

TESTS ON A LOCAL TRUCK FLEET  
PROVED THE NEW TYPE PR VALVES  
TO BE A WINNER.



# Three times more durability with ceramics

THE HALDEX PLANT IN GRAND HAVEN, MICHIGAN, IN THE UNITED STATES, SUPPLIES LEADING TRUCK MAKERS WITH HEIGHT CONTROL VALVES. THE QUEST FOR MORE DURABLE MATERIAL, RESISTANT TO CHEMICALS AND TEMPERATURE CHANGES, HAS RESULTED IN THE USE OF A NEW MATERIAL - CERAMICS.

TEXT AND PHOTO DWIGHT CENDROWSKI

FROM HENRY FORD'S revolutionary production line through today's competitive world market, Detroit remains an important center for the auto business and auto parts manufacturing. But 200 miles to the west, along the shores of Lake Michigan, a hub for auto suppliers is developing. And Grand Haven is at the center of that hub. Nestled along Lake Michigan's sandy coast, it is home to many suppliers, including Haldex Suspension Control's Grand Haven Operation, a business within the Air Management business unit and part of the Commercial Vehicle Systems (CVS) Division.

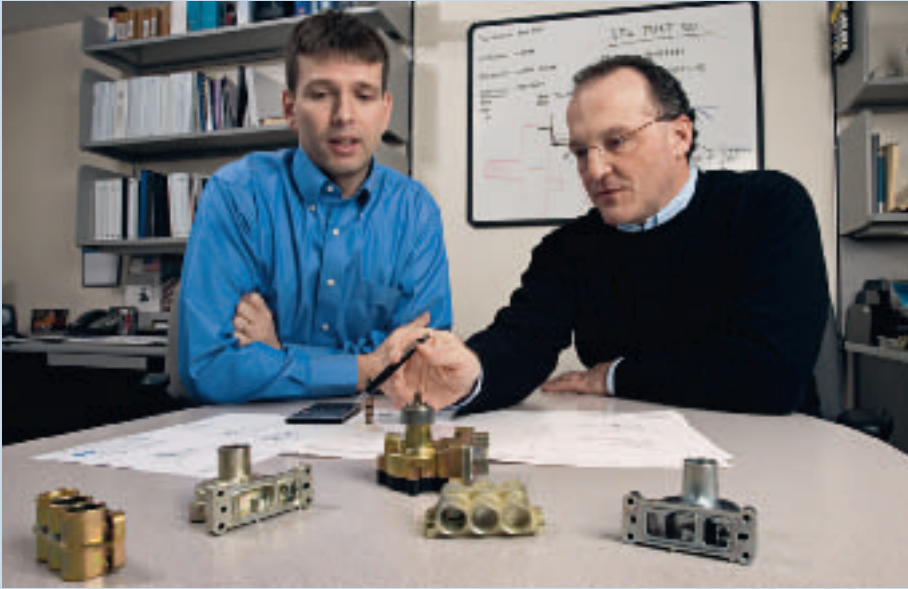
The company's 15,000-square-foot assembly plant, with 41 employees, designs and supplies the industry's best truck makers with height control valves. Height control valves constitute an important and growing market, and this operation has been making a name for itself over the past few years with an innovative valve design featuring ceramic technology.

Haldex has been supplying height control valves for Class 8 truck and commercial trailer makers such as Kenworth, Volvo, Freightliner and Mack for many years. The air suspension valves automatically return

the truck to an optimum height when a load is added or removed. In the United States more than 90 percent of the over-the-road truck chassis are now using air suspensions, while only about 60 percent of the trailers are air-equipped.

Thomas Bronz is the general manager in Grand Haven. Back in the late 1990s his team saw opportunities developing. "The most significant issues we identified in the market at the time were product reliability and durability," Bronz says. "For nearly 30 years we led the market with height control valves that conserved air. The Type CR





MODULARITY WAS THE KEY TO MAKING CERAMICS AFFORDABLE IN HALDEX VALVES, EXPLAINS VICTOR PLATH, LEAD ENGINEER, AND GENERAL MANAGER THOMAS BRONZ.

valve is well known and respected. A new competitor came in at a lower price, but the lower price without reliability was not what many customers were looking for.

“Haldex Type IR valves also led the market in niche segments of extremely heavy-duty off-road and vocational vehicles such as oil-field equipment, front-discharge cement mixers and dump trucks,” he continues. “That low-volume product was well regarded for its durability, but it was very expensive and it would never fit the cost model of an OEM standard position. We needed durability like that at a price point that would fit our target customer’s standard position.”

Key customers such as PACCAR had concerns about durability. Valves were usu-

ally lasting from one to three years, while the trucks and trailers had a much longer life. “Rubber seals in the valve’s core technology were the culprits,” says Victor Plath, lead engineer in the development of the ceramic technology in Grand Haven. “Our previous valves were elastomeric-based, and those types of sealing mechanisms tend to wear out and fail because of different things – contamination, chemical attack.” The performance of the rubber seals also varied as temperatures changed, and they leaked more easily.

Plath led the research to find a more durable material that was more resistant to chemicals and temperature changes. The engineers looked at several technologies, but all had problems except for one clear

winner – ceramics. The material is used in many industries, including the high-end home water faucets and mining slurry processing valves. “It’s a very chemical- and abrasive-resistant product,” says Bronz. “We knew it was extremely durable. But altering it to work in our application was the trick for us.”

The key to making ceramics affordable in Haldex valves turned out to be modularity, a key concept used in other Haldex applications. “If we use enough of one core technology, which includes the shaft, ceramic seal and a bushing housed it in several different modules, we can give customers a lot of different variations of the Precision Response (Type PR) product,” explains Bronz. “The modular concept drives the cost of that core technology down.” Adds Plath, “Today we probably make upwards of 60 to 65 valve assemblies, and they all use the same ceramics.”

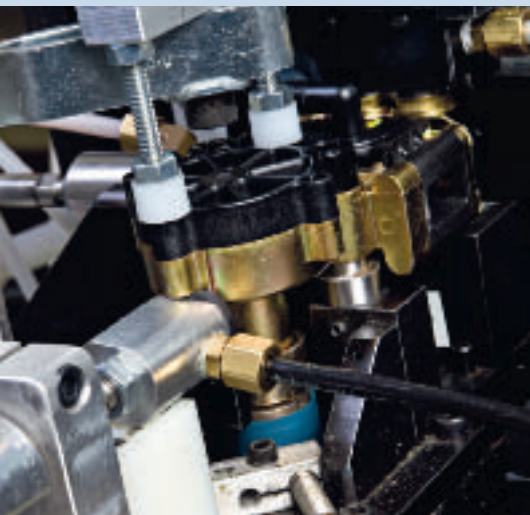
**AFTER TESTING THE NEW TYPE PR** valves in the lab and on local truck fleets, the engineers knew they had a winner. And once important customers such as Kenworth tried the product and saw how the modularity concept could simplify their installations, it was an easy sell. “We took Kenworth from 94 to 11 installation drawings, which is much easier for them to control and easier for them to maintain on the plant floor,” says Plath. “It was all part of lowering their total installed cost.”

One of Haldex’s toughest competitors makes a similar ceramic valve. But Haldex has won this fight hands down. “We’ve recently displaced them on premium truck brands here in North America,” explains Bronz. Haldex has pushed its market share to nearly 40 percent, up from 30 percent. It’s a nearly 16 million US dollar business, with the majority of customers in North America. For the customer, the new valve’s purchase cost is a little higher but the total installed cost is lower. No one else in the business has the unique Haldex combina-



41 EMPLOYEES ASSEMBLE AND SUPPLY HEIGHT CONTROL VALVES TO AN IMPORTANT AND GROWING MARKET. HALDEX MARKET SHARE HAS INCREASED 10%.





CUSTOMERS HAVE TESTED THE VALVES, AND FOUND THEM TO BE THREE TIMES MORE DURABLE THAN COMPETITIVE PRODUCTS.

tion of ceramic technology and modularity.

The best tributes for the Haldex type PR height control valves come from satisfied customers such as Kenworth and Volvo. They did studies of the valves on their trucks and praised the simplification of the installation process, the precise response, the more accurate ride height and the reduced opportunities for leaks. They found the valves more than three times more durable than the earlier generation of valves.

One non-US customer provides a stunning testimonial to the durability of the Haldex valve. An Australian fleet of residential garbage trucks had been going through a competitor's valves every four to six



CERAMICS IS A UNIQUELY CHEMICAL AND ABRASIVE RESISTANT PRODUCT, USED IN MANY INDUSTRIES.

weeks. Some 4,000 starts and stops a week puts a brutal strain on valves in standard air suspensions. Haldex Type PR ceramic valves were installed and now the trucks are approaching two years of life without a failure. Bronz says that a similar segment in the US market can't be tapped because most garbage trucks still use mechanical steel suspensions.

Right now business is booming for Haldex Grand Haven. A new EPA emissions regulation goes into effect in 2007 that will tighten standards, and all the big fleet customers are buying ahead of that regulation. Of course, says Bronz, "business will tougher in 2007, but our new customer-specific placements are much more difficult



THE GRAND HAVEN PLANT MAKE 60 TO 65 VALVE ASSEMBLIES, ALL USING THE SAME CERAMICS.

for competitors to match. The Truck OEM segment of our business is more solid than ever. In 2007 we'll have to focus on success in our trailer segments and the aftermarket." The modularity of the Type PR valve makes extension of the product to trailer suspensions convenient, while Haldex Grand Haven's long history provides for a significant business in the aftermarket.

The Haldex Grand Haven Operation is receiving recognition for its efforts. In October 2005 the Grand Haven plant was the first in the US to receive the Haldex Way Copper Level certification, and it is looking to reach the bronze level in August 2006. It is also certified to ISO 9001:2000 and ISO 14001:2004 standards. □

#### FACTS

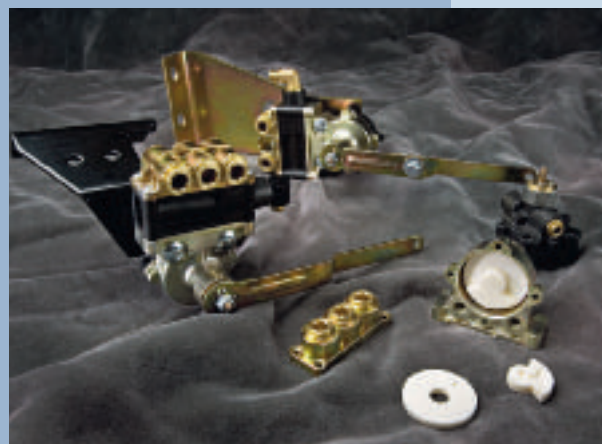
The ceramic discs used in the Haldex Type PR air suspension height control valves are manufactured to exacting standards by the largest technical ceramics manufacturer in North America.

The part is made of an aluminum oxide powder that is 99.5 percent pure; after firing it is highly polished to create a superior seal. This key component is instrumental in providing advantages truck producers are looking for:

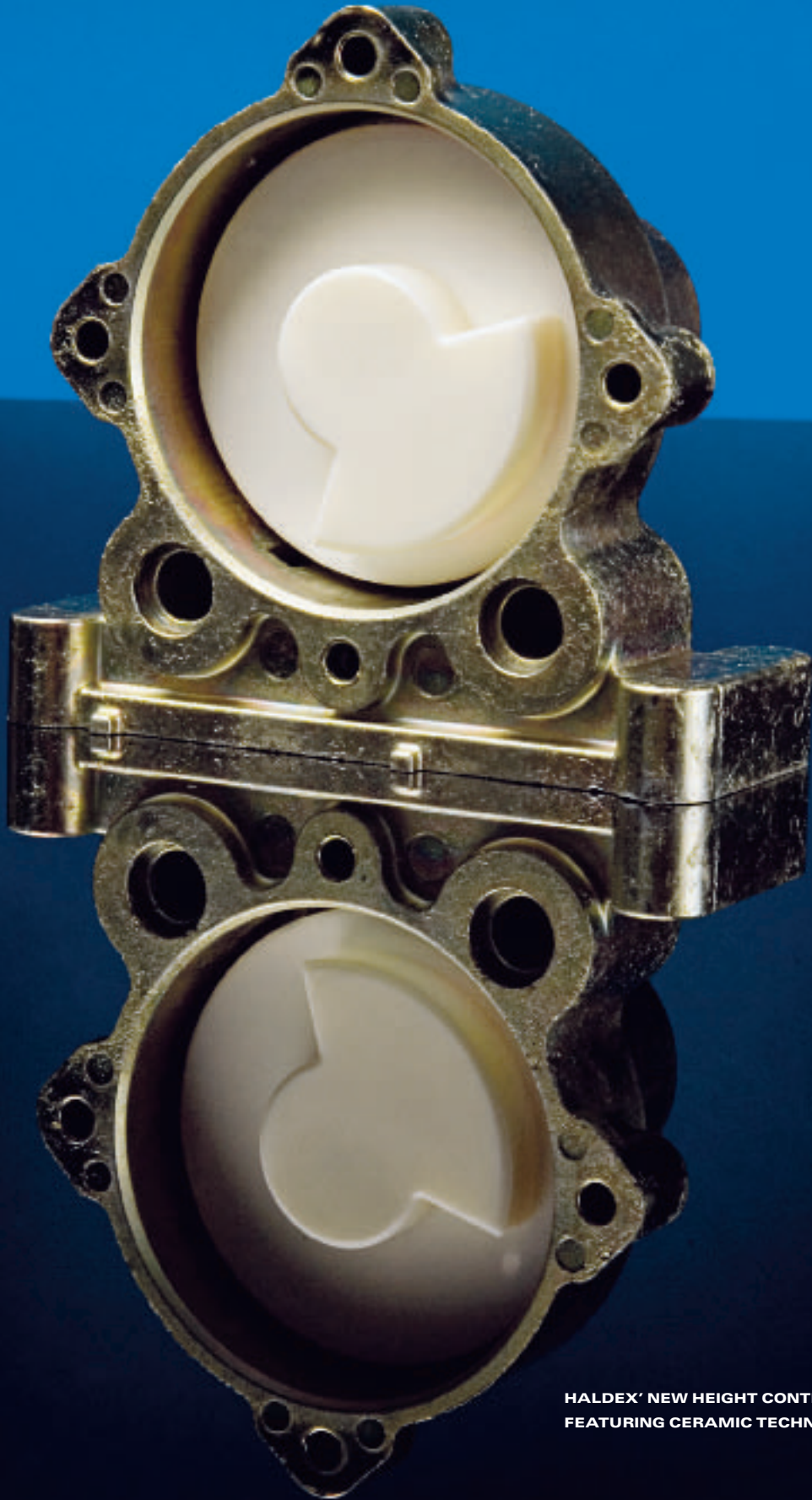
- Ceramic technology seals that are more robust and contamination resistant
- Reduction of the total number of critical dynamic seals to just one

- Type PR valve dead zone of just 3 degrees, an industry best
- When housed in a modular assembly, reduced installation cost and complexity.

All Haldex Type PR ceramic height control valves are 100 percent electronically leak-tested to 1 ccm or less. In severe duty testing, the life expectancy of the Haldex Type PR valve surpasses 100 million cycles (and the reliability curves of any competitor). Haldex Grand Haven makes it tough, to exacting standards, to make it last, and the company works closely with customers to do it all at a lower total installed cost.



THE MODULAR CONCEPT OFFERS THE CUSTOMERS SEVERAL DIFFERENT VARIATIONS OF THE TYPE PR VALVES.



HALDEX' NEW HEIGHT CONTROL VALVE  
FEATURING CERAMIC TECHNOLOGY.