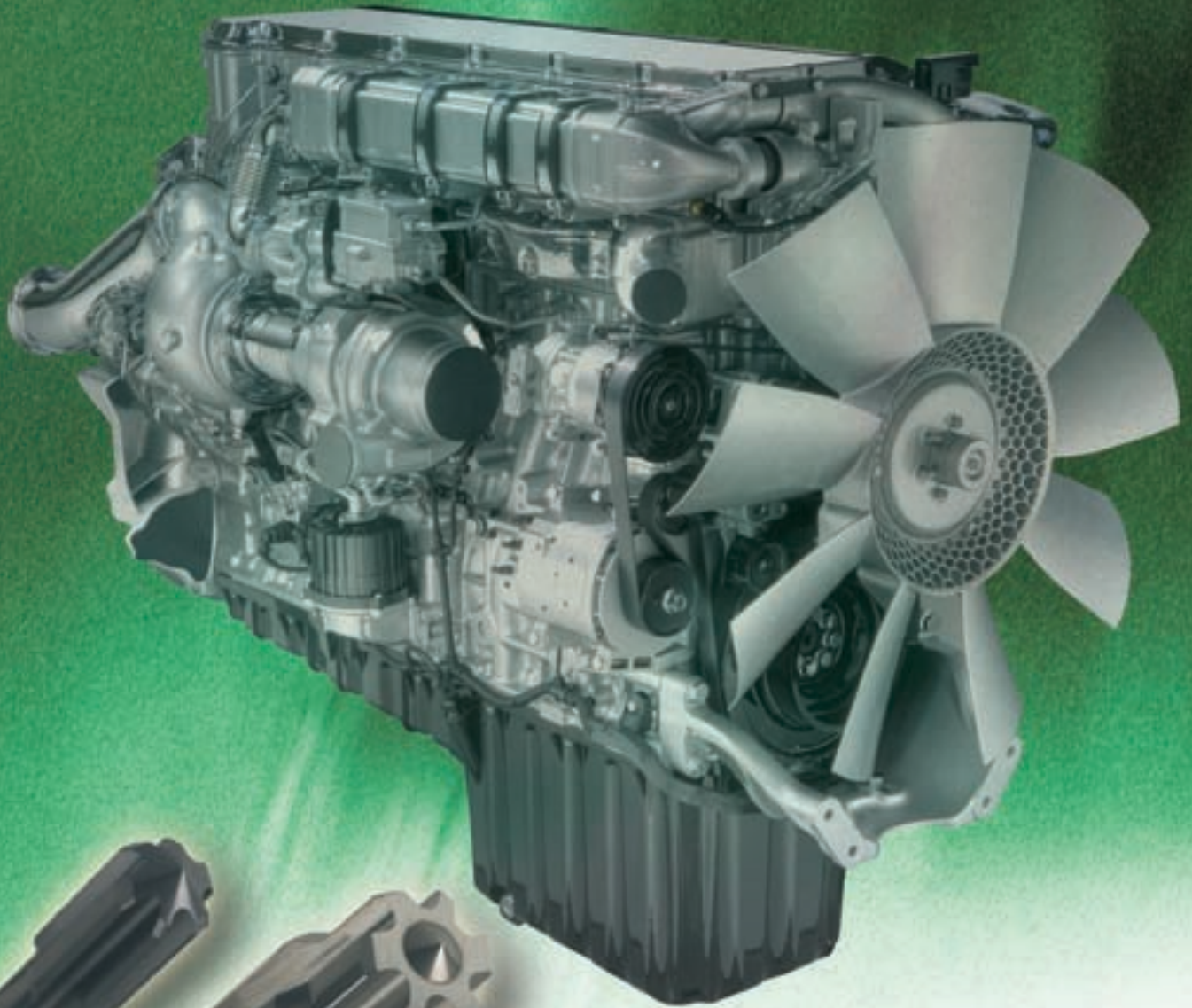


GUHRING

The Tool Company

HR 500 High Performance Reaming in Cast Iron Cylinder Blocks: *A performance advantage*



An actual case history at:

DETROIT DIESEL



High Performance Reaming

With the HR 500 Reamer Series, GUHRING outperforms to Detroit Diesel Corp

Detroit Diesel Corporation is an affiliate of Daimler Trucks North America LLC, and is a leading manufacturer of on-highway, heavy-duty, diesel engines for the commercial truck market. The company offers a complete line of engines for the on-highway and vocational markets.

Through its corporate headquarters in Detroit, Michigan, Detroit Diesel is engaged in the design, manufacture, sale and service of these products, in addition to supporting alternative and hybrid engine strategies for the commercial truck marketplace.

Detroit Diesel was founded in 1938 and has built more than 5 million engines to date. Currently the company has more than 1 million engines in operation worldwide. The Series 60 has been the top selling heavy-duty diesel engine since 1992, and in 2008, the company built its one millionth Series 60 engine.

The revolutionary DD15, launched in 2007, opened a new era in heavy-duty engines -- offering pulling power, affordable fuel economy, bullet-proof reliability and easy maintenance on a single engine platform. In September of 2008, DD15 engine orders surpassed Series 60 orders.

The Detroit Diesel DD13, launched in 2008, is designed specifically for less-than-truckload, regional distribution and vocational applications. It offers the same serviceability and performance -- and up to 5% better fuel economy -- than the DD15. In the medium duty range, Detroit Diesel has shipped more than 115,000 MBE 900 engines in North America since 2002.

Guhring and Detroit Diesel have enjoyed a close cooperation for decades. During a cost reduction initiative between Detroit Diesel and all of their cutting tool suppliers, Guhring was approached by Dirk Hilss, Business Unit Manager, and was given the opportunity to prove the potential of the HR 500 reamers.

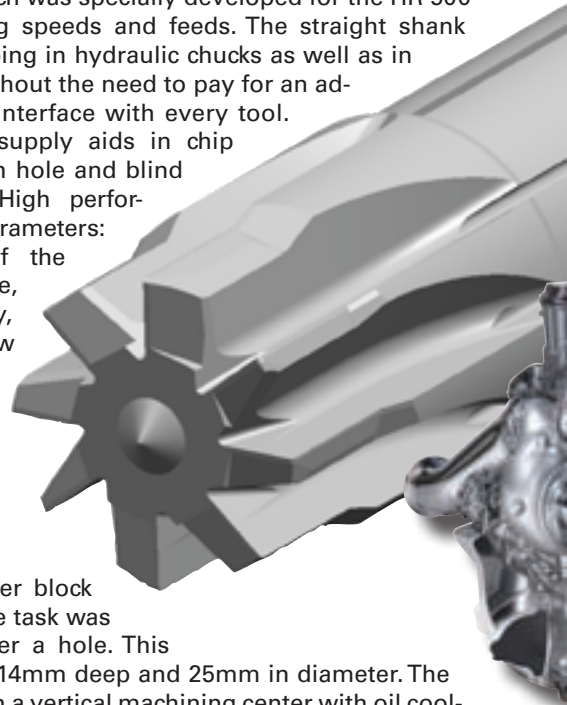
The Tooling Facts

A few design features of the HR 500 reamer guarantee a cost advantage right from the beginning:

A carbide grade which was specially developed for the HR 500 ensures high cutting speeds and feeds. The straight shank design allows clamping in hydraulic chucks as well as in shrink fit holders without the need to pay for an additional, expensive interface with every tool. Optimized coolant supply aids in chip flow in both through hole and blind hole applications. High performance cutting parameters: the combination of the special carbide grade, superior tool rigidity, and high coolant flow rates allow for very aggressive cutting parameters.

The Task:

On the DD15 cylinder block made out of GG, the task was to ream and chamfer a hole. This was a through hole 14mm deep and 25mm in diameter. The operation was run on a vertical machining center with oil coolant through the spindle at a pressure of 725 psi.



in Cast Iron Cylinder Blocks

*ms the competition and brings dramatic cost savings
oration in Detroit, MI.*

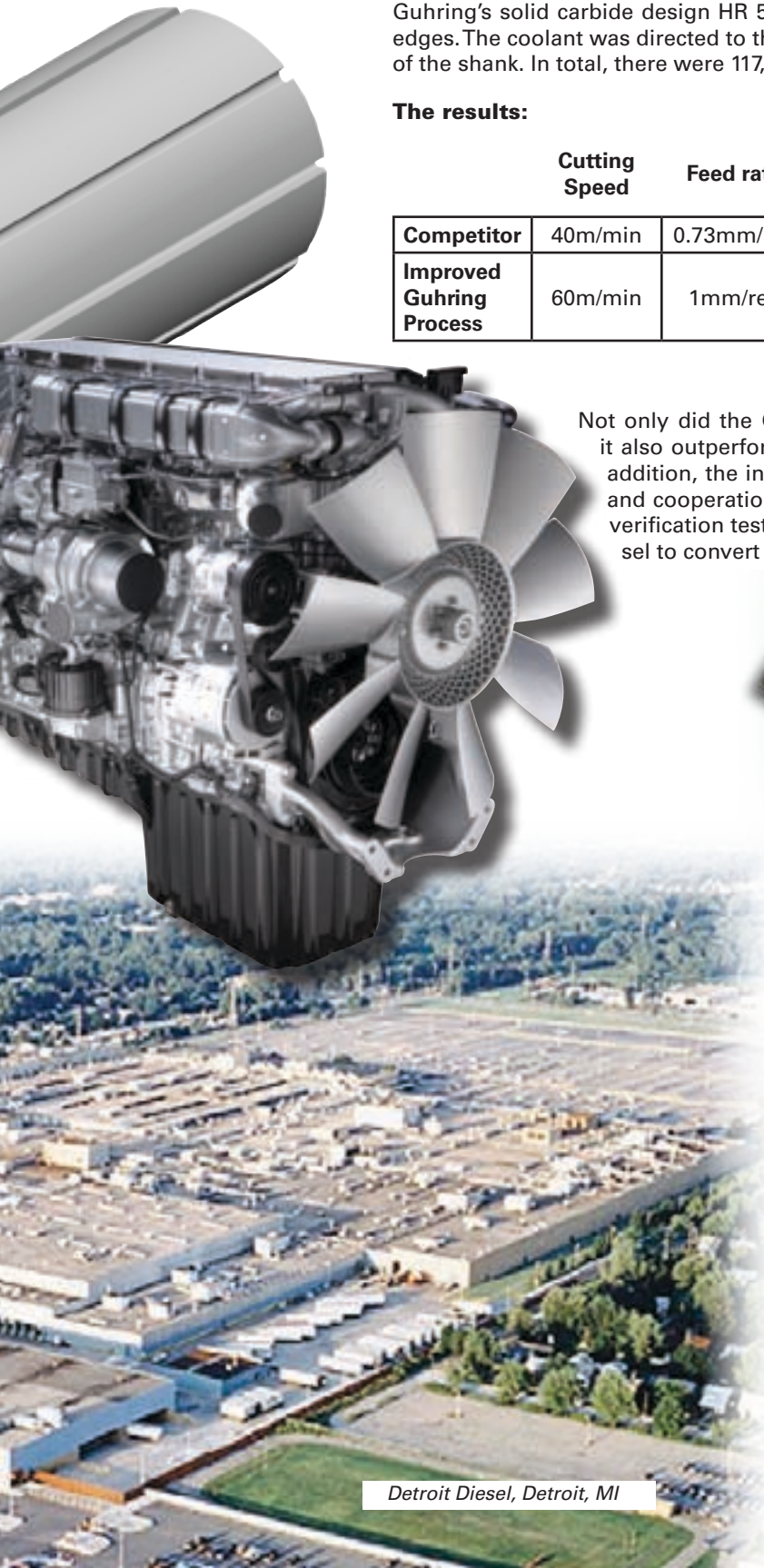
The Tool:

Guhring's solid carbide design HR 500 reamer, 25mm diameter with a 27mm step and 8 cutting edges. The coolant was directed to the cutting edges via grooves which are located on the outside of the shank. In total, there were 117,000 holes to produce.

The results:

	Cutting Speed	Feed rate	Feed	Cutting Time	Total Machining Time	Tool Life
Competitor	40m/min	0.73mm/rev	365mm/min	0.27s	1053h	500 holes
Improved Guhring Process	60m/min	1mm/rev	764mm/min	0.13s	507h	10,000 holes

Not only did the Guhring reamer save Detroit Diesel 50% in machining time, it also outperformed the competitor by achieving 20 times more tool life. In addition, the initial purchase price was 12% lower. The cost saving initiative and cooperation with Dirk Hilts was a success. With these results, and after verification tests with reground tools, it was an easy decision for Detroit Diesel to convert all reaming operations from the competitor over to Guhring.



Guhring's high-performance HR 500 carbide reamers are available in blind hole and through hole designs, in cutting diameters from 4.00 to 20.00mm. There are several distinct series to select from to best suit your application.

Reamers designed for blind hole applications have an axial coolant duct through the tool to help flush chips from the hole. Through hole series have coolant grooves ground along the length of the tool body, to deliver coolant to the cutting edges.

Carbide- and cermet-tipped special reamer designs have produced excellent results in field tests. Contact your Guhring representative for further information.

STANDARD & SPECIAL PRODUCT RANGE

• HSS, HSCO & PM Standards •

GU 500 DZ Universal Drills
GT 500 DZ High Performance Drills
GT 100 Parabolic Flute Deep Hole Drills
Coolant-Through GT 100 IC Parabolic Flute Deep Hole Drills
GT 80 Parabolic Flute Deep Hole Drills
Coolant-Through GT 80 IC Parabolic Flute Deep Hole Drills
GT 50 Parabolic Flute Deep Hole Drills
General Purpose Drills
Heavy Duty Drills
Heavy Duty Split Point Drills
Low Helix Drills
High Helix Drills
Micro-Precision Drills
NC Spot Drills
Drill-Countersinks
High Performance HSS-E Taps
High Performance PM HSS-E Taps

• HSS & HSCO Specials •

Drills
Step Drills
Step Drill Reamers
Step Core Drills
Step Core Drill Reamers
Reamers
Step Reamers
Subland Drills
Subland Drill Reamers
Subland Core Drills
Taps

• Carbide Standards •

RT 100 U/F High Penetration Drills
RT 100 X High Penetration Drills
RT 100 R High Penetration Drills
RT 100 T Deep Hole Drills
Coolant-Through RT 100 U/F/C High Penetration Drills
Coolant-Through RT 150 GG Straight-Flute High Penetration Drills
Coolant-Through HT/RT 800 WP Interchangeable Insert Drills
GS 200 U/G Three-Flute High Precision Drills
GT 100 Parabolic Flute Deep Hole Drills
Exclusive Line® Small-Diameter Drills
EB 100 Small-Diameter Single-Flute Gun Drills
General Purpose Drills
NC Spot Drills
PRO-Line Universal End Mills
TECH-Line High Performance End Mills

• Carbide Specials •

Drills
RT High Performance Drills
G Drills
Gun Drills
Three- & Four-Flute Drills
Step Drills
Step Drill Reamers
Step Core Drills
Step Core Drill Reamers
Reamers
Step Reamers
Subland Drills
Subland Drill Reamers
Subland Core Drills
Taps
End Mills

• PCD Specials •

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• Reconditioning Service •

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GUHRING

ISO 9001:2000 CERTIFIED

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