

**PUC-8eN™**

## Introducing PUC-8eN™ Tungsten Carbide for use with Aqueous-Based Subsea Control Fluids

Tungsten carbide has become the preferred material for oscillating and sliding valve seal faces for Oil and Gas subsea and subsurface controls worldwide. Its wear characteristics and other mechanical properties offer numerous benefits over alloys like Stellite™ and 440C. Unfortunately the most commonly used grades of tungsten carbide for Oil and Gas controls applications are susceptible to corrosion when used with aqueous-based hydraulic control fluids. Penn United Technologies' PUC-8eN™ offers the solution.

Penn United Technologies, Inc. is one of the world's leading suppliers of complex control parts and assemblies utilizing tungsten carbide materials. Using its experience gained through providing tens-of-thousands of wear and control parts to the world's leaders in subsea drilling and production, Penn United has developed a composite binder grade of tungsten carbide called PUC-8eN™. While specifically formulated to provide the mechanical properties required for seal plates, rings, and cups, PUC-8eN™ adds superior resistance to long-term corrosion—often called “binder leaching”—caused by today's aqueous-based control fluids.

### **PUC-8eN™ reduces binder leaching by 73% in Castrol® Transaqua HT™**

Those in the Petrochemical industry found ways around tungsten carbide binder leaching in aqueous applications through the use of materials such as alumina ceramic and silicon carbide—unfortunately these are too brittle for most subsea and downhole controls requirements. The way the Oil and Gas industry adapted was to use nickel binders instead of cobalt binders for tungsten carbide in these applications, providing an approximate 40% improvement in corrosion resistance over the cobalt-bound tungsten carbides. But even the use of nickel binders does not provide sufficient long-term protection of the sensitive sealing surfaces of seal plates, rings, and cups in aqueous-based hydraulic control fluids.

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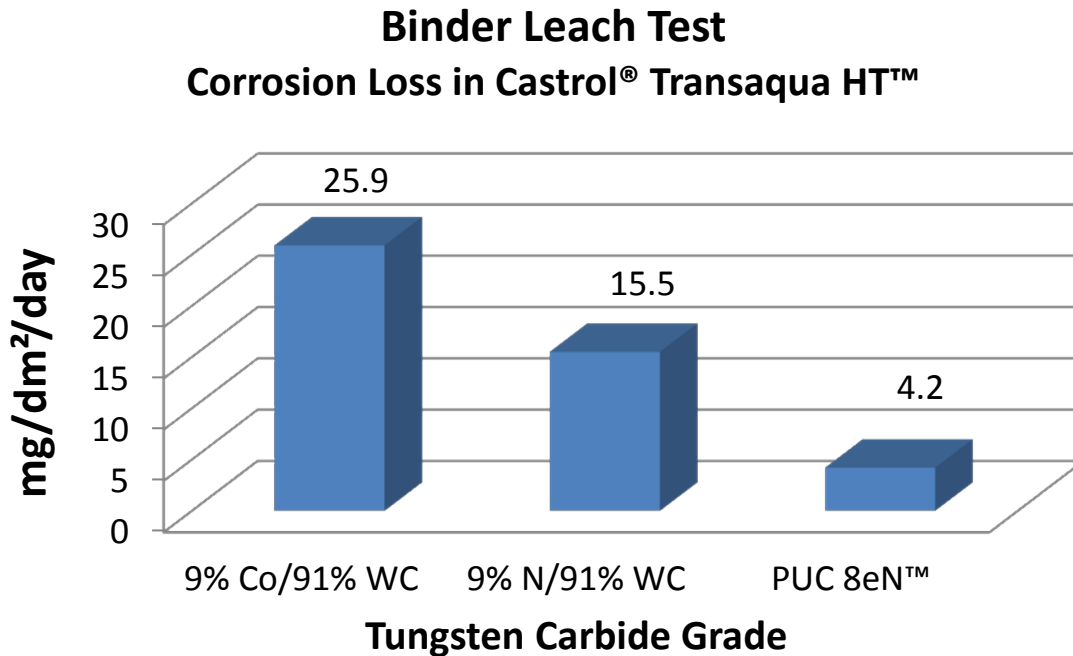
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Penn United Technologies' PUC-8eN™ was tested extensively in Castrol® Transaqua HT™, one of the most common aqueous control fluids used in subsea BOP controls—and one in which tungsten carbide is known to suffer long-term binder leaching. Below is a comparison of three tungsten carbide grades exposed to Transaqua HT™ in third-party corrosion tests. 9% Ni/91% WC being the most commonly used grade in these applications today, PUC-8eN™ reduced binder depletion by 73% compared to the 9%Ni grade.



No company is more experienced than Penn United Technologies in supplying tungsten carbide oscillating and sliding valve seal faces for Oil and Gas subsea and subsurface controls. And Penn United's PUC-8eN™ provides solutions to the challenges posed by today's aqueous control fluids while still providing the right mechanical properties for the most demanding control valve seal face requirements

**Now more than ever, Penn United Technologies is the obvious choice for subsea and subsurface control components.**

For more information on PUC-8eN™, or any of Penn United's superior tungsten carbide materials and manufacturing services, please contact Penn United Technologies through your Sales Engineer; or directly at +1 (724) 352-1507.

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