



# GLOBAL SOLUTIONS



## DIC: A FORCE IN KOREAN GEAR PRODUCTION



**Korean gearmaking leader DIC uses new Gleason technology to keep pace with fast-growing demand from Hyundai, GM Daewoo and others.**

*“To be the best powertrain maker in the world...”* If its list of customers is any indication, Korea’s DIC (DAE-IL Corporation) is well on its way to achieving its stated mission. Hyundai, KIA Motors, GM Daewoo, Doosan and many other leading Korean automotive, forklift and truck manufacturers rely on DIC for high precision gears and shafts for engines and transmissions. DIC is becoming increasingly well-known around the world too, with customers like Caterpillar, John Deere, Clark Material Handling, and many others. With annual sales fast approaching \$300 million and over 1,000 employees at three modern facilities in the manufacturing center of Ulsan (strategically located on the southeast coast on the East Sea), DIC is indeed Korea’s undisputed gearmaking leader.

**Keeping pace, with new technology.** According to Mr. Seo Jeong-Ok, Managing Director of DIC, investment in new Gleason technology is an important component in DIC’s ability to meet the production requirements of customers like the Hyundai KIA Automotive Group, one of the world’s

fastest growing car manufacturers. Hot-selling, fuel-efficient mini SUVs like the Hyundai Tuscon and its KIA sister car, the Sportage, have helped propel Hyundai's U.S. marketshare to 4% -- and climbing fast. DIC produces differential sub-assemblies, oil pump drive gears and other components for these Hyundai vehicles so business has never been better -- or the stakes higher.

"At DIC, we're meeting the demand for increased volume, cost efficiency and worldclass quality from customers like Hyundai by investing in advanced new gear production machines that greatly exceed the capabilities of older machines," says DIC's Mr. Seo. "Gleason machines are the best examples."

**P 60: hobbing five times faster.** Floor-to-floor times for hobbing an important oil pump drive gear for the KIA Sportage and Hyundai Santa Fe vehicles used to take three minutes. It's now being done in just 35 seconds, on a new Gleason Pfafter P 60 Horizontal Hobbing Machine. As a result, just one P 60 is producing the same volume of parts that used to require three older hobbing machines. In addition, the new P 60 is designed to hob dry, and to take advantage of hobs featuring the latest, most productive carbides and advanced coatings. The older machines used a wet hobbing process and conventional high speed steel tooling.

The P 60 features a unique design that gives it the ability to take full advantage of the latest carbide tooling, and to machine dry. It uses very high speed direct-drive hob and work spindles and a thermally stable work area that facilitates the disposal of hot, dry chips.

In addition, a fully integrated, exceptionally fast gantry loader system, with buffer storage, helps speed production and can easily be adapted to different part types. Yet the entire footprint of the machine, including automation, is just 3.5 sq. meters -- an important consideration at DIC where floorspace is at a premium.

**Hard finish grinding at 50 m/second.** A second Gleason product, a new 300TWG Threaded Wheel Grinding Machine, is delivering remarkable finish gear grinding speeds on drive gears as large as 300 mm in diameter -- and opening still more doors with customers like Hyundai and GM Daewoo, according to DIC's Mr. Seo. "With our older conventional gear grinding equipment we would not have been able to deliver the production volumes that we can with 300TWG, which would have meant turning away business," says Mr. Seo. "With the new machine, we can finish grind at speeds that give us an important new capability to offer our customers."

**“Gleason is helping us meet the demand for increased volume, cost efficiency and worldclass quality.”**

— DIC's Seo Jeong-Ok

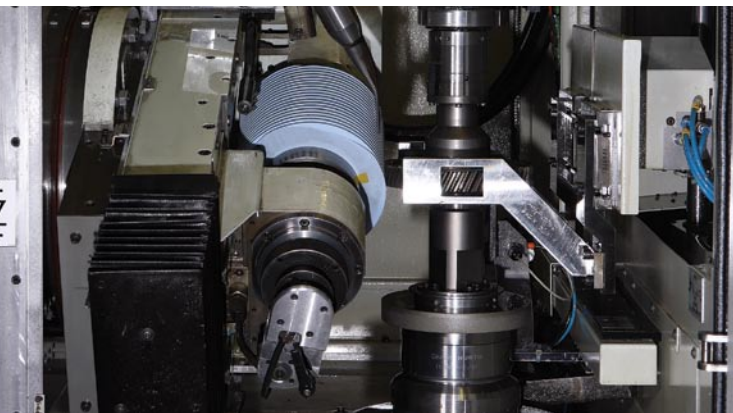


**Gleason Pfafter P 60 Horizontal Hobbing Machine cuts floor-to-floor times on an important Hyundai oil pump drive gear from three minutes to 35 seconds, and doing the work of three older machines.**

Take, for example, the finish grinding of a Hyundai drive gear typical of the type being produced on the 300TWG. What would have taken three or four minutes on a conventional grinder now can be done in just 80 or 90 seconds. The use of dressable, multi-start grinding wheels -- 5 to 10 times more productive than a single start grinding wheel -- is of course an important component. But equally important is the use of Gleason's patented diamond plated master dressing gear system, integrated right into the clamping fixture. The master gear can engage all the threads of a wheel at once, thus doing in one pass what



**50 m/second grinding speeds and 300 mm part diameter capacity of the Gleason 300TWG Threaded Wheel Grinder enable DIC to meet production demands from Hyundai, GM Daewoo and others that couldn't be met before.**



**(Above) Multi-start wheel technology, on-board stock dividing capability and patented master dressing gear system all combine to make 300TWG the most productive machine in its class.**

**(Right) DIC integrates automated parts handling with 300TWG's high-speed double gripper loader mechanism to speed production.**

would take many passes with a typical single diamond dressing disk arrangement. As a result, the dressing cycle takes no more time, or even less, than the grinding cycle itself.

In addition, the new 300TWG takes minutes out of part setup by automating the stock dividing process. Conventional stock dividing requires the manual adjustment of a stock divider to place it in close proximity to the part, a process usually requiring two to three minutes. But the 300TWG has a sensor integrated right into the grinding head, so stock dividing is done in seconds using NC motions. The sensor also can perform inspections to detect heat treat distortion.

The 300TWG also gives DIC another important competitive advantage: the ability to produce a quieter gear. Powerful new software, Siemens CNC and direct-drive spindles are at the core of Gleason's patented VRM (Variable Rate Method) grinding process, which enables the 300TWG to produce much quieter gears by making kinematic adjustments in the grinding process.

**New technology, local support.** DIC is quick to point out, however, that new technology is only part of the equation. Full utilization of these new machines could not be done as quickly, nor as effectively, without a strong local support resource. Gleason's Korean sales and support resource, Myonghwa Net, Inc., Seoul, Korea, has been instrumental in bringing these new technologies into production quickly and successfully.

"DIC's success has come from its ability to quickly react to the requirements of its most demanding customers, anywhere in the world," says Mr. H.Y. Bang, General Manager, Myonghwa Net, Inc. "They expect no less from their suppliers. Our close presence here in Korea gives DIC, and other Korean customers, complete access to the best gear production technology in the world."



# Gleason

## Gleason Corporation

1000 University Avenue  
P.O. Box 22970  
Rochester, NY 14692-2970 USA  
Fax: 585-461-4348  
e-mail: sales@gleason.com

## The Gleason Works

1000 University Avenue  
P.O. Box 22970  
Rochester, NY 14692-2970 USA  
Tel: 585-473-1000  
Fax: 585-461-4348  
e-mail: sales@gleason.com

## Gleason - PFAUTER

Maschinenfabrik GmbH  
Daimlerstraße 14  
D-71636 Ludwigsburg, Germany  
Tel: +49 (0)7141 404 0  
Fax: +49 (0)7141 404 0 500  
e-mail: pfauter@gleason.com

[www.gleason.com](http://www.gleason.com) [sales@gleason.com](mailto:sales@gleason.com)

For Worldwide Locations and Additional Information.