High-Performance Product Marking at Wiseco Piston

Reprinted from Modern Applications News, September, 1992

Jim Calvert, manager of the finishing department and overall quality control at Wiseco Piston, Inc., had searched for over two years to find a better marking system with which to label the thousands of high-performance and replacement pistons made by his company. He found his answer in the TMP6000 Single Pin PINSTAMP® marker from Telesis Marking Systems. Now, one operator can do the same work that previously required as many as eight people and do it much better.

Right up until early 1992, line employees, often as many as eight at a time, were marking up to four lines of information on the piston domes with handstruck dies. For the automotive part numbers, individual dies, one for each letter and number, were inserted into a die holder. Then the holder was placed on the piston dome and struck with a hammer to imprint the information. The same procedure was used to imprint the ring type and the overbore size. The last stamp was a simple arrow that pointed to the exhaust side of the engine, an aid in getting the piston installed correctly.

Hand-stamping the marks with dies has several disadvantages.

First, there was the cost. The seven or eight people marking pistons were seven or eight people who were not doing something else. Wiseco is a relatively small company—80,000 square feet of manufacturing space at its Mentor, Ohio factory—and each employee is trained for several tasks. Even though it required some skill and attention to detail, marking pistons was viewed as necessary, but hardly challenging or critical when compared with some of the other jobs those people could have been doing.

There was also room for error as the individual dies were selected and inserted into the holder, sometimes with one or two upside down. Sixes and nines were especially troublesome. Mistakes were quickly caught when the marks were checked for accuracy, but that still meant discarding what would otherwise be a perfect piston worth $90 or more at list pricing.

Then the die holders had to be struck with just the right amount of force. Hit a die too lightly, and the mark would be too shallow and hard to read. Hit too hard, and the dies would be forced too far into the aluminum surface, creating two problems. First, the deep marks tended to create stress points within the metal. Second, deep marks created high ridges of metal along the outlines of each of the characters. These could become hot spots, weakening the piston and possibly interfering with proper ignition. Also, a die holder with eight characters in it had to be struck with eight times the force of the single die with the arrow.

An alternative, of course, would have been to forego marking. After all, it had been argued, all that information could be put on the package. But that didn't fit with Wiseco's concept of service. Customers needed the information on the piston not only as a convenience when it was installed to replace the original equipment, but also as a practical necessity when the time came to replace it with another Wiseco piston. If the idea of replacing the replacement seems a little strange, some background into Wiseco's market might clear things up.

Clyde Wiseman founded the company in 1941 to manufacture replacement pistons for the outboard engines that powered racing hydroplanes. An avid racer himself, Wiseman discovered that he couldn't rebuild engines that had thrown a rod, for instance, because nobody made pistons that would fit the cylinders after they were rebored to remove any damage caused by the failure. He could get original equipment pistons, but they would be too small for the overbore. So, he made his own pistons and discovered in the process that there was a real market for them.

Wiseco pistons are made for two basic markets. First, is the replacement market. It covers just about any non-automotive engine made in the U.S., Europe or Asia—from outboard marine, motorcycles (street, racing and motocross) and ATVs to snowmobiles and personal watercraft, i.e. jet skis. An outboard engine used for racing represents the most demanding application of all because the propeller is in and out of the water continually. The boat hits a wave, and the engine goes from a full load (propeller in the water) to no load (propeller out) then to full load again as the boat settles back into the water. All of these engines, though, are used hard and rebuilt as needed, often several times. Each rebuild requires pistons to fit the new overbore cylinder size.

Wiseco's second market is high-performance automotive, mostly racing, but also the street rod and muscle car enthusiasts. Applications range from Indy and Formula One cars to stock cars and dragsters, all the way to sprint cars and go-carts. For big-money racing, engines are generally rebuilt before they are ever used. All of the Buick-powered cars in the '92 Indianapolis 500 had Wiseco pistons: one, a Lola-Buick driven by Roberto Guerrero, set a speed record of 232.482 mph in qualifications, and another, driven by Al Unser, Sr., finished third. On the NASCAR circuit, Bill Elliott is setting records in a Ford equipped with Wiseco pistons.

All in all, Wiseco makes pistons to fit over 300 different American, European and Japanese engines from big-block Chevys to two-cycle outboards. Each engine represents a

standard (original equipment) piston, plus as many as seven progressively larger overbore sizes. The total number of different Wiseco pistons available is well over 1500. Wiseco catalogs even carry listings for discontinued pistons as an aid to locating leftover units in shop and distributor inventories and to help identify possible alternatives.

When it's time to rebuild, the mechanic at the shop has only to clean up the dome of the Wiseco piston that was in the engine and read off the part number, overbore size and ring type. He can order exactly what's needed without having to depend on records kept by the previous shop or purchase orders, packing slips or receipts from the owner.

Calvert, as supervisor of the finishing operations and head of quality inspection, had been searching for two years for a new marking system to replace the handstruck dies. He had decided a "peening" technology would be best because of the relatively low total force that it applies to the piston. In peening, dot matrix characters are created by driving one or more conically tipped pins into the surface. Because the force is concentrated at the tip of the pin, the total force is substantially lower than that required from die stamping or roll forming.

It was about that time Calvert heard about the TMP6000 Single-Pin PINSTAMP® marker made by Telesis Marking Systems. He asked for an in-plant demonstration and made his decision before the Rep had even finished.

Ask Calvert what he likes about the TMP6000, and he can rattle off a long list of advantages "First of all," said Calvert, "it's fast—a lot faster than other dot-peen markers I looked at. They all used a fixed-pin, cartridge or single-pin ball-screw mechanism." The TMP6000 uses a robotic arm drive.

"That speed shows up in production," he continued. "One operator in a single shift can mark up to 1900 pistons. Each mark will be perfect, and every mark will be uniform. Its speed shows up in other ways, too. It's PC-based, so every marking pattern for every different piston we make can be stored in memory. It takes about a minute for the operator to change the setup from one piston to another."

Calvert also likes the physical flexibility he has with the TMP6000. "I can mark a pattern anywhere I want on the piston dome. The single pin can get into recesses or it can mark on high areas. It'll do flat spots or mark on slopes," he said.

In addition to standard alphanumeric fonts, the TMP6000 can do custom marks and logos. "Just about anything I can put on paper with a pencil, I can mark on a piston with the TMP6000," said Calvert. "The arrow is just one example. I could easily add a logo. Or mark the part number in an arc. Or I could split up the pattern and put the part number in one location and the exhaust arrow in another and the bore size and ring type somewhere else. Calvert also gives the TMP6000 high marks for precision. "Occasionally, a piston will get marked twice because the operator gets distracted and leaves it in the marking jig. When that happens, the pin hits every dot in exactly the same location. There are no visible double strikes. In fact, you can't even tell with the naked eye that the piston was marked twice."

I also have to credit Telesis for its support," concluded Calvert. "As might be expected with any new computer-based system, we discovered some problems in using the software. Each time, I was able to talk directly with the programmer at Telesis and get my problem solved. Telesis has been remarkably responsive."

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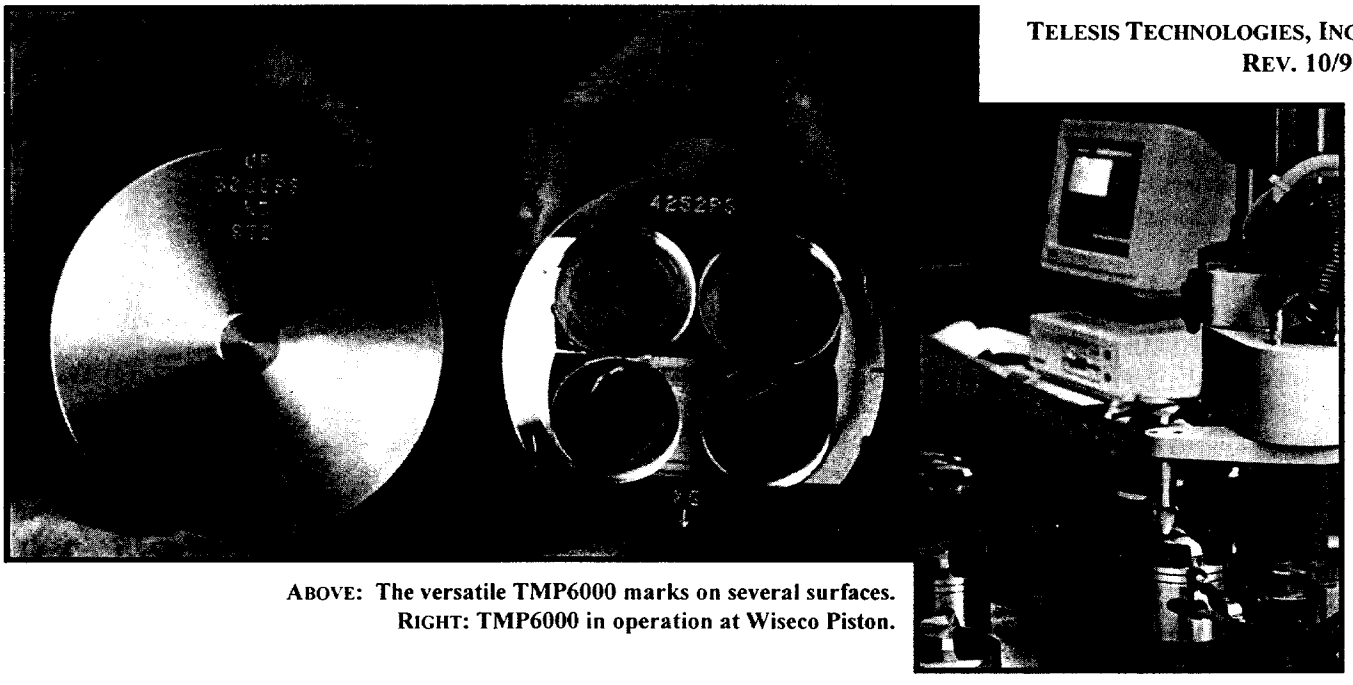

ABOVE: The versatile TMP6000 marks on several surfaces.
RIGHT: TMP6000 in operation at Wiseco Piston.