The anilox roll is what sets the flexographic industry apart from every other printing discipline. In gravure the image cylinder makes contact directly with the ink. In offset and letterpress ink is transferred via smooth rollers to the printing plate. Flexography differs from these processes in that the ink is transferred to the anilox roll, whose unusual surface determines how much ink will be deposited on the printing plate.

From its beginnings a half century ago as a less-than-refined printing process, flexography has soared into the upper reaches of the quality spectrum. The continuing development of the anilox roll plays no small part in this achievement of excellence.

Several generations of anilox roll have emerged. For many years the standard was the mechanically engraved chrome cylinder. These are still around, still being made. But in the narrow web industry the laser engraved ceramic anilox roll became the standard, and remains so today. What continues to change is the method of engraving the cells, and the performance of the roll in concert with ink, as well as with anilox roll cleaning technologies.

Anilox rolls are graded on the number of engraved cells per linear inch. These can range from the low hundreds up to 1,800, even higher. Such cell counts, unheard of a half dozen years ago, are becoming more common, as flexographers push four-color quality to ever higher standards. Working with high cell-count anilox rolls presents challenges, for sure, and many flexo printers prefer to remain in more familiar territory, where 1,000 or 1,200 is considered extreme.

Ink is delivered to the anilox roll in a couple of ways. Presses with open ink pans have a metering roll that rests in the ink, picks it up and transfers it to the anilox roll. A doctor blade mounted along the surface of the anilox removes the excess ink. (See Doctor Blades, page 68.)

Presses that have chambered doctor blades don't have metering rolls. Instead, ink is pumped into an enclosed chamber that has two doctor blades to contain the ink. Part of the face of the anilox roll is exposed to the ink in the chamber, and the transfer is made there.

Cell structure

Engraving of ceramic anilox rolls by laser is performed using a CO2 gas laser process. A few years ago a different technology emerged, known familiarly as Yag laser engraving. The official name is Nd:YAG, an abbreviation for Neodymium:Yttrium/Aluminum/Garnet. It is this engraving technology that allows anilox manufacturers to craft rolls with very high cell counts.

What separates Yag engraving from the CO2 process is that Yag makes use of a crystal instead of a gas. This results in a laser beam with a uniform distribution of atoms in a regular arrangement. The beam's wavelength is one-tenth that of the CO2 laser's, and is produced with a sharper burst of energy. The result is more complete absorption by the ceramic. The effect is more like drilling instead of blasting, and authorities say that the resulting cell walls...
The new generation

are more uniform in size, depth and shape.

The method of laser engraving is but one of the many engineering aspects that go into making a perfect anilox roll. Manufacturers must control the ceramic coating process, the ceramic density, the grinding and polishing and honing required to achieve the finish. If one of these processes is substandard, no type of engraving will produce a quality anilox roll.

The secret of the lightweight roll is also proprietary, but basically it involves a different composition of the base material of new materials to reduce the overall weight of the roll. Printech Anilox Roll Service, also in Charlotte, developed a roll called Ultralight. “We have a patent on the lightweight anilox roll,” says Cameron Wright, vice president of sales. “We were the first ones to do it.”

At Labelexpo Americas in Chicago last year, CTS Industries attracted attention with its new anilox roll. CTS, based in Cedartown, GA, unveiled its Pro-Lite anilox roll at the show, “and it was a big hit,” says Carol Harrison, OEM sales manager.

“Customers would come by the booth and we’d let them pick it up. They were amazed at how much lighter it was,” Harrison says. “They had a ball with it.”

The secret of the lightweight roll is also proprietary, but basically it involves a different composition of the base material.
cylinder. A conventional 10” anilox roll weighs about 24 pounds on average, Harrison says, “but the same size roll in Pro-Lite weighs around nine pounds.”

Echoing Lanska, Harrison says that the Pro-Lite is a bit more expensive for CTS to produce, “but we have absorbed that.” Pro-Lite production is taking over sale of conventional ceramic laser engraved rolls, but not from chrome rolls, which still are being produced by the company.

**Sleeves**

The new generation of narrow web flexo presses are gearless — that is, they are driven by an army of servo motors connected to computers. The technology offers far more flexibility to operators, as well as tighter register at higher speeds. Such new presses also offer re-designed print stations that allow for the use of anilox roll sleeves.

These are anilox rolls built on a hollow cylinder that is mounted on an air-loaded mandrel, thus eliminating the need for the operator to lift out a solid, heavy anilox roll from the press and install another one. The sleeves slide on to the mandrel, which remains mounted in the press, and lock on with air pressure. They are engraved the same way that heavier rolls are engraved, though the sleeve itself is a composite that does not include metal.

“The sad thing with sleeves is that because they are lighter the operators are mishandling them more,” says Pete Hartman of Harper. “Because they can throw them around, they do.”

“The reconditioning capability of sleeves is limited,” says Cameron Wright. “You can’t do it as often as you can with a conventional anilox roll.”

“That’s the question,” Hartman adds, “how long they last and how often they can be reconditioned. The jury is still out on that.”

**Damage report**

Customer service is big in the anilox roll business. Manufacturers offer complete education programs to their customers, as well as roll audits to help them improve handling and cleaning.

Some suppliers report that they have seen a decline in the amount of damage to anilox rolls in the recent past. “That would be due to the education by the anilox people,” says Wright. “We want to do the right thing to service our customers and teach them how to clean and protect them.” Another suggested that a slight reduction in the number of damaged rolls and an increase in roll reconditions is a reaction to the economic downturn. People are not yet ready to buy new and are taking more care of what they have.

Still, roll damage is widespread, and the main cause is abuse. Scoring is another problem. “Ninety percent of the rolls that come back for reconditioning are damaged, not worn out,” says Printech’s Wright. (See the accompanying article on identifying and preventing anilox roll damage on page 66.)

In the course of audits, anilox people see different causes of damage. “In one case a customer had an anilox storage rack on a bench, with a collection of ink jugs on the floor in front of the bench,” recalls Lanska. “The operators had to bend forward and extend their arms in an awkward position to retrieve a roll or put it back, and risk damage to the roll or personal injury.

“In another case, a customer was using very dangerous chemicals on a regular basis to clean rolls. One guy used concentrated hydrochloric acid, got the roll cleaned and wrapped in with bubble wrap, which then melted into the roll face. I’ve seen people use concrete and asphalt cleaners on anilox rolls. As you can see, we have a long way to go with anilox education. It’s an ongoing process.”