



### When tight register accuracy counts

*Chi Hsus Color Lithography Co Ltd is a prominent producer of heat transfer labels for the textile industries*

**WOLFGANG KLOS-GEIGER**

*Based in the Wu-Ku Industrial Park of Taipei, the Taiwanese company started in 1997 – they celebrate their 14th anniversary this year – and today employs a total of 80 staff in three factories (Taipei and Taichung). Initial product was offset printed labels. In 2000 their first screen printing machine was installed. Today six single-colour SPM (SPM-320SX, SPM-450SX, SPM-620SX) machines from Smooth Machinery are used at the Wu-Ku site.*

When producing multi-colour heat transfer labels the production sequence is: application of the release agent, printing, drying, printing, drying etc. The final pass is the glue application. As for the reproduction of logos, text or graphic designs a high resolution and high ink thickness are required, two passes for all components (release agent, every colour and the glue are required. This means: a «simple» two-colour label will require up to eight passes. Why? Because of the high release agent and ink thicknesses and the materials (carrier and facestock) used, long drying times at relatively low temperatures are required in order to not create any damages to both coating layers and materials.

When looking at the production sequence, it is quite obvious that

highest accuracy for the second and subsequent passes is required. According to KEVIN WEN, General Manager, the company can accept a register tolerance for multi-colour labels of maximum 50 micron. This requirement was a decisive reason for selecting *Smooth Machinery's* equipment, he confirmed. «We can guarantee a register accuracy of 10 micron for re-passes», says FRANK LO, Managing Director of *Smooth Machinery Co Ltd* of Yang-Mei Town, Taoyuan County. «Combined with our patented drying ovens, this was the «winning package» for *Chi Hsus.*»

#### Composing release agents and glues

*Chi Hsus'* expertise is not just the printing of the heat transfer labels:

a great part is the proprietary expertise in composing the release agents and the glues. The entire production of a heat transfer label starts with the composition of the appropriate release agents and glues. *Chi Hsus* buys the raw materials to mix and compose their proprietary recipes based on the label, the release liner and the garment type. Constant research is with new components and materials.

#### Materials

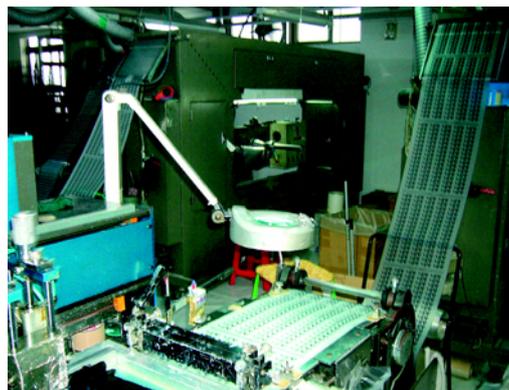
The label substrate is largely depending on the garment type to be decorated (cotton, synthetics, mixtures etc) and thus the glue type applied. The majority of labels produced by *Chi Hsus* are based on filmic materials, namely Polyester (PET). They are also experimenting with other substrates to be decorated such as glass, plastics, (artificial) leather and others.

Majority of the carriers (release liners) used are top-coated PET films. A new material tested for the label carrier (release liner) is the so-called «mineral» paper: a mixture of resin and mineral powders (calcium carbonate). This material degrades under UV light after several months without any harmful waste eliminating the common problem of disposing release liner waste. For processing to carry heat transfer labels a special coating is required. Another benefit with this «mineral» paper is the saving of energy cost as drying temperatures are lower.

**Left:** Kevin Wen (left), General Manager Chi Hsus, and Frank Lo, Managing Director of Smooth Machinery.

**Centre:** Chi Hsus is producing in heat transfer labels on six single-colour SPM machines from Smooth Machinery. Printed labels are directly fed into the special driers (background, right).

**Right:** Inspecting heat transfer labels at Chi Hsus.



According to KEVIN WEN, his customers do accept both papers and films for release liners.

**Patented smooth drying**

An extremely important component in the production chain is the drier: *Chi Hsus* counts on *Smooth Machinery's* patented hot air driers (HDTR-17M, 4HDTR-17M and 6HDTR-17M).

»Depending on the web material (e.g. PVC, PE, OPAT films) drying by UV or IR may cause shrink, fissure and other problems. The smooth and gently hot air drying therefore is the preferred application for almost all kind of materials at a most economical way«, says JIM TIEN, Sales Manager at *Smooth Machinery*. The drying speed is another important parameter.

Unlike a traditional tunnel dryer, *Smooth's* patented drying unit makes a web circulate in (multiple) loops inside the oven from one circle run of 7 meters (22.96 ft) drying length up to a five circles run of 35 meters (114.8 ft). Special oven designs offer up to 102 and 135 meters (334.6–442.9 ft) drying path (and even longer). For drying the inks, the shorter version is sufficient; some of the glues applied require a longer drying path.

The temperature range of 0–150 °C (32–302 °F) allows the smooth drying a big variety of web materials. The driers guarantee a temperature tolerance +/- 5 °C (+/- 41°F). These driers are an economic solution for RFID printing; thermal, water-based or pressure-sensitive transfer printing; electronic con-



ductive films printing etc and can be connected with any label press to dry and rewind automatically. Optionally a lamination unit and web guider is available.

**Finishing**

When all release agent, ink (printing) and glue application passes are completed the dried web is sheeted. Subsequently a manual inspection of every sheet is following. After piling the inspected sheets the labels are through-cut on a manually operated flat-bed die-cutting unit and then packed.

**Outlook**

In their 25 years of operation, the company has achieved an export rate of around 80% (to mainly Asia). Customers are the garment industries producing for all the major international and regional brands.

Heat transfer labels for the textile industries are a growing market. There is a certain transition from woven labels to transfer labels underway. The inner »neck« label is increasingly replaced by a transfer

label. Reasons are decreasing price differences in favour of heat transfer labels, and the increased »comfort« for the wearer (consumer) of garments.

For »outside« decoration *Chi Hsus* is offering the traditional heat transfer label but is increasingly experimenting with multi-colour designs in various inks: glossy, matte, glitter, fluorescent, reflective and others. This too requires increased research with regards to the composition of transfer release agents, inks and glues – all in relation to the garments and inks used. Asked for the major differences in requirements from the market, *Chi Hsus* replied: in Europe it's quality, in Asia it is the price.

Environmentally friendly production has top priority. *Chi Hsus* uses only materials free of heavy metals or other harmful substances. The experimenting with the »minimal« paper, for example is such a prove.

- [www.smoothmac.com](http://www.smoothmac.com)
- [www.chihsus.com.tw](http://www.chihsus.com.tw)

**Left:** Multi-colour heat transfer label.

**Right:** Heat transfer label with special effect inks and varnishes, e.g. glitter.

**Photos:** W. Klos-Geiger.