

REAPER MILL

Reap the benefits



REAPER MILLING ADVANTAGES

- Made with high quality tungsten inserts with chip breaker technology
- A superior off center insert design for maximum cutting and wear.
- Gauge protection that is casing friendly yet very hard even in the most extreme milling scenarios.
- Mill to the toe and not worry about losing cones.
- Average gauge loss of 78 stage zone is .1 mm - .5 mm with one mill one trip saving multiple runs and multiple mills.

REAPER MILL CUSTOMER FEED BACK

- For 4" well bore 400-450 Lpm with fresh water or what ever was used for fracing. No gel or chemical. The odd time metal to metal friction reducer is used.
- Rubicon plugs average 3 min of mill time to slips, then slow down to 5-10 min in between to break up slips and make debris nice and small for returns.
- Diamond back SL takes about 5 min per plug with a 10-15 min in between push down rate.
- Fast drill plugs, Boss Hog plugs mill pretty close to the same, 6 min with about 8 min of breaking up slips to under 1" x 1" debris.
- Maverick Ultron plug mills in 4 min to slips and then 5 min to break up hardened slips.
- Averaging 75 plugs per mill even if ran in multiple wells. No penciling effect or notching on the mill. Keeping drift gauge to the toe.

CUSTOMER QUOTES

- “Basic summary of mill performance is that we have had no additional trips to surface. In the past we would either be making trips to surface because the mill was scrubbed or because we had trouble making hole due to the mill and pulled out prematurely.”
- “Basically if there is an issues downhole we can now eliminate the mill as being the issue and focus on monitoring the differential pressure to ensure the motor is functioning and monitor returns for debris. Sometimes you can run into sand which can slow down or almost stop you from making hole, with this mill we can sit, wait for returns to cleanup and know that it is just wellbore conditions.”
- “This mill going to the toe with one trip is saving me a lot of money, as we were accustomed to 3-4 mills to try and get the same results.”
- “Went 22 stages averaging 6 min a plug. Ran into casing deformation stages 23-25 and trusting this mill we kept milling 1 hour through this zone per plug. We popped back into stage 26 and averaged 6 min per plug again. Shows how well built the mill is and the quality product used in the mill.”



REAPER CONVEX

This design is to stop debris from forming rings that slip over the mill and motor.

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REAPER CONCAVE WITH BALL BUSTER

The design of the concave is to keep debris in the middle and grind up to smaller manageable debris. The ball buster off set is to create a ratcheting effect on hard slip debris. This will kick it up and out of the flow flutes breaking the slips into smaller more manageable debris.

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FAST DRILL DEBRIS



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RUBICON DEBRIS

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RINGLETS FROM RUBICON PLUG

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ULTRON DEBRIS



TRYTON PLUG DEBRIS

- Mill reduced debris in volume by 80% from what other mills were doing.
- Overall debris very good and easily manageable.
- Water course served as a gauge to regulate debris size and debris control seems to have been observed.
- No stalls and motor did not work excessively.
- Debris did lock up in the face or water courses.
- The Reaper mill design is the balance between reasonable sized debris while achieving remarkable ROP.

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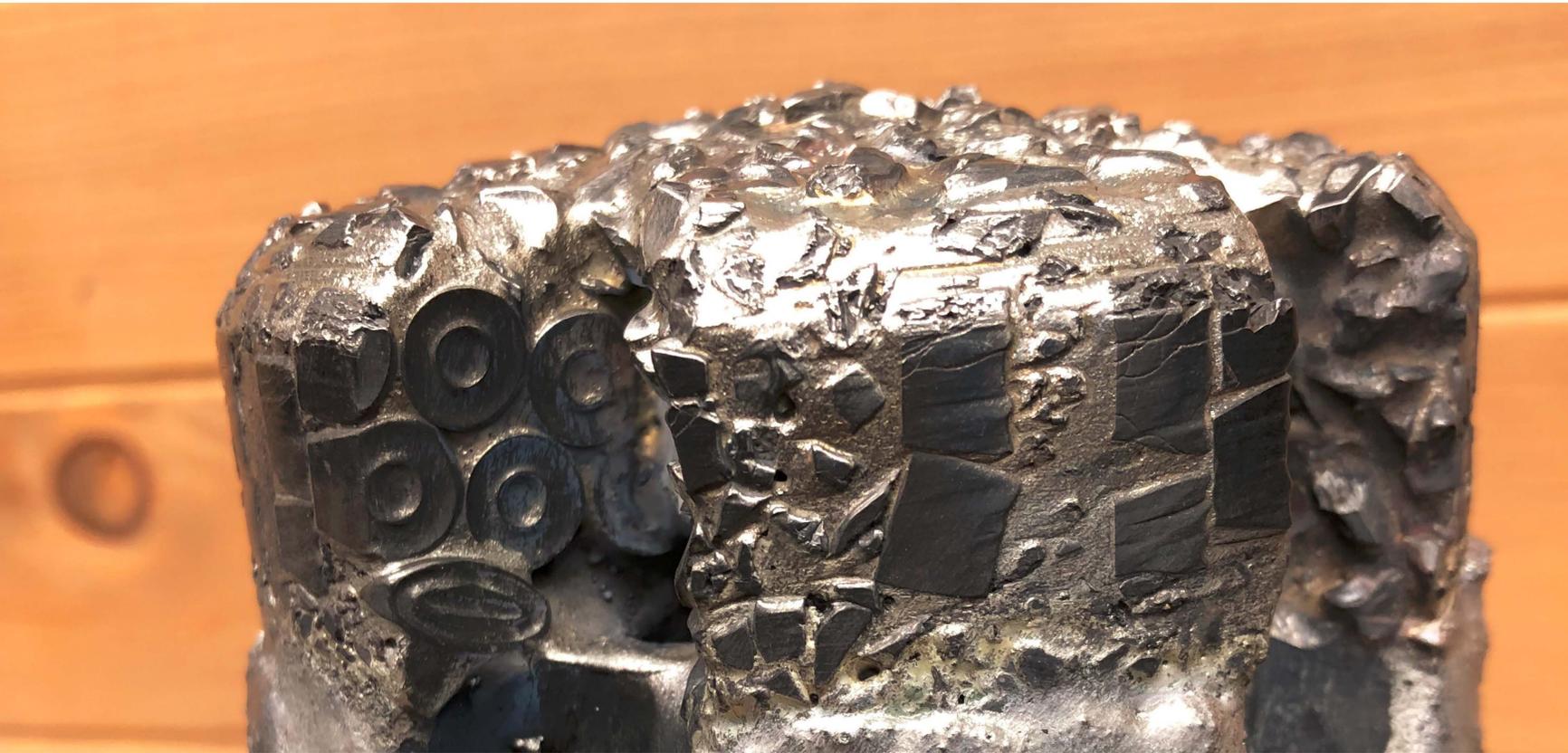
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REAPER USED 36 BOSS HOG PLUGS

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**REAPER USED 68
PLUGS OF
VARIOUS MAKES**