

**A comparative analysis of the latest
electromechanical processes by Daetwyler and Hell
Gravure Systems**

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EXECUTIVE SUMMARY

To overcome the shortcomings of quality in traditional electromechanical engraving, both Hell Gravure Systems and Max Daetwyler have released new engraving systems capable of ultra fine detail reproduction. The underlying question is, "Which electromechanical engraving system is better?" Hell Gravure Systems' newest engraving system is called *Xtreme Engraving*. It is capable of engraving up to 2000 l/cm with a max engraving depth of 100 μ . The engraving time at 200 l/cm is equivalent to a standard engraving system operating at 100 l/cm. Daetwyler's newest engraving system is called *tranScribe*. It is capable of engraving up to 200 l/cm with an engraving depth of 60 μ in normal mode and a depth of 130 μ in high output mode. The engraving time in *tranScribe* mode is 0.02 to 0.08 m²/hr. The *tranScribe* system can do both line art and process work with one engraving head, making it a versatile solution. Both systems use a special screening technique whereby the engraving stylus is only controlled via the image signal. While both electromechanical engraving systems have the ability to do ultra-fine detail reproduction, Daetwyler's *tranScribe* System is more suited for engravers looking for a versatile solution, while Hell's *Xtreme Engraving* system seems to be for engravers involved in niche markets.

I. INTRODUCTION

It's no wonder why electromechanical engraving has been the standard for cylinder engraving around the world: engravers have preferred it over the other processes of laser and chemical etching because of its overall simplicity and stability. Gravure printers understand that the only way to compete with flexographic printing is by having complete process control over the engraving procedure. However, while process control is important, quality control is also important and electromechanical engraving falls short in this facet. When it comes to fine lines and detail, offset and flexography have been ahead of the movement. To overcome the shortcomings of quality in traditional electromechanical engraving, both Hell Gravure Systems and Max Daetwyler have released new engraving systems capable of ultrafine detail reproduction. The introduction of these new systems will help gravure excel in printing, especially in security printing and pharmaceuticals, countering the forces of offset and flexography.

I.a RESEARCH QUESTION

Which electromechanical engraving system is better? Both systems have key similarities and differences. An in-depth comparison will show that Daetwyler offers more benefits in its new electromechanical engraving technology.

I.b RESEARCH METHODS

Methods used for research are "Secondary Research" and "Elite and Specialized

Interviewing.” Written information about the technologies were found mainly through each company’s website.

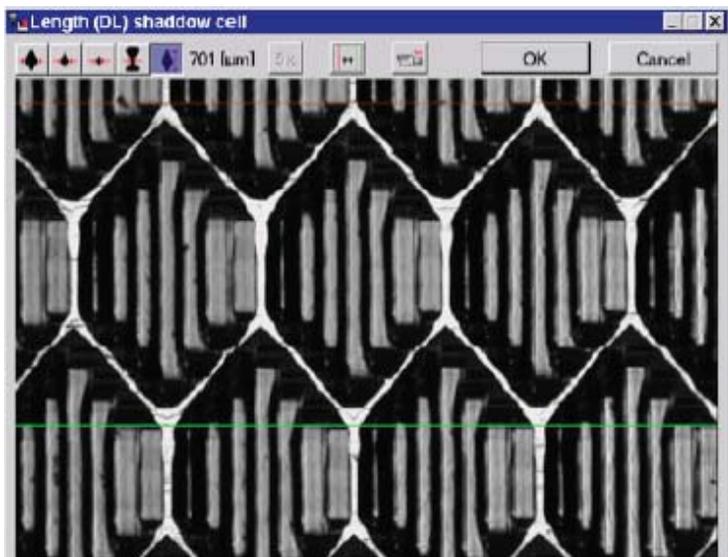
Sales Reps and Engineers were interviewed from each company.

II. HELL’S *XTREME ENGRAVING*

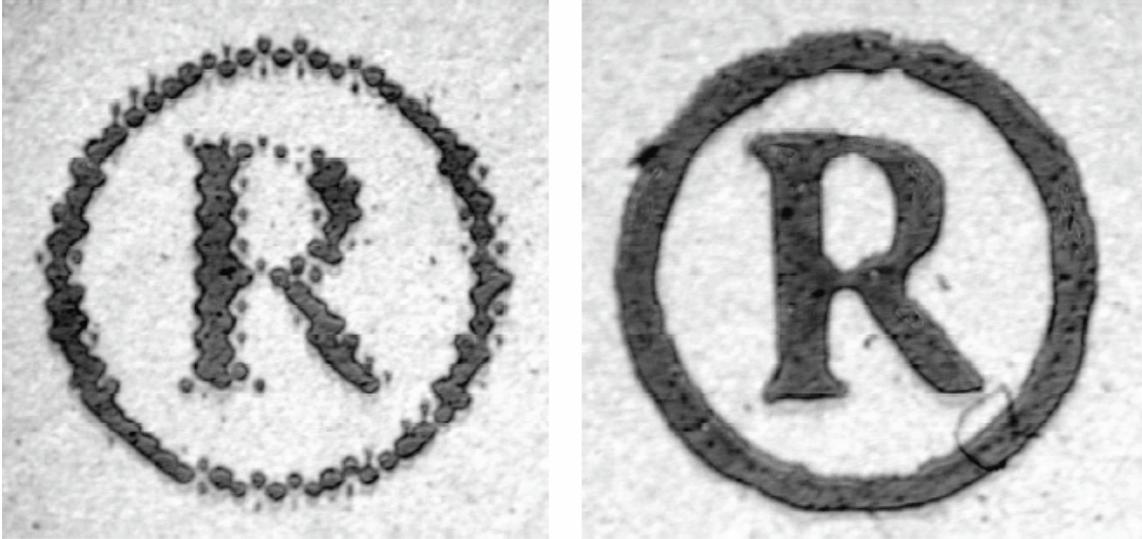
Hell Gravure Systems calls its newest engraving system *Xtreme Engraving*. This innovative technology allows for high-resolution cylinder engraving, similar to that of a laser imagesetter. It is capable of engraving up to 2000 l/cm with a max engraving depth of 100 μ (Zack, 2004). The engraving time at 200 l/cm is equivalent to a standard engraving system operating at 100 l/cm (“*Xtreme Engraving*” 2004, 8). It is important to know that the engraving head in *Xtreme Engraving* is only capable of reproducing line art and text because of the technology’s unique method of engraving. It is incapable of doing process work, which means that *Xtreme Engraving* has to be used in conjunction with one of *Hell’s* a standard engraving heads if a cylinder requires image elements.

The attributes of *Xtreme Engraving* gives printers an immense advantage. It allows them to achieve a higher write resolution without compromising ink volume. Because cells are made three-dimensionally in standard electromechanical engraving, ink volume diminishes with higher resolutions. The *Xtreme Engraving* method allows for a variety of cell shapes to be made, thereby improving ink saturation while increasing contour definition of characters (Figure 1). To do this, Hell uses a special screening technique, whereby the engraving

stylus is only controlled via the image signal (“Xtreme Engraving” 2004, 6). The inherent saw-tooth effect of electromechanical engraving is no longer visible (Figure 2). Furthermore, this screen technology has the integrated option of producing conventional, autotypical and FM screens in the future (“E-topics” 2004, 3). Autotypical screens occur when screen dots have different diameters, but the distance between them is the same, according to the size of the screen itself. FM screens occur when screen dots have same diameters but the distance between them is different. To achieve resolutions of up to 2000 l/cm, the engraving head must be installed on Hell’s latest engraving machine, the HelioKlischograph SP-500.



I. An example of how cell shapes can be produced in *Xtreme Engraving* (“Xtreme Engraving”, 2004, p.5)



II. Example on PE foil: Left, conventional engraving, 70l/cm screen, angle (effective resolution 100 l/cm); right, the effects of *Xtreme Engraving*, 200 l/cm produced (“*Xtreme Engraving*” 2004, 2)

Xtreme Engraving is superior to laser engraving in terms of reproduction of detail and contour definition and is close to being equivalent in quality to chemical etching (“*Xtreme Engraving*” 2004). The system can be retrofitted on any of Hell’s K500 Helioklischographs, which gives approximately 270 engravers the ability to upgrade (“*E-Topics*” 2004, 2). The cost to upgrade a K500 with *Xtreme Engraving* is approximately \$121,000 USD. (Zack, 2004)

III. DAETWYLER’S *TRANSCRIBE*

Daetwyler’s newest electromechanical engraver, capable of superb linework sharpness and text reproduction, is called the *tranScribe Engraving System*. It can engrave up to 200 l/cm with an engraving depth of 60 μ in normal mode and a

depth of 130 μ using high output mode, giving quality results comparable to chemical etching (Taylor, 2004). The *tranScribe Engraving System* can do both line art and process work with one engraving head, giving it a lot of flexibility. The engraving time in *tranScribe* mode is 0.02 to 0.08 m²/hr which is at least six times slower than any of its standard engraving heads ("Engraving Heads" 2004). When the engraving head is in conventional mode (for process work), it can engrave at an impressive speed of 0.81m²/hr at 60 l/cm using the *VISION 3* head ("Engraving Heads," 2004). The *VISION 3* is Daetwyler's latest conventional engrave head that has won the title of "the world's fastest engrave head" ("World's Fastest Engraving", 2004, para. 1). With a speed of 8 kHz, an 80% increase in speed over the *VISION 1* head is accomplished. Since its launch at the IPEX in April 2002, more than 100 engravers have equipped their facilities with this technology. The bulk of the machines went to the Chinese Yuncheng Group (the world's largest service house) which produces more than one million gravure cylinders per year. European Cylinder manufacturers Saueressig, Keating Gravure, and Wetzel have also decided to upgrade to this technology ("World's Fastest Engraving," 2004). The *tranScribe* system can be retrofitted on to its GS 850 and 2215 machine and its cost is under \$300,000 USD (Taylor, 2004).

The *tranScribe* system uses a similar screening technique as *Xtreme Engraving* to produce various cell shapes, allowing high contour definition in characters (Figure 3). In fact, the screening technique is so similar, Daetwyler Engineering Manager, Eric Sarenos, claims that Hell's technology for *Xtreme Engraving* is a duplicate of

Daetwyler's *tranScribe* system. The only difference, he says, is that *tranScribe* actually works (Sarenys, 2004). While this might be an exaggerated marketing statement, it does raise some interesting questions about the credentials of Hell's technology since *tranScribe* has been out for quite some time already.



III. Left, Traditional engraving of kanji characters; Right, *tranScribe* engraving of same kanji characters.

IV. COMPARING QUALITY, RELIABILITY, AND COST-EFFECTIVENESS

The most important factors to look at when comparing Hell and Daetwyler's engraving systems are quality, reliability, and cost-effectiveness. In terms of quality, both output extremely high quality linework and text, but differ when it comes to specialty applications. According to Hell, while *tranScribe's* write resolution is capable of 200 l/cm, *Xtreme Engraving* is capable of 2000 l/cm, a much higher write resolution. This means that *Xtreme Engraving* has a greater potential in the security printing industry, where microprint of 1 pt font may be needed. In respect to engraving depth, *Xtreme Engraving* can do up to 100 μ , whereas *tranScribe* can do up to 130 μ in High Output mode. Having a higher engraving depth means that *tranScribe* has a greater capacity to do jobs where more ink volume may be needed, such as lacquer or cold seal. In terms of reliability (consistency of color and detail) and cost, it is difficult to determine at

this time how *Xtreme Engraving* compares because it is so new; however, 4Packaging GmbH has recently installed Hell's new K500 XL HelioKlischograph with *Xtreme Engraving* and are pleased with the system ("December E-Topics," 2004, 5). *tranScribe* has been out on the market for some time already, and as a result has established a reputable record for itself as a reliable machine. What's more, since *tranScribe* requires only one engraving head to do ultra fine linework and process work rather than two separate engraving heads like *Xtreme Engraving*, the *tranScribe* is a more cost effective solution.

V. CONCLUSION

Engravers will eventually have to upgrade their engraving systems to compete with the speed and environmental safeness of offset and flexography, therefore it is important to understand how these two engraving systems differ. While both electromechanical engraving systems have the ability to do ultra-fine detail reproduction, the *tranScribe* system can do both linework and process work with one head, making it a versatile solution. *Xtreme Engraving* requires two heads to do linework and process work, which makes it more costly than Daetwyler's system. However, if *Xtreme Engraving* can in fact perform at 2000 l/cm, its system will have leverage in niche markets like security printing. This conclusion is based on all current information provided by both companies, and is subject to change once Hell fully demonstrates their capabilities of *Xtreme Engraving*.

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