Variocut C 334 Shows Clear Advantages in Gundrilling

NUCLEAR (USA)

Gundrilling Stem Bores

Castrol Variocut® C 334

BENEFITS: Increased feed rate, Increased tool life

THE SITUATION

A key contractor for the US Department of Energy was seeking a new gundrilling oil for their stainless steel stem boring operations. Their existing oil was an old technology that had to be mixed on-site.

The customer conducted a test of 7 new gundrilling oils, seeking the one that would deliver the best overall machining results.

BEFORE

- 50-50 mix of sulfurized and chlorinated oils
- Feed rate: 0.5 in/min
- Tool life: 5 holes on average

AFTER

- Variocut C 334, chlorine-free oil chosen as the best from 7 candidates
- Feed rate (max): 0.8 in/min (**60% increase**)
- Feed rate (conservative): 0.65 in/min
- Tool life: 8+ holes

THE SOLUTION

- The customer tested 7 oils and quickly eliminated 3 due to ancillary concerns (odor and color).
- Four (4) of the oils were tested in the gundrilling operations where feed rates, tool wear, and surface quality (SEM) were evaluated.
- Castrol Variocut C 334 was chosen as the best fluid, allowing a 60% increase in feed rate while delivering the lowest tool wear rates and excellent surface condition.
- In addition, the Variocut C 334 met the new lower viscosity requirements of the gundrill manufacturer.

- **Increased feed rates**
- **Increased tool life**
- **Chlorine eliminated**

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RECOMMENDATIONS

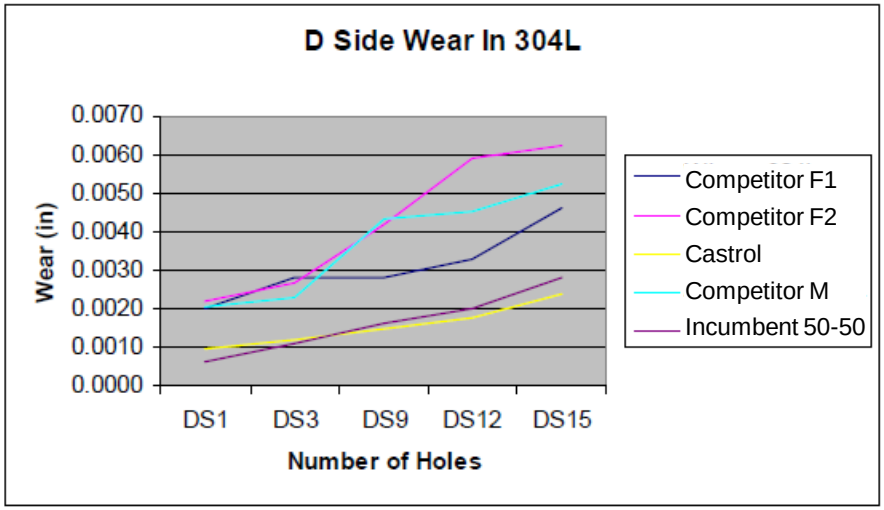
This customer is producing critical nuclear gas transfer systems (GTS), so a detailed study was required to change oils. The operations consist of gundrilling with Nagel-TBT twin spindle machines to produce small stem bores (0.0625" diameter) in several grades of stainless steel including 304L, 316, and 21-6-9.

CONCLUSION

Castrol Variocut C 334 proved to be the best gundrilling oil out of 7 tested in this operation. It produced high quality bores at a higher feed rate than the incumbent and without the need for chlorine or high odor additives.

"…the surface appearance of the holes produced by the Castrol 334 at a high feed in bar stock have similar surface appearance to those produced previously by 50-50 at a lower drill feed rate."

– Excerpt from contractor's formal report



OTHER POTENTIAL APPLICATIONS

Variocut C 334 represents the latest technology in low odor, chlorine-free, high performance gundrilling oils. It is suitable for machining of all ferrous materials where a light viscosity or excellent chip flushing is required.