>
<tr>
<th></th>
<th>Phenolic</th>
<th>Meldin 9000</th>
<th>SPiN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength (psi)</td>
<td>10,000+</td>
<td>2000</td>
<td>3700</td>
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<tr>
<td>ASTM D-2290</td>
<td></td>
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<tr>
<td>Density (g/cc)</td>
<td>1.28</td>
<td>1.10 to 1.20</td>
<td>0.80 to 0.90</td>
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<tr>
<td>ASTM D-1622</td>
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<tr>
<td>Hardness (Shore D)</td>
<td>~90</td>
<td>84</td>
<td>60</td>
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<tr>
<td>ASTM D-2240</td>
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<tr>
<td>Temperature Range</td>
<td>-150 to +300F</td>
<td>-400 to +600F</td>
<td>-400 to +600F</td>
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<tr>
<td>Outgassing</td>
<td>3.30</td>
<td>1.39</td>
<td>0.73</td>
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<tr>
<td>ASTM E-595 TML (%)</td>
<td>0.02</td>
<td>0.01</td>
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<tr>
<td>CVCM (%)</td>
<td></td>
<td></td>
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<tr>
<td>Oil Absorption (% weight)</td>
<td>2 to 3</td>
<td>8 to 14</td>
<td>25 to 30+</td>
</tr>
<tr>
<td>Pore Size (microns)</td>
<td>N/A</td>
<td>0.95 to 1.25</td>
<td>1.50 avg</td>
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<tr>
<td>ASTM D-2873</td>
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