

## Shop Test Ductile Cast Iron Seat

Short Bit & Tool Co.  
225 Gold St  
Garland, Texas 75042  
972-205-1011

Basis:

Ductile Cast Iron ball seat from 2.700" to 3.700"

Lathe setup with target being turned in the lathe chuck at 220 RPM and just a trickle of coolant being pumped.

#1: We ran our SDBR2 purpose-built reamer to set the bench mark. It has a 5/8" carbide twist drill flanked by two 1" long SDB2 carbide inserts for cutting the Aluminum ball.

Al ball cut:

<https://vimeo.com/218282977/0d876bc245>

Time was about 1 min until ball was pushed through 2 5/8" bore

Applied force was light (about 50-75 lbs)

Cast Iron Seat:

<https://vimeo.com/218283125/006755bb29>

Time was about 1 min

Applied force was about 75 to 100 lbs



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Note: The same SDBR2 reamer was used to 4" 13 Chrome Tubing

<https://vimeo.com/226170183/5e4b4b21bb>

Time was about 1 min

Applied force was about 200 lbs.

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#2: We tested a light set (6 rows) diamond reamer set with 4mm spherical TSD with the first 1 min test being on a square corner to maximize the loading per diamond.

<https://vimeo.com/242620369>

Cut was for 1 min...no wear



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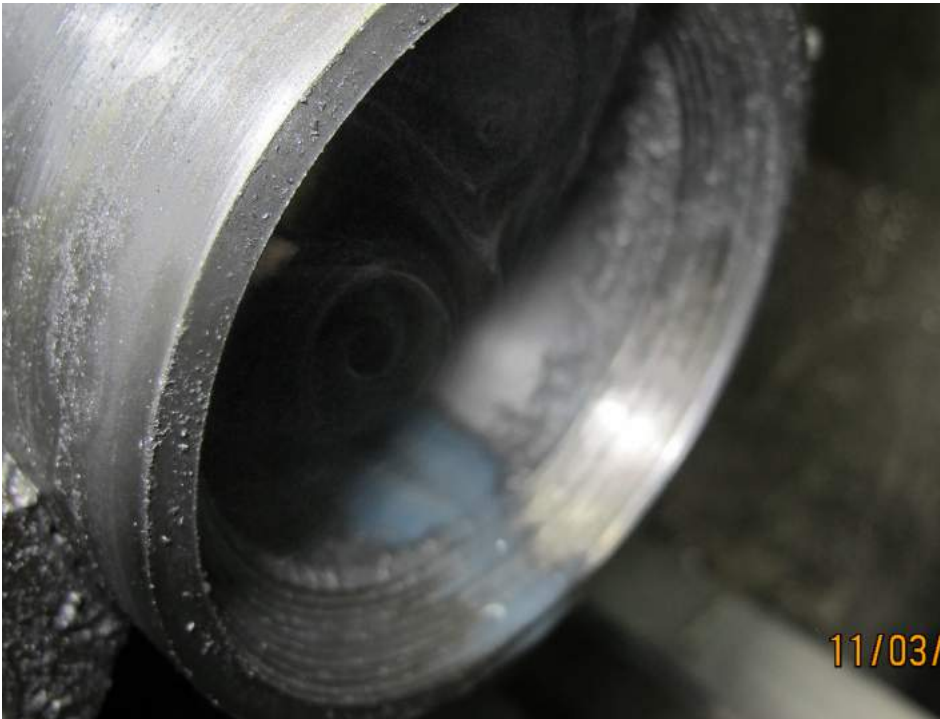
#2: Second cut

<https://vimeo.com/217718114/1c34b3fe69>

Time was about 1 min

Applied force was about 200 lbs

Cuttings were much finer than SDBR2



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#3: We used a plain matrix body / PDC cement mill set with 8mm PDC in 8 blades.

<https://vimeo.com/242621946>

Run time was about 45 sec and created the largest cuttings with the highest amount of chatter



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## OBSERVATIONS & OPINION:

\*Both the diamond and the PDC cutter geometry create a much higher heat than does the purpose-built SDBR2 reamer. We would expect that purpose-built diamond or PDC reamers could approach the cutting ease of the SDBR2 but would prove much more expensive.

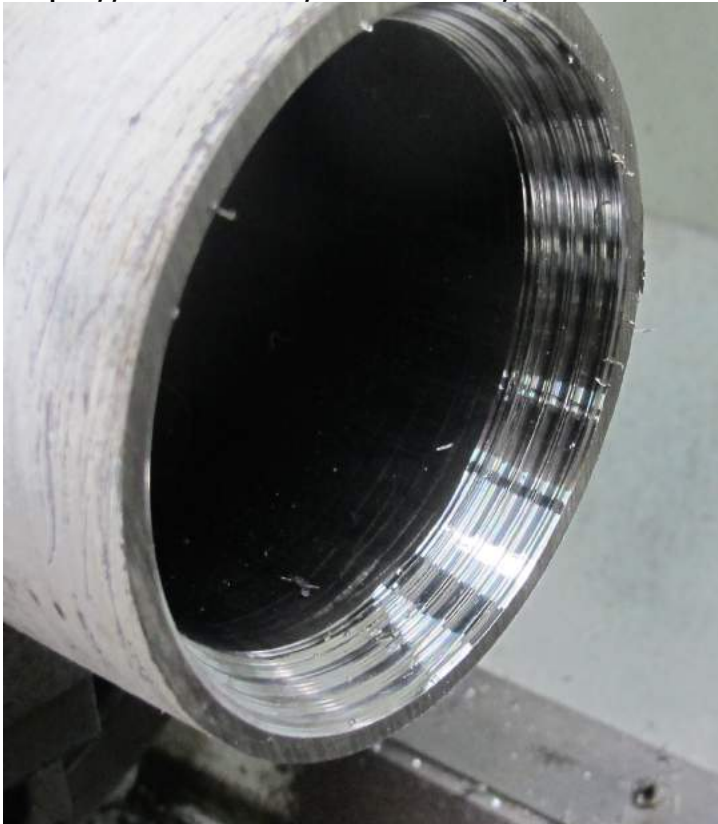
\*If built for this purpose both the diamond and PDC styles would be built with the pilot twist drill and carbide inserts for drilling the Aluminum balls.

\*We saw no reason the carbide reamer would wear excessively when used to cut multiple balls and seats.

## NOTE:

In a separate test the same SDBR2 reamer was used to test milling 4" tubing with good results.

<https://vimeo.com/226170183/5e4b4b21bb>



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Our SDBR2 reamer was created to find a better way to cut targets that work harden like 13 chrome, 17-4 stainless, Inconel, and Incoloy high Nickel alloys. In understanding the way the targets fail when being cut we have gained ground on the cutter geometry needed to take a small and controlled size of cut. This work hardens the brittle chip ribbon which being confined will easily break up into small clippings. This controlled amount of cut does not force excessive plastic deformation back into the target, so it remains in its softer state and easy to cut.

Brittle Chip Ribbon in 13 chrome

<https://vimeo.com/220819464>