



Chameleon

Böttcher's roller system for dual purpose printing.





Rollers for UV and Dual Purpose Printing

Within the field of offset printing, the use of UV ink curing systems has steadily expanded in recent years. This trend is mirrored by a growing market demand for rollers for UV and dual purpose applications. While in 2004 only 7% of all rollers produced and marketed by the Böttcher group were for UV and dual purpose printing, by 2008 that number had doubled and in the USA even increased to 20%. There are significant variations in growth rates in the individual markets, but on a world-wide scale there is a clear growth trend. For a manufacturer with a global presence, such as Böttcher, it is important to support this growing market with innovative products and solutions

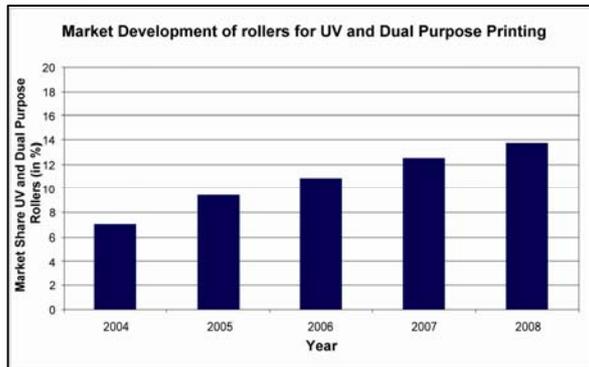


Fig. 1: Market Development 2004 - 2008

Rollers and Inks

It is now common knowledge that special roller materials are required for printing with UV inks, as rubber compounds designed for conventional offset inks are not sufficiently resistant to UV inks. Each year, Böttcher conducts over 30.000 ink/rubber compatibility tests based on DIN/ISO 1817 procedures. Ink samples are collected from both end users and ink manufacturers and examined for their swelling or shrinking effects on rubber, the results serving as a basis for both general development work and individual compound recommendations for specific customers. These tests afford a good overview of the development of UV inks from the standpoint of rubber roller design and manufacturing and highlight some very distinctive trends: while in the past the vast majority of UV inks caused more or less severe swelling of rubber rollers, some manufacturers have succeeded in developing UV inks with much less

harmful effects. Unfortunately, the compatibility with roller materials often figures towards the lower end of the list of development priorities, compared with objectives such as the development of low-migration material systems for food packaging or inks for special substrates.

By virtue of this continual observation of the evolving ink chemistry with regard to our own products, Böttcher is always at the leading edge of technology in the field of UV printing, a fact which is documented by the success of Böttcher rubber compounds for UV and mixed mode printing in both the end user and the OEM markets.

Dual Purpose Printing

In the USA, a market with a relatively high proportion of UV printing, the Böttcher compounds 171 25 and 471 38, specifically developed for printing with both UV and conventional offset inks, received one of the coveted GATF InterTech Technology Awards for 2005. With this award, GATF recognised the exceptional performance of these materials and their chemical and dimensional stability in the different ink systems. These **Chameleon** compounds represent state of the art technology with regard to rubber compounds for UV and dual purpose applications. This applies not only to sheet-fed printing (packaging, plastic foil printing, etc.), but – due to the excellent dynamic properties of the Chameleon family compounds – to UV applications in narrow web printing and on newspaper presses.

To complete the Chameleon product line, the 134 25 form dampening roller compound was introduced at Drupa 2008. This compound is a unique synthesis of the chemical stability of the **Chameleon** series with the dampening properties of a compound specifically formulated for alcohol-reduced or alcohol-free printing. For the first time, printers don't need to compromise between UV ink resistance and dampening performance in the form dampening position - **134 25** is a true dampening roller with all the chemical stability of the **Chameleon** inking rollers.



Special Demands of Dual Purpose Applications

UV inks specifically formulated for printing on paper generally run well with dedicated compounds for dual purpose printing, making the process relatively uncritical. Swell rates are low to moderate with the majority of inks of this type. Recently, some new UV ink series have been introduced to the market with swell rates as low as some hybrid inks and certainly lower than the average UV ink available up until now. As these inks have even less effect on the rubber coverings of the inking and dampening rollers and also the blankets, the printing process will be more stable in both UV and conventional modes, making printing at reduced alcohol levels much easier.

on a press, printing problems can be incurred. For these situations, Böttcher recommends the use of rubber compounds formulated exclusively for UV printing.

The three leading German press manufacturers commissioned Fogra, the German graphic technology institute, with implementing a testing and certification programme for materials used in UV and dual purpose printing. Within the context of this programme, the Böttcher dual purpose compounds 471 38, 171 25 and 134 25 and the 725 40 and 715 25 UV compounds were approved and certified (see attachment). The same applies to the corresponding UV ink series. So far, no inks have been certified for dual purpose applications in plastic foil printing.

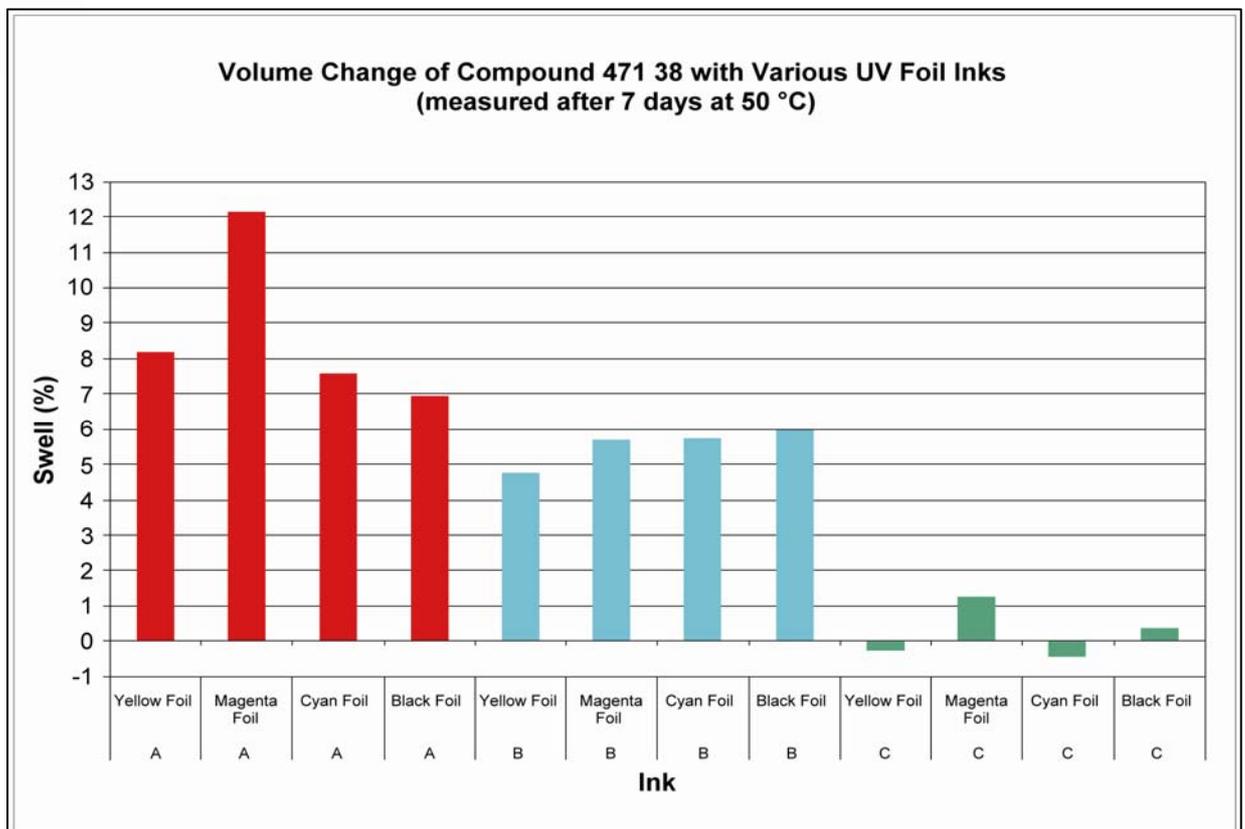


Fig. 2: Swell Test Results with UV Foil Printing Inks of Different Manufacturers

There are, however, extremely aggressive inks on the market, which stretch dual purpose compounds to the absolute limit. In particular, inks for plastic foil printing and metal decorating can cause severe swelling on rollers and blankets. If inks of this nature are used for a major proportion of the work done

Fig. 2 shows the swell test results for 3 common ink series for plastic foil printing with the Böttcher dual purpose compound 471 38. The results clearly show that ink series A is much more likely to adversely affect the dual purpose rollers than ink series C. Unfortunately, inks with swell characteristics similar to series C are rare exceptions in today's



marketplace, the vast majority of available inks displays characteristics similar to series A and B.

When looking at dual purpose printing, the effects of the conventional offset ink, which is also in contact with the rollers and blankets, must also be taken into consideration. Conventional offset inks series can also vary significantly in their effects on rubber. As a general rule, conventional inks will have a tendency to cause shrinkage on dual purpose rollers. If a printer simultaneously runs an extremely aggressive conventional ink, causing severe shrinkage, and an equally aggressive UV ink, leading to swelling, the rollers will react with significant changes in nip geometry and in their behaviour, particularly immediately following an ink switch. This doesn't make printing impossible, but it does make it more difficult to maintain a stable process.

Choosing the right roller compounds enables the printer to maintain control of his dual purpose printing process, though – besides the rollers – the inks have a major influence on both print quality and process stability.

EPDM Roller Compounds for UV Printing

When printing exclusively with UV inks, roller manufacturers typically recommend the use of roller coverings based on EPDM (Ethylene-Propylene-Diene-Caoutchouc). This material is chemically resistant to UV inks, but may not be used with conventional inks and solvents, which would immediately cause severe swelling.

There are, however, significant differences between individual EPDM compounds with regard to their long-term stability. Böttcher's 715 25 and 725 40 compounds are to be found in UV printing applications the world over and many of the world's leading press manufacturers rely on these compounds as original equipment on their UV presses. 715 25, a specialised compound for certain applications, is particularly remarkable in this respect, as it is normally very difficult to reconcile a soft rubber formulation with excellent chemical resistance and longevity on press. Recently, long-term observation of the evolving ink market led to the introduction of a new version of the successful 725 40 compound: **Böttcher Stabilo UV 726 40**.

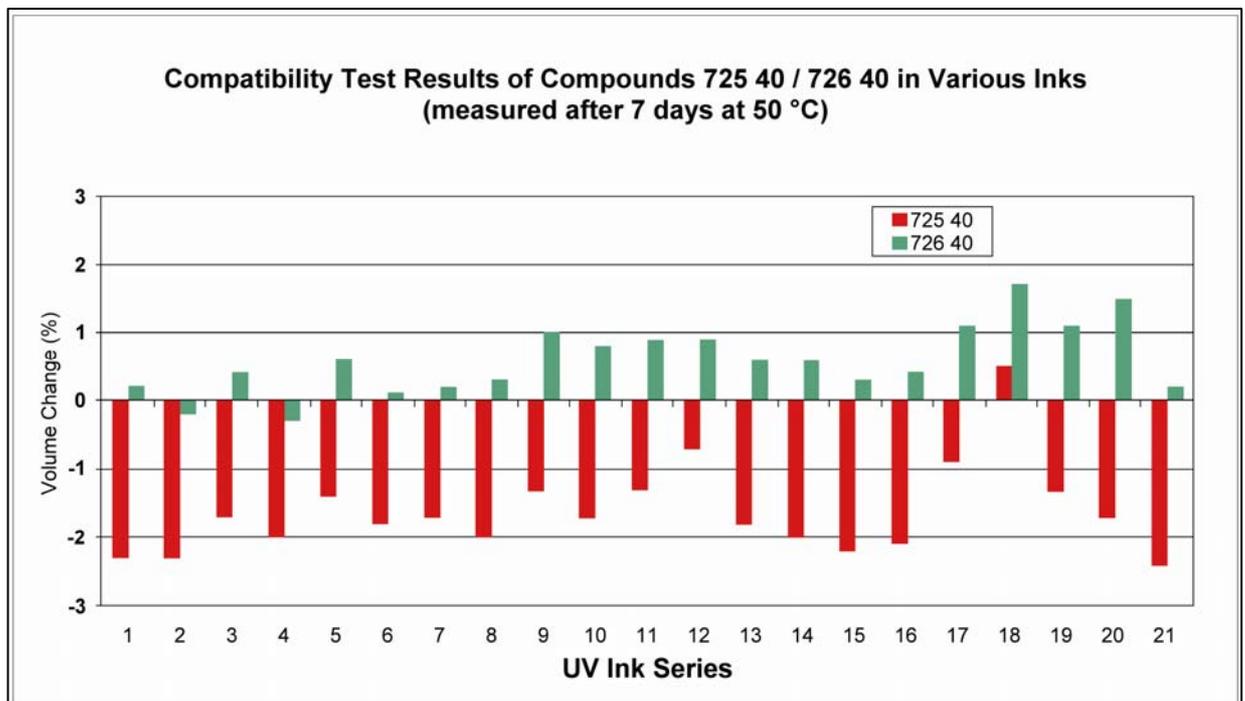


Fig. 3: Comparison of Compounds 725 40 and 726 40 in Different UV Inks



Recent developments in UV ink formulation had led to situations in which 725 40 showed a tendency to shrink. In some cases, the use of certain inks on presses with limited latitude for re-setting the rollers led after a period of time to problems. Due to this shrinkage process, the roller stripe can assume a flared form at the ends (see Fig. 3). The new compound **Stabilo UV 726 40** eliminates these problems. There is less need to re-set the rollers, as the contact stripe remains constant for a much longer period of time.

Fig. 4 demonstrates the underlying reason for this, the improved chemical and dimensional stability of 726 40 compared to 725 40 when exposed to inks of this nature.

The **Stabilo UV 726 40** compound was introduced to the global market several years ago and has established itself as a successful and reliable roller covering for UV printers.



Fig. 4: Roller Stripe "Flaring" as a Result of Roller Shrinkage

In conclusion, it is safe to say that the speed of innovation in the field of UV and dual purpose printing remains high: new substrates, new inks with a new set of characteristics, new consumables and new press technology and, of, course, new interactions between all these components of the printing process.

Böttcher devotes significant resources to observing and reacting to changes in the process environment to ensure that Böttcher roller materials are always on the leading edge of UV printing technology.



Böttcher's roller system for dual purpose printing - Chameleon

The successful products in the **Chameleon** series are available as **471 38** in 38 Shore A durometer and as **171 25** in 25 Shore A durometer. **134 25** is a special development for dampening rollers in dual purpose applications, which can also be used in 100% UV printing (with the exception of inks for plastic foil printing).

The system for 100% UV printing

Standards compounds with global experience and acceptance are

725 40 (40 durometer) and **715 25** (25 durometer).

The latest innovation in this field is the new **Stabilis UV 726 40** compound (40 Shore A)

