

New Generation Coders Drive Line Productivity in Wire, Cable and Pipe with up to Five Times Greater Uptime



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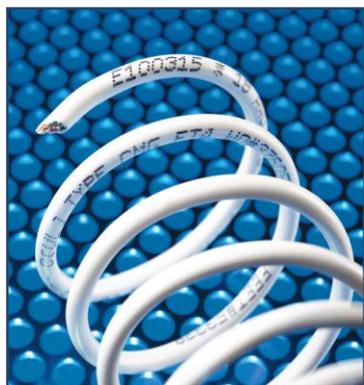
Abstract

Numerous coding maintenance events—both planned and unexpected—often impact productivity in the cable, wire and pipe industries. New-generation continuous ink jet (CIJ) technologies represent a step-change improvement over mechanical and early-generation variable coding methods, increasing coding reliability and quality while extending mean times between scheduled maintenance to reduce downtime and material waste.

New generation CIJ coders have demonstrated uptime (defined here as the mean interval between required maintenance, e.g. printhead cleaning) that is **up to five times greater** than early generation CIJ technology.

The Long and Winding Code

Coding and marking on wire, cable and pipe exists for many reasons. Manufacturers need to identify part numbers, lot codes and production dates. Some codes are needed to meet regulatory compliance, such as listing material composition, electrical insulation rating and resistance to fire.



Others help with product measurement and installation. And some markings serve as the primary means for branding the product with the manufacturer's name and logo—particularly in the pipe industry.

It all adds up to a lot of printing that is essential to the quality, compliance, traceability and even the brand identity of the product. Regardless of the reason for coding and marking products, this information has to be visible on a wide variety of colored substrates and withstand the friction of product winding, storage and installation without smudging or transferring. But first, the codes need to get on the product.

It's a Tough Business

According to Global Industry Analysts, Inc., the worldwide insulated wire and cable market is projected to grow to more than US\$113.9 Billion by 2015. Thanks largely to economic recovery in Europe and

North America, the Freedonia Group projects an overall annual growth of 5.8 percent in the overall pipe industry and 7.3 percent growth for plastic pipe through 2015. That's the good news.

The more sobering news isn't news at all. Extrusion businesses are very expensive to operate—more than three times as expensive as the US manufacturing average in the case of wire drawing and insulation according to North American Industry Classification System statistics. Much of the cost is due to the cost of raw materials—something manufacturers have little control over. Labor costs must be paid whether or not product is coming off the line, meaning that any downtime is a serious liability. And the high cost of production machinery also plays a substantial role.

The message is clear: Make sure that new equipment investments are driving production efficiencies to maximize uptime and minimize overall production costs. While it's natural to focus on extrusion, winding and other “core process” machinery, consider that the codes and marks are as much a part of the product as the copper, resin and other material inputs. And if the coding and marking system isn't working properly, the production line is idle.

Demanding Operating Environment



The operating environment in wire, cable and pipe production doesn't make the coding task any easier. Facilities are often exposed to external weather conditions that can swing widely with both seasonal and daily changes. The environment can range from hot and dry to cold and damp—and everywhere in between.

High production speeds increase coding difficulty. Depending on the diameter of the product, line speeds can reach thousands of feet per minute. Electrical static becomes a concern when dealing with product that is moving at high rates of speed. Also, coding quite often happens within proximity of extremely hot extruder output.

So a coding solution has to be able to work reliably in harsh, fluctuating conditions. And it must be able to keep up with peak production speeds, without becoming fouled. If the printer fails in any way, the extruder or line isn't going to stop until the run is finished. Then the manufacturer is left with production line downtime, material rework and scrap. The associated costs per event can range from a few hundred dollars on the low end to many thousands of dollars.

When Coders Don't Keep Their Commitments

Many times, the “something” that goes wrong during a run is an aging industrial coding solution. Outmoded marking methods like hot stamping, contact rolling and pad printing require nearly constant maintenance. In addition, they don't allow for reliable variable coding, such as inserting a different mark at each meter of cable.

With these older coding methods, something as simple as changing the date requires laborious changeover activities. Worse still, the codes produced are often of low quality and difficult to read—which can unfairly influence the customer's perception of the underlying product's true quality.

Early-generation continuous ink jet (CIJ) technologies have proven to be an improvement over those older analog methods. With just the push of a button, a line manager can immediately recall a digitally stored code, thereby reducing changeover times. Resistance to smudging is also much improved.

Still, these early-generation printers have their drawbacks in demanding operating environments like those found in wire, cable and pipe manufacturing. Numerous printer maintenance events—both planned and unexpected—can severely impact productivity.

Early-generation CIJ is susceptible to nozzle blockages due to contaminants introduced through open fluids or air intake in the printhead. Either of these conditions can cause blockage of a digital coding machine's printhead nozzle, which is only about one third the diameter of a human hair. Even the smallest of foreign particles can clog these nozzles. Suddenly, the printer is no longer printing high-quality codes. It may even be printing no codes at all. Splashback from electrical static and high speeds may create ink buildup which clogs the printhead.

Not All Air Is Created Equal

An often-overlooked reliability factor is that plant air compressors can contribute to downtime when using older CIJ coders.

Coders need positive air pressure for two main reasons: to drive the ink through the printer and to keep the printhead clear. Older printers were designed to simply connect to a plant's air compressor systems.

Air compressors often use lubricating oil to operate. That oil can easily contaminate the air being supplied to the coder and may come in contact with the ink. This oil is wholly incompatible with the inks used in coding and marking. And if the compressor is taking in overly humid air, condensation can collect in the air lines and contaminate the ink with water.

Good new-generation CIJ printers avoid these problems by incorporating an internal air-compression system, isolating the ink and printhead from any contamination that may be present in plant-supplied air.

The High Cost of Maintaining Low Tech Coders

In an effort to avoid unpredictable production disruptions, line managers routinely perform coder maintenance between runs. This, of course, slows down changeovers between SKUs and negatively impacts productivity.



Additionally, with such older technology, this maintenance is fraught with potential problems. Something as simple as replacing inks—a common task—takes on complicating factors that can have huge consequences. In older CIJ printers, the inks and makeup solvents are held in tanks. Beyond the possibility of spilling expensive fluids and creating an enormous mess, there's the very real chance of mismatching inks and solvents or even pouring in the wrong ink for a printer. By the time the mix-up is realized, the damage has been done.

Even just removing a tank's lid carries potential issues. Given the difficult production conditions, dust and dirt from the lids can contaminate the ink and lead to production downtime.

The Case for New-Generation CIJ Technologies

The latest CIJ technology is a step change improvement over prior CIJ options, which were themselves superior to older mechanical coding technologies.

New CIJ technologies increase coding solution reliability and extend the mean times between scheduled maintenance procedures, increasing production line uptime while reducing product rework and material waste. In laboratory testing, new generation CIJ coders have demonstrated uptime (defined here as the mean interval between required maintenance, e.g. printhead cleaning) that is **up to five times greater** than early generation CIJ technology.



Manufacturers should look for improved technologies like these to make the coding and marking operation nearly invisible on the production line:

- The newest printhead designs ensure the highest print quality with minimal cleaning, even when using the toughest pigmented inks. Perforated designs with increased positive airflow are engineered for reducing ink buildup in high-output, high-Static environments like those found in wire, cable and pipe production environments.

- Cartridges with built-in intelligence replace messy open tanks. Sealed cartridges deliver the required inks and makeup solvents while eliminating spillage, contamination and flash-off. They also allow for quick ink replacement with no mistakes, so line managers don't have to worry about the wrong fluids fouling a printer, bringing down production and requiring a time-consuming and expensive flush of the system.
- Integrated units combine wear parts and filters into a single central module that users can easily replace on one predictable maintenance interval. Once the module is replaced, users can feel confident that their CIJ printer will run efficiently over a specified number of production hours.
- Built-in air pumps insulate new-generation printers from external air compressors, ensuring a clean laminar flow of air over internal components and through perforated printheads. This prevents the intrusion of outside contamination in dirty production environments. They also tend to operate much more cost effectively than expensive plant air.
- Temperature-sensing devices and internal heaters keep the ink stream at a constant temperature, regardless of ambient conditions, so the ink is more controllable and overspray is reduced. Whether the coder is installed near the extruder or next to a drafty door, the coder is more likely to operate smoothly and deliver optimum ink drop placement and quality.

Benefits of New CIJ Technologies

Transitioning to new-generation variable coding in wire, cable and pipe applications brings a host of benefits:

- Fewer touches by maintenance personnel—especially when using high-contrast pigmented inks—lead to dramatically improved production uptime (particularly compared to analog hot-stamping and roller-coding methods)
- Code content can be varied automatically based on length of wire, cable or pipe produced
- Higher quality and greater flexibility enables full inline printing of scannable barcodes and logos
- New coding printers are able to withstand wide temperature swings and difficult operating environments
- Cartridge innovations with built-in intelligence simplify ink management and reduce human errors



Case in Point: Baosheng Cable Group



China's largest cable manufacturer was wasting money on scrap, rework and lost productivity due to outdated coding technology.

Read the "Baosheng Case Study" to evaluate their experience in transitioning from older coding technology to new-generation CIJ.



Driving Production Efficiency

New-generation variable coders offer significant and relevant improvements to help keep production moving and keep idle time, scrap and rework costs to a minimum. Wire, cable and pipe producers can drive much higher production uptime, throughput and quality when they upgrade from an early-generation CIJ solution to today's advanced technology.

And if they are still using hot stamping, roller coding or other antiquated marking technology that requires higher levels of maintenance and produces substandard codes, manufacturers have even more to gain from the benefits of improved production uptime, automatic code variation and higher-quality results using new-generation CIJ systems.

Get more information

For more information about coding and marking on wire, cable or pipe, please contact Videojet Technologies Inc. at 800-843-3610 or visit www.videojet.com

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