ISSUE THREE

2008

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SPECIALIST PRINTING

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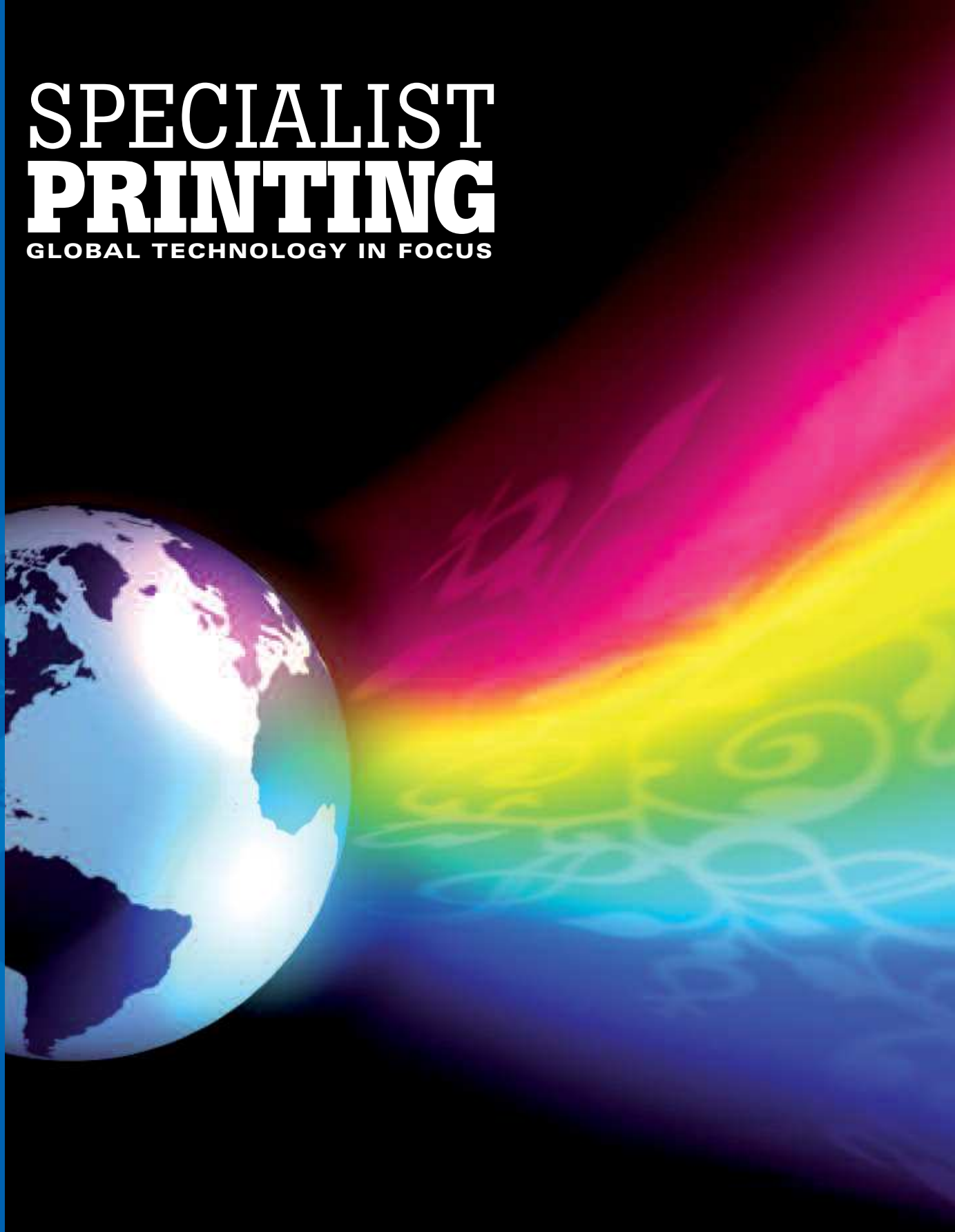

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ESMA specialist printing in focus

NASMA

FOCUS ON ESMA

4 **The European Market and more; Current ESMA membership**

FOCUS ON THE USA

6 **Today's innovators are tomorrow's business leaders**

FOCUS ON NASMA

7 **NASMA forms technical committee to address environmental issues affecting the printing and printing supply industries**

PRE PRESS

8 **Hot isn't cool**
Mick Orr warns screen makers of the dangers of turbo drying in drying cabinets

10 **Mesh moiré: causes and cures**
Steven Abbott outlines the development of his Mesh Moiré Calculator and explains how its use can aid the elimination of moiré

14 **What does a RIP do for an ink jet printer?**
Richard Greaves looks at the different types and benefits of software RIPs

18 **Quality in screen fabric: what matters and why?**
Kevin Lewis advises on how to give a better chance at a quality print

20 **What the JPEG is this? Part 2**
In the first part of his article, Michael Lackner gave us an introduction into the world of graphic formats; in this second part he delves into the mysteries of the jpeg

ON PRESS

22 **Printing special effects**
Johann Bauer outlines the various types of print special effects and describes their uses

26 **Keeping the printing process on track**
Thomas Wübbers explains how the inspection process can be used for more than quality assurance

28 **The common error of visual colour control on press**
Mike Ruff explains why printing to numbers is a more accurate and productive way of attaining correct colour matching

32 **Developments in inkjet ink**
Marco van Niekerk describes a customer-driven technology development that offers new business opportunities

34 **How can we print to international standards?**
Laurie Mullaney outlines the use of proof match software to achieve a single standard for screen printing

36 **Direct screen printing onto cosmetic jars**
Harald Gavin outlines the use of a three-dimensional decorating machine in the design of containers

Welcome
Benvenuti
Bienvenue
Willkommen
Bienvenido
欢迎您
Добро пожаловать

POST PRESS

38 **Verifying the drying and curing process of screenprinted inks**
In the first of a series of articles on drying and curing within the screenprinting industry, Alan Shaw outlines the best process for verifying dryer settings

44 **A multitude of finishing options**
Chris Dillon details some finishing options for die cutters and folder-gluers

HEALTH, SAFETY & ENVIRONMENT

46 **Sound the fire alarm**
Jim Hingst offers some valuable advice in fire prevention and safety

48 **Exploring the eco jungle: part 2**
In the second part of their article, Robb Schneider and Paul Roba ask what we can do to pursue green technology in the graphics industry

IN BRIEF

52 **A round-up of news and new technology**

COMPANY FOCUS

54 **Making printing an environment for growth**
Jane Cedrone details the company and product history and future development strategy of a worldwide digital printing supplies manufacturer

EVENTS

56 **Open house at Thieme**

57 **FESPA Digital Printing India and World Expo Asia Pacific**

58 **CTS and Digital Workflow 2008**

59 **European Membrane Switch Symposium 2008**

60 **Drupa 2008**

62 **Viscom Frankfurt, Italia and Paris; SGIA '08; Future events**

NASMA GUIDE

63 **Current NASMA membership**

MESSAGE FROM BRYAN COLLINGS

Another summer behind us, Drupa a distant memory and SGIA '08 in Atlanta to look forward to. Major stock markets in serious decline and economies suffering, but it isn't all as bad as the press would have us believe – the media does like a bit of sensationalism. From what I hear from a number of manufacturers, they have known far worse times than they are currently experiencing in both the US and European markets and hope to at least maintain current levels of business.

The SGIA show last year was very successful for the magazine with many compliments from printers who had found the content to be extremely informative. As a result of many new printers signing up to receive the magazine, we now send it out to a mailing list in excess of 10,000 people. Fespa Digital in Geneva and Drupa were a success for us with again much interest being shown by printers and manufacturers alike. The magazine, like its mailing list, continues to grow and we have now decided to publish four times in 2009 following demand from both our readers and our advertisers. A media pack for 2009 is available by application from our website (www.specialistprinting.com).

I note that on page 4 Peter Buttiens of ESMA has written about the double seminar being held in Neuss on 4, 5 and 6 November covering Computer-to-Screen & Digital Workflow, plus a Membrane Switch Symposium on the last day. These events will be held simultaneously in both German and English. This has created a lot of additional demand from domestic printers in Germany, as well as from Austria and Switzerland. You can find more information on pages 58-59 in the events section. I hope to see you there!

Bryan Collings
Publishing Director, Specialist Printing

CONTENTS

ESPAÑA

FOCUS SOBRE ESMA
4. El mercado europeo y más…
FOCUS SOBRE LOS ESTADOS UNIDOS:
6. Los innovadores de hoy son los líderes empresariales de mañana
FOCUS SOBRE NASMA
7. NASMA forma un comité técnico sobre asuntos medioambientales
PRE-IMPRESIÓN
8. Secado y almacenamiento correctos para un buen recubrimiento de las pantallas
10. Causas y remedios del moaré en la malla
14. ¿Cómo facilita la tecnología RIP la impresión por inyección de tinta?
18. Calidad de la tela para pantallas…¿qué es importante y por qué?
20. ¿Qué es eso del JPEG? (2ª parte)
IMPRESIÓN
22. Acabados y efectos especiales de impresión
26. Los sistemas de visión mantienen encaminado el proceso de impresión
28. El error habitual del control visual del color en la impresión
32. Desarrollos en tinta para inyección
34. ¿Cómo podemos imprimir según estándares internacionales?
36. Serigrafía directa sobre tarros para productos cosméticos
POST-IMPRESIÓN
38. Verificación del proceso de secado/curado de tintas serigrafiadas
44. Multitud de opciones de acabado
SALUD, SEGURIDAD Y MEDIOAMBIENTE
46. Alarma de incendio
48. Tecnología verde en la industria gráfica: ¿qué podemos hacer nosotros? (2ª parte)
BREVES
52. Últimos desarrollos técnicos del sector
FOCUS SOBRE EMPRESAS
54. Perfil de EFI VUTEk
EVENTOS
56. Avances y revisiones de eventos del sector, incluidos el CTS & Digital Workflow 2008 y el European Membrane Switch Symposium 2008

FRANCE

LE POINT SUR ESMA :
4. Le marché européen et plus encore…
LE POINT SUR LES ETATS-UNIS :
6. Les innovateurs d'aujourd'hui sont les leaders de demain en affaires
LE POINT SUR NASMA
7. NASMA crée un comité technique pour affronter les problèmes écologiques
PRÉ-PRESSE :
8. Séchage et stockage appropriés pour l'enduction adéquate des écrans
10. Moire de tissu : causes et remèdes
14. Que fait un RIP pour une imprimante à jet d'encre ?
18. Qualité du tissu d'écran…ce qu'il faut retenir et pourquoi ?
20. Qu'est-ce donc que ce JPEG ? Deuxième partie
SOUS-PRESSE :
22. Impressions de finitions spéciales et d'effets spéciaux
26. Systèmes de vision en contact avec le processus d'impression
28. L'erreur courante du contrôle visuel des couleurs
32. Nouveautés dans l'encre du jet d'encre
34. Comment imprimer selon les normes internationales ?
36. Sérigraphie directe sur les pots de produits de beauté
POST-PRESSE :
38. Vérification du processus de séchage / durcissement des encres sérigraphiées
44. De multiples options de finition
SANTÉ, SÉCURITÉ & ENVIRONNEMENT :
46. Alerte au feu !
48. Technologie verte dans l'industrie graphique - Que pouvons-nous faire ? Deuxième partie
EN BREF :
52. Les développements techniques dernier cri du secteur
SOCIÉTÉ EN VUE :
54. Profil d'EFI VUTEk
ÉVÈNEMENTS :
56. Avant-premières et bilans des évènements du secteur, notamment CTS & Digital Workflow 2008 et European Membrane Switch Symposium 2008

ITALIA

OBIETTIVO SU ESMA:
4. Il mercato europeo, ma non solo…
OBIETTIVO SUGLI USA:
6. Gli innovatori di oggi sono i business leader di domani
OBIETTIVO SU NASMA:
7. NASMA crea comitato tecnico per affrontare le problematiche ambientali
PRESTAMPA:
8. L'importanza di essicazione e immagazzinaggio per la corretta emulsionatura dei telai.
10 Moiré della maglia: cause e soluzioni
14. A cosa serve il RIP nella stampa ink jet?
18. La qualità della tela. Quali sono i fattori importanti e perché?
20. Che JPEG è? Seconda parte
IN MACCHINA
22. Finiture speciali e stampe di effetti
26. Sistemi di visione per guida del processo di stampa
28. Il classico errore del controllo visuale del colore in macchina
32. Gli sviluppi degli inchiostri inkjet
34. Come possiamo allineare la stampa agli standard richiesti dal mercato internazionale?
36. Stampa in serigrafia diretta su vasetti per cosmetici
POSTSTAMPA:
38. Verifica dell'essicazione degli inchiostri segrafici
44. Una moltitudine di opzioni di finitura
SALUTE, SICUREZZA E AMBIENTE
46. Suona l'allarme antincendio
48. Le tecnologie "verdi" nell'industria grafica. Cosa possiamo fare?
IN BREVE:
52. I più recenti sviluppi tecnologici del settore
OBIETTIVI DELLE AZIENDE:
54. Profilo di EFI VUTEk
EVENTI:
56. Anteprima e rassegna degli eventi più importanti del settore, compresi CTS & Digital Workflow 2008 e European Membrane Switch Symposium 2008

DEUTSCHLAND

ESMA IM FOKUS:
4. Der europäische Markt und vieles mehr …
USA IM FOKUS:
6. Die Innovatoren von heute sind die Wirtschaftskapitäne von morgen
NASMA IM FOKUS:
7. NASMA ruft ein technisches Komitee für Umweltfragen ins Leben
PREPRESS:
8. Korrekte Trocknung und Lagerung für die sachgemäße Beschichtung von Rastern
10. Mesh Moiré: Ursachen und Heilung
14. Welche Wirkung hat ein RIP auf einen Inkjetdrucker?
18. Qualität des richtigen Stoffs – worauf es ankommt und warum?
20. Was für ein JPEG ist das? Teil Zwei
PRESS:
22. Sonder- und Effektdruck
26. Mit Vision-Systemen läuft der Druckablauf nach Plan
28. Ein häufiger Fehler bei der visuellen On-Press- Farbkontrolle
32. Tintenentwicklungen für Inkjetdrucker
34. Wie druckt gemäß internationalen Standards?
36. Direkter Siebdruck auf Kosmetiktöpfchen
POSTPRESS:
38. Überprüfung des Trocknungs-/Aushärtungsprozesses von Siebdrucktinten
44. Unzählige Veredelungsoptionen
GESUNDHEIT, SICHERHEIT UND UMWELT:
46. Feueralarm auslösen!
48. Grüne Technologie in der Grafikbranche – was können wir tun? Teil 2
IN KÜRZE:
52. Aktuelle technische Entwicklungen in der Branche
FIRMENFOKUS:
54. Profile Von EFI VUTEk
EVENTS:
56. Vorschau und Rezension der Industrie-Events, darunter CTS & Digital Workflow 2008 und European Membrane Switch Symposium 2008

汉语

聚焦 **ESMA:**
4. 欧洲市场及更多…
聚焦 **USA:**
6. 今天的创新者就是明 天的商业领袖
聚焦**NASMA:**
7. NASMA成立应对环 境问题的技术委员会
印前:
8. 正确干燥和存储以实 现丝网的正确涂层
10. 丝网龟纹故障成因及 排除
14. RIP对喷墨打印机有 何作用?
18. 丝网结构的质量…重 要事项及原因?
20. 这是什么JPEG文 件? 第2部分
印中:
22. 特种加工和特效印刷
26. 视觉系统保证打印流 程有条不紊进行
28. 印中视觉色彩控制的 常见错误
32. 喷墨油墨的发展
34. 如何使打印达到国际 标准?
36. 直接在化妆品瓶子上 进行丝网印刷
印后:
38. 检验丝网印刷油墨的 染色 / 修正流程
44. 多样化的加工选择
健康、安全和环境:
46. 鸣响火灾警报
48. 制图业中的绿色科技 - 我们能做什么? 第2部 分
简述:
52. 业界最新技术发展
公司聚焦:
54. EFI VUTEk简介
展会:
56. 行业展会预展和回 顾, 包括 2008年CTS和 数字工作流展会 (CTS & Digital Workflow 2008)及2008年欧洲薄膜研讨 会 (European Membrane Switch Symposium 2008)

Россия

В ЦЕНТРЕ ВНИМАНИЯ—**ESMA:**
4. Европейский рынок и не только он…
В центре внимания — США
6. Сегодняшние новаторы — лидеры завтрашнего дня
В ЦЕНТРЕ ВНИМАНИЯ—**NASMA:**
7. NASMA формирует техническую комиссию по вопросам охраны окружающей среды
ДОПЕЧАТЬ :
8. Хорошее окрашивание сеток как результат правильной сушки и хранения
10. Причины и устранения муара от сетки
14. Какова роль RIP в работе струйного принтера ?
18. Качество ткани сетки … что имеет здесь значение , и почему ?
20. А это что еще за JPEG? Часть вторая
ПЕЧАТЬ:
22. Особые методы финишной обработки и эффекты печати
26. Благодаря оптическим системам процесс печати идет по графику
28. Типичная ошибка визуального контроля при печати
32. Разработки в струйной печати
34. Как обеспечить печать на уровне международных стандартов ?
36. Прямая шелкография на косметическую тару
ПОСЛЕПЕЧАТЬ :
38. Проверка сушки и отверждения краски при шелкографии
44. Разнообразие вариантов финишной обработки
ЗДОРОВЬЕ, БЕЗОПАСНОСТЬ И ОКРУЖАЮЩАЯ СРЕДА :
46. Звук пожарной сигнализации
48. «Зеленые » технологии в полиграфической промышленности- что мы можем сделать ? Часть 2
КОРОТКОЙ СТРОКОЙ :
52. Последние технические достижения в отрасли
ПРЕДПРИЯТИЕ В ЦЕНТРЕ ВНИМАНИЯ:
54. Профиль компании EFI VUTEk
СОБЫТИЯ:
56. Анонсы и обзоры событий отрасли, включая конференции «CTS Digital Workflow 2008» и «European Membrane Switch Symposium 2008».

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1 Cantelupe Mews, Cantelupe Road
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www.specialistprinting.com
Fax: +44 (0)1342 322664

PUBLISHING DIRECTOR:
Bryan Collings
+44 (0)1227 272095
bryancollings@specialistprinting.com

EDITOR:
Jess White for Tick Communications
editor@specialistprinting.com

DESIGNER:
Alison Smith for Blue Daze Design Ltd
copy@specialistprinting.com

PUBLISHERS:
Frazer Campbell
Tel: +44 (0) 1342 322278
frazercampbell@specialistprinting.com

Debbie Drewery
Tel: +44 (0) 1342 322133
debbiedrewery@specialistprinting.com

Dave Fordham
Tel: +44 (0) 1342 315032
davefordham@specialistprinting.com

ADVERTISEMENT SALES:
Carol Gibbons
Tel: + 44 (0) 1425 617429
carolgibbons@specialistprinting.com

ADMINISTRATION MANAGER:
Sam Dunmore
Tel: +44 (0) 1342 322133
samdunmore@specialistprinting.com

SUBSCRIPTIONS:
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GERMAN AGENT:
August-Wilhelm Rust
Internationale Medienvertretungen
Tel: +49 6127 660325
Fax: +49 6127 965 9734
info@specialistprinting.com

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THE EUROPEAN MARKET AND MORE ...

WE NOTICED THAT THE PREVIOUS ISSUE OF *SPECIALIST PRINTING* WAS SUCH A SUCCESS AT DRUPA THAT MANY THOUSANDS OF COPIES WERE TAKEN FROM THE INTERNATIONAL PRESS BOOTH AND FROM THE STANDS OF ESMA MEMBERS. IT IS CLEAR THAT THIS MAGAZINE IS BECOMING MORE AND MORE IMPORTANT WITH ITS CONTENT AND VALUE!

Looking back at the past major exhibitions such as Fespa Digital and Drupa, I received some very positive feedback on sales and activities from a large number of members. The European market seems to continue with some good results, even with high competitive influences on a weak dollar. It was also noticeable that Far East manufacturers are less evident at major European trade shows than in the past. The European trend is to focus on innovative developments and environmental issues such as BIO inks and other interesting developments for the near future.

Even the displays of many screen printing manufacturers at Drupa were showing their further progression into industrial applications. This can be confirmed with the high interest of manufacturers for our European Membrane Switch Symposium (more details below). The event was expanded due to the high interest from the market. Printed electronics are becoming a very important application area for the screen printing process. Looking to the growth in photovoltaic production through screen printing, but also other new electronic developments are finding their way to screen printing, and even in some instances to digital printing.

Since the Drupa show, ESMA has grown to more than 60 members and attracted not only new digital members, but also a number of important screen printing manufacturers. The activities of ESMA are also growing with a new Digital committee working on its own projects such as standardisation and symposia.

The screen printing manufacturers within ESMA are currently developing an interesting graphical applications project which we've called the Initiative for Process Optimisation, or IPS. It will be of great benefit to European screen printers to become more competitive in the market against other printing processes.

ESMA also has two upcoming events in November in Neuss (near Düsseldorf, Germany): Computer-to-Screen & Digital Workflow Forum on 4 and 5 November. The European Membrane Switch Symposium is on 6 November, with a networking event on 5 November at the table top exhibition from 18.00-20.00. More information about the programme and how to attend can be found on pages 58 and 59, as well as on the websites (www.ctsforum.org and www.euromembraneswitch.org).

Peter Buttiens,
General Manager, ESMA

Further information:
ESMA, Belgium
tel: +32 16 894 353
fax: +32 16 434 971
email: pb@esma.com
web: www.esma.com

ESMA MEMBERS (August 2002)
3M Deutschland GmbH, Aurelon, Color Scanner Technology GmbH, ColorGate Digital output solutions GmbH, Com2C Gmbh & Co KG, DIP-Tech, Durst Phototechnik Digital Technology GmbH, Dutchscreen International, EFI Vutek, Encres Dubuit, Ergosoft AG, Ferro GmbH, Fimor, Fotec AG, Fujifilm Sericol UK Limited, Fusion UV Systems Inc, Gallus Ferd Rüesch AG, Grünig-Interscreen AG, Hurtz GmbH & Co KG, ISIMAT GmbH Siebdruckmaschinen, Kammann Maschinenfabrik GmbH & Co KG, K-Flow GmbH, Kiian SRL, Kissel + Wolf GmbH, Laurie Mullaney Associates Ltd, Lechler SPA, Lüscher AG Maschinenbau, MacDermid Autotype Ltd, Machines Dubuit SAS, Mactac Europe, Mantel, Heinrich AG, Marabu GmbH & Co KG, Mutoh Europe, Natgraph, Nazdar, Nicomatic, Océ Display Graphics Systems, Onyx Europe, PPG Industries Inc, Printcolor Screen Ltd, Printing International, Quimovil SA, R Tape Europe, Remco Chemie Rentzsch GmbH, RK Siebdrucktechnik GmbH, Roland DG Benelux, Ruco-Druckfarben, Saati SpA, Sefar AG, Sign Tronic AG, SPS®Rehmus ScreenPrintingSystems GmbH & Co KG, Spühl, Sun Chemical Europe, TCG AG, Technigraf GmbH, Tiflex, Trinagle Digital INX, Ulano International VI Inc, VFP-Tripette & Renaud Group, Wängi Mesh AG.

TODAY'S INNOVATORS ARE TOMORROW'S BUSINESS LEADERS

By Michael E Robertson, SGIA President and CEO

THE US MARKETPLACE IS BATTLING THROUGH A SOFT ECONOMY AS A RESULT OF SEVERAL FACTORS: INFLATED HOUSING COSTS, BANK MANAGEMENT ISSUES AND RISING FUEL PRICES TO NAME A FEW. BUT THIS ISN'T A NEW STORY; EVERY DEVELOPED NATION GOES THROUGH ECONOMIC CYCLES.

At SGIA, we're helping our members see the positive aspects of the current business environment instead of dwelling on the problems. We're showing them how to take advantage of these challenges to strengthen their value to their customers. We're helping graphic producers maximise innovation and develop creative products and solutions.

"Competition increases during economic slowdowns … during these times innovation and creative solutions are most valued"

BEING AHEAD OF THE PACK

Competition increases during economic slowdowns. It's during these times that innovation and creative solutions are most valued, and businesses in any industry need to be more effective and efficient to succeed. Graphic producers who push through by providing new and effective solutions for their customers will be the leaders as the economy continues to improve. They will be ahead of the pack.

"Digital imaging is a fast-paced, emerging technology that brings a constant flow of new capabilities and exciting opportunities to our industry"

When it comes to developing innovative solutions, the speciality imaging community has a real advantage over other business sectors. Digital imaging is a fast-paced, emerging technology that brings a constant flow of new capabilities and exciting opportunities to our industry. The best way companies can stimulate innovation, develop new markets and strengthen support to existing customers is by maximising these emerging technologies in their production workflows.

But innovation isn't limited to the production floor – successful companies are maximising innovation in all phases of their operations. They are finding creative ways to interact with their customers and better understand their needs. They are also discovering methods to bring additional value to their customers and use the experiences they have gained to enter new markets.

THE EVOLUTION OF DIGITAL IMAGING

In the US market, digital imaging is at an important stage in its evolution. Digital imaging has broken through the high-production barrier, and graphic producers in the USA are becoming confident in the technology's latest capabilities. It shows as they eagerly employ these new devices. High-production digital imaging capabilities are creating exciting opportunities for innovation.

"Graphic producers develop innovative solutions through increased product diversification"

In addition to improved production capability, graphic producers develop innovative solutions through increased product diversification. An ever-expanding array of new media, substrate and ink systems helps speciality imagers offer new value to existing customers, as well as expand into new markets. We've just scratched the surface in the ways digital imaging can be used to create or enhance products. Flatbed technology and late-breaking UV developments are particularly important in the USA.

Corporate sustainability concerns, including environment protection and employee / consumer safety, also are paramount in the United States – and, indeed, the rest of the world. Companies of all types are meeting consumer demand by establishing practices that minimise their impact on the planet, while operating a profitable business that supports the workforce and local community. Recent sustainability-driven developments in digital and screen printing offer graphic producers viable solutions that meet consumers' calls for 'greener' products and services.

A FAST-PACED BUSINESS

All of these recent developments demonstrate how the speciality imaging marketplace is in a constant state of change, and that pace will just become faster and faster. The businesses that make change work for them will be the most successful.

SGIA '08 (being held in Atlanta from 15-18 October 2008) will be an innovative powerhouse. We'll see a dramatic number of new products and capabilities, all focused on creating inventive solutions. Graphic producers will benefit from the latest technology developments, a comprehensive educational programme and speciality imaging expertise that only SGIA's annual Expo brings together.

Come to Atlanta and learn first-hand how to infuse more innovation into your business, and be one of tomorrow's leaders.

"Companies of all types are meeting consumer demand by establishing practices that minimise their impact on the planet"

Mike Robertson of the SGIA

Further information:
Specialty Graphic Imaging Association,
Fairfax (VA), USA
tel: +1 703 385 1335
fax: +1 703 273 0456
email: sgia@sgia.org
web: www.sgia.org

NASMA FORMS TECHNICAL COMMITTEE TO ADDRESS ENVIRONMENTAL ISSUES AFFECTING THE PRINTING AND PRINTING SUPPLY INDUSTRIES

Parnell Thill, VP Marketing for Ikonics and President of NASMA

Harold Johnston, NASMA's Executive Director

INTEREST IN 'GREEN' PRODUCTS AND SUSTAINABLE BUSINESS PRACTICES HAS TAKEN A STRONG HOLD IN THE USA. NASMA RECENTLY FORMED A TECHNICAL COMMITTEE TO REVIEW BEST PRACTICES FOR ITS PRINTING SUPPLIER MEMBERS AND TO PROVIDE SUPPORT FOR THE NEWLY FORMED SUSTAINABLE GREEN PRINTING (SGP) PARTNERSHIP.

The SGP Partnership was founded in 2007 by three major trade organisations – Screen Graphics Imaging Association (SGIA), Printing Industries of America / Graphic Arts Technical Foundation (PIA/GATF) and the Flexographic Technical Association (FTA). The goal of the Partnership is to serve as a source of credible information for sustainable business practices across all print platforms.

SGP has initiated an aggressive effort to take a leadership role in defining sustainable green printing practices and identifying steps that can help the printing industry establish manufacturing practices and products that are more environmentally sustainable.

NASMA's newly formed Technical Committee is providing technical support to the SGP Partnership as it establishes its certification, benchmarking tools and business practice measures. An important first contribution by the NASMA committee is a glossary of environmental and technical terms; you can view the glossary and learn more about the SGP Partnership on the Partnership's website (www.sgppartnership.org).

NASMA's Technical Committee members are: Neil Bolding (MacDermid Autotype), Steve Pocock (Fujifilm Sericol), Phil McGugan (Nazda), Tadd Armbruster (Chemical Consultants) and Steve Kahane (International Coatings Company).

A full list of NASMA members is on pages 63-64 of this issue.

Further information:
NASMA, USA
tel: +1 816 506 1868
web: www.nasmaonline.org

INDEX TO ADVERTISERS

The publishers of *Specialist Printing* would like to sincerely thank the following companies who have advertised in the magazine since its launch in 2007. Their commercial support has enabled us to grow our circulation list to include over 10,000 users of screen and wide format digital systems from around the world. Due to popular demand, the frequency of *Specialist Printing* will increase to four issues in 2009.

BELTRON GmbH 24
Brother International Corp 63
CTS & Digital Work Flow Forum 2008 23
Dynamesh Inc 63
Encres Dubuit 19
Epson 3
ErgoSoft . . . . . -
ESC EUROPA-SIEBDRUCKMASCHINEN-CENTRUM . . . . . -
European Membrane Switch Symposium 2008 25
Fimor 29
Fujifilm Sericol UK Ltd 11
Gallus Ferd. Ruesch AG 51
Grünig-Interscreen AG 57
Hurtz GmbH & Co KG 41
International Chemical Corp 63
International Coatings Co, Inc 63
Ikonics / Chromaline 63
ISIMAT GmbH 15
K-Flow GmbH 43
Kiaan SpA . . . . . -
Kissel + Wolf GmbH . . . . . Outside Back Cover
Lüscher AG Maschinenbau 45
Marabu GmbH & Co KG 39
MacDermid Autotype Ltd 17
Mutoh Europe N.V. 31
Natgraph Ltd 9
Nazdar 5
Pleiger Plastics Company 64
REMCO CHEMIE Rentzsch GmbH 19
RUCO Druckfarben 37
Saatiprint . . . . . Inside Front Cover
SaatiChem . . . . . Inside Back Cover
Sefar AG 49
Sign Tronic AG 21
SPS®Rehmus ScreenPrintingSystems GmbH & Co KG 43
STAEDTLER Mars GmbH & Co KG
Sun Chemical 13
Technigraf GmbH 35
Thieme GmbH & Co KG
VFP-Tripette & Renaud Group 21

HOT ISN'T COOL

Mick Orr warns screen makers of the dangers of turbo drying in drying cabinets

IT'S A SHAME TO SEE SCREEN MAKERS EXECUTE THE PROPER COATING OF SCREENS, ONLY TO HAVE THEM FAIL BECAUSE OF IMPROPER DRYING OR STORAGE. MODERN SCREEN PRINTERS USE A MUCH BETTER AND SAFER EMULSION SYSTEM THAN PREVIOUSLY. TODAY, QUALITY EMULSIONS DO NOT CONTAIN HEAVY METALS AND ARE EASIER TO USE THAN THEIR PREDECESSORS, BUT MOST SCREEN PRINTERS CONTINUE THE AGE-OLD PRACTICE OF DRYING SCREENS USING A HEATED DRYING CABINET. WHEN USED PROPERLY, THIS IS ENTIRELY ACCEPTABLE AND VERY PRACTICAL.

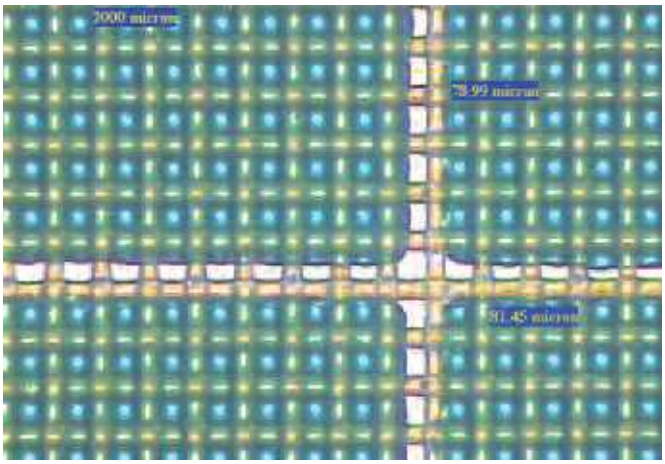
Unfortunately, many screen printers use drying cabinets for more than drying; drying cabinets protect the coated screen from UV light, dust, clumsy fingers etc. Again, this is entirely practical. The problem with drying cabinets occurs when printers resort to using the cabinet as a storage area and when they attempt to speed up the drying process by dramatically increasing the heat ('turbo drying'). This is not a good idea.

DIAZO SENSITIVITY

Excessive heat and sensitisers are not compatible. Heat promotes the decomposition of the sensitiser which is problematical because, for most printers, speed is of the essence and finding ways to short-cut the screen making process is a constant quest. Unfortunately when screen printers use their drying cabinets to 'turbo dry' their screens, or when they use the cabinet as a storage unit – thereby exposing the screen to excessive, lingering heat – the diazo in the emulsion prematurely decomposes, effectively deadening the stencil.

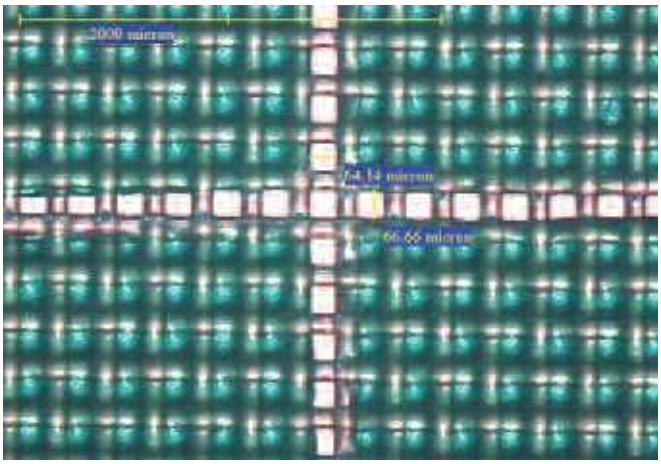
Diazo is a condensation polymer, i.e. Diazonium Salt. When UV light comes into contact with the diazo polymer it becomes active and will react with anything around, including itself. This fundamental reaction makes stencil production possible.

Diazo is not only sensitive to ultraviolet light, but also to heat. Once diazo starts to decompose it cannot be reversed, it can only be slowed down. So a well-intentioned printer, hoping to speed up the drying of a screen by exposing it to high or prolonged heat, is also inadvertently

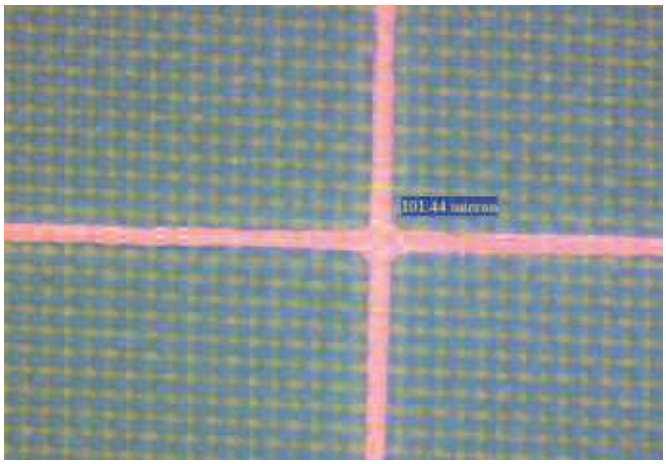


A slight line width reduction when exposed to short term heat can be seen

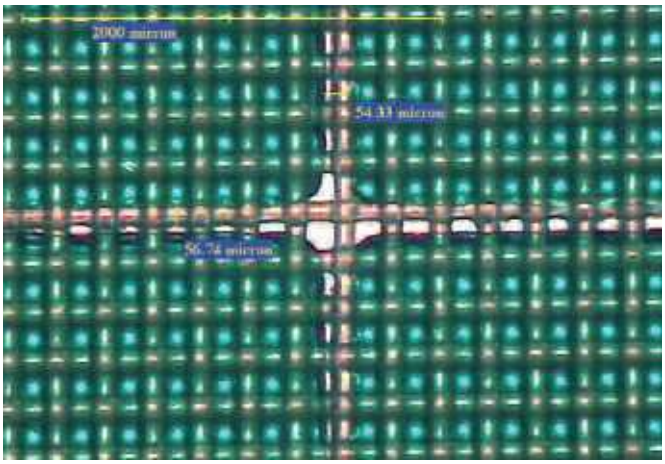
Grid pattern photopositive used for test



Moderate fill after 5 minutes



Razor capillary film dried at 110° F (44°C) for one hour in a drying cabinet



Severe fill-in after 15 minutes

destroying the stencil by prematurely promoting the cross-linking of the photopolymer component of the stencil.

HEAT AND DECOMPOSITION

In addition to speeding up the stencil drying process, heat causes the diazo sensitiser to decompose – the higher the temperature, the faster it degrades. When diazo is added to the emulsion and stored at room temperature, the decomposition begins. This decomposition happens much faster than that of a photopolymer film or emulsion. Decomposing or partially dissolved diazo will produce a weak or failed stencil; for this reason it is always best to use fresh emulsion and a drying cabinet that can regulate the drying temperature.

Typically the life expectancy of a sensitised diazo emulsion is four to six weeks, compared to that of a photopolymer emulsion, where life expectancy can be as much as two years. (Chromaline emulsions are guaranteed for 18 months before sensitising.)

Complicating matters, usually there is no visual difference between newly mixed emulsion and ones that were sensitised weeks or months ago. Successful screen printers manage and organise their inventories according to the age and mix-dates of their emulsions.

REDUCING HEAT-RELATED PROBLEMS

While summer months are notorious for complaints about stencil problems – many of which can be traced to fundamental overexposure to heat – heat-related complications occur in shops all over the world, in every month of the year. These are some guidelines to aid reducing heat-related stencil problems:

1. Store unsensitised emulsion in a cool, dark area.
2. Store diazo sensitiser in a refrigerator if it isn't to be used right away. (Use a separate refrigerator for storing emulsions and diazos – never store in a refrigerator used for food.)
3. Keep film and emulsions cool.
4. Label the emulsion container with the mix-date / sensitised date. Diazo emulsions have a pot life of 4-6 weeks.
5. Control the temperature and humidity in the screen making area; optimal conditions are 70° F (21° C) and humidity of 50% or less.
6. Use a drying cabinet that is heat controllable. Do not go over 110° F (44° C).
7. Only use a drying cabinet for drying screens.
8. Never use a drying cabinet for storage.

The images accompanying this article demonstrate the effects of improper heat on a stencil (all measurements are typical and not to be taken as exact). The results with the capillary films were similar to the direct emulsions. Even though these stencils are imaged they still were affected by heat and didn't reproduce the 105 micron line.

CONCLUSION

Drying screens in an excessively hot cabinet (anything over 110ºF (44ºC) will adversely affect the stencil reproductive accuracy. Also, storing screens that haven't been imaged in a drying cabinet will not be able to accurately reproduce the image on the positive. Use a drying cabinet as intended; remove dry screens and store in a cool, dark, dry, well-protected space.

Mick Orr is Applications Specialist for Chromaline Screen Print Products

Further information:

Chromaline Screen Print Products (an Ikonics company), Duluth (MN), USA
tel: +1 218 628 2217
fax: +1 218 628 3245
email: sales@chromaline.com
web: www.chromaline.com

MESH MOIRÉ: CAUSES AND CURES

Steven Abbott outlines the development of his Mesh Moiré Calculator and explains how its use can aid the elimination of moiré

MIKE RUFF'S EXCELLENT ARTICLE ON MOIRÉ IN ISSUE ONE, 2008 OF SPECIALIST PRINTING REMINDS US THAT MOIRÉ IS ALWAYS OUT THERE THREATENING TO DISRUPT OUR PRINTING LIVES. A FEW YEARS AGO I WROTE A LITTLE BOOK CALLED 'MOIRÉ, CAUSES AND CURES - A PRACTICAL GUIDE FOR THE SCREEN PRINTER', WHICH DESCRIBES THE ROOT CAUSES AND CURES FOR MOIRÉ. IT'S BEEN AMAZINGLY POPULAR AND HAS BEEN TRANSLATED INTO SEVERAL LANGUAGES – EMAIL ME IF YOU WANT A FREE COPY.

As Mike's article noted, the screen world is increasingly and often unnecessarily being pushed to higher LPI (lines per inch) printing, which brings many challenges including the phenomenon of mesh moiré – produced by a clash between the halftone pattern and the mesh – which is just one of the prime causes of moiré described in my book.

As so often happens in screen printing, much nonsense has been written about mesh moiré. For example, there is a myth that it only happens if there is an integer ratio between LPI and TPI (threads per inch). Another is that the moiré would go away if only the mesh could be stretched 'perfectly'.

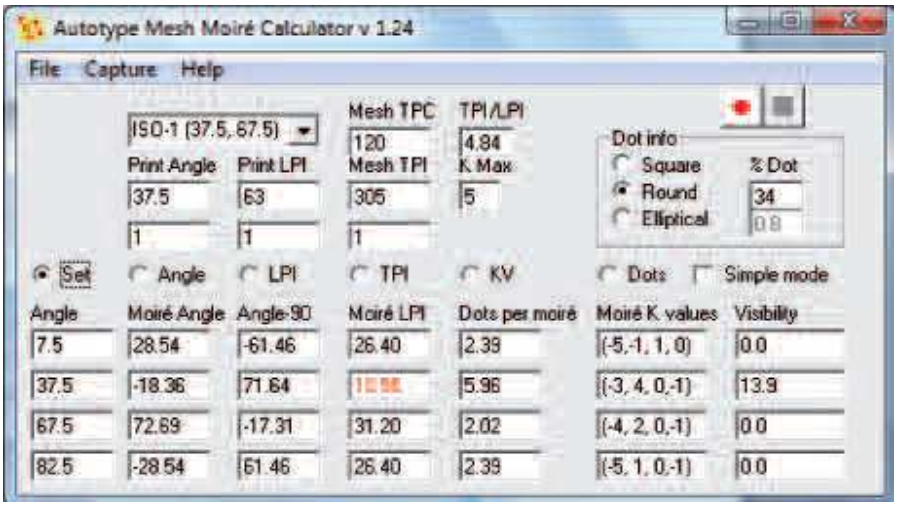


Figure 1

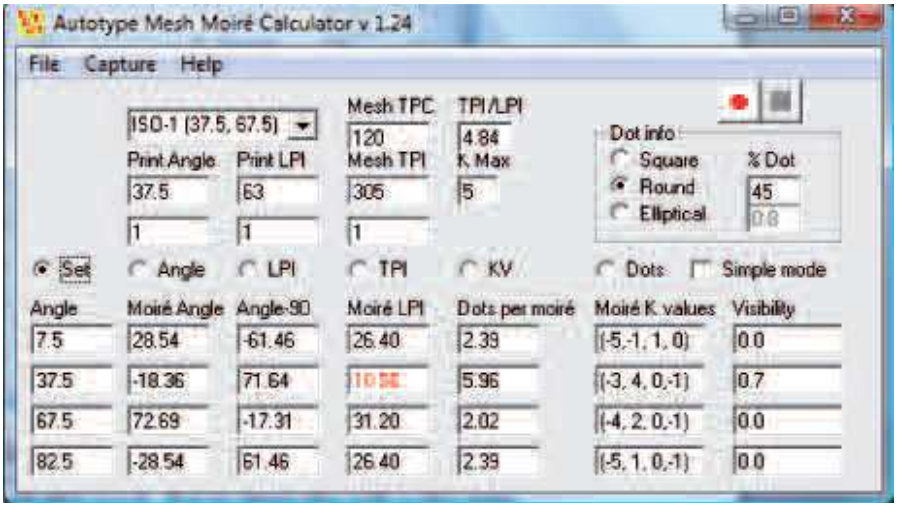


Figure 2

DISPROVING THE MYTHS

Happily, both myths can be disproved mathematically and experimentally. Even better, because we now understand the phenomenon of mesh moiré at a fundamental level, we can use software to predict it in advance and thereby take steps to eliminate it. My Mesh Moiré Calculator (MMC) is available free of charge to anyone who emails me for a copy.

The symptoms of mesh moiré are often puzzling. First, do you see the moiré when you print the individual colour? In other words, it has nothing to do with interactions between colours. This is the basic diagnostic step you should take to know if you have mesh moiré rather than any other type. Often you can have a CMYK screen set which gives moiré-free prints for three out of the four colours. This, incidentally, disproves the myth of integer ratios – each of the four screens has the same ratio so why does only one of them show the moiré?

Equally puzzling is that for the (usually) one colour which shows the moiré, it's not equally visible throughout the tonal range – some tints show it strongly, others don't. And the moiré can depend on the shape of the dot (round, elliptical, geometric) but in no obvious fashion – if you cure it for one tint for one shape of dot, it pops up at another tint level for a different dot. Finally, some mesh moiré is visible but 'stable', yet an apparently similar mesh moiré is wildly unstable and changes rapidly with small changes in mesh tension (the probable origin of the 'perfect stretching' myth).

EXPLAINING THE PHENOMENA

The MMC explains all these phenomena in one go. It uses a powerful mathematical method for calculating how the mesh and dot shapes interact to form (or not form) a visible pattern. I have to stress that the complex maths involved are beyond me – all I did was code the algorithm developed by Isaac Amidror and provide a visual interface which hides the complexity and gives us the ability to find a screen set which should be free of mesh moiré.

See figure 1 for a specific example. There's a lot going on in the modeller but let's focus on the essentials. We have a 63 LPI print on a 305 TPI mesh (I'm sticking to threads per inch, TPI, and lines per inch, LPI, in this article for simplicity). There's a red warning for the 37.5° colour, with a 'visibility' of 13.9 for a 34% round dot.

We can therefore be pretty certain that it would be most unwise to use this LPI with this mesh. But to stress the uncertain nature of mesh moiré, let's see what happens when we print a 45% round dot. Although there's still the red moiré warning, the calculated visibility is only 0.7, in other words a 45% round dot will show effectively no moiré.

A STABLE MOIRÉ

If I simulate bad stretching with a particular TPI/LPI combination in figure 2, it turns out that the visibility and moiré angle hardly change as the mesh varies between 304 and 307 TPI (you can test this yourself with the software), so this is a 'stable' moiré. But if I set up a different TPI/LPI combination and use the software to vary the mesh from 353 to 356 TPI, the moiré angle changes from 25.6 to 67.2 – in other words there is a big visual shift in the orientation of the moiré, an alarmingly 'unstable' moiré which would definitely upset your customer.

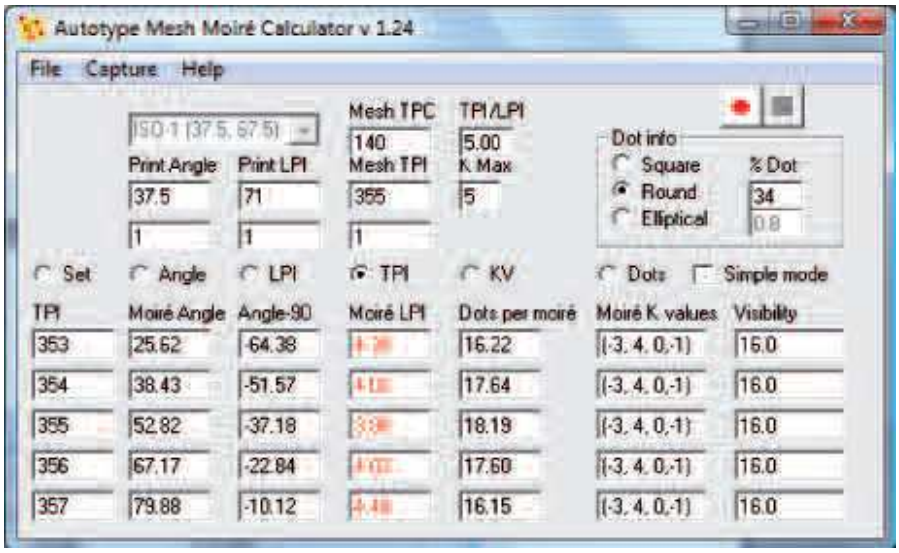


Figure 3

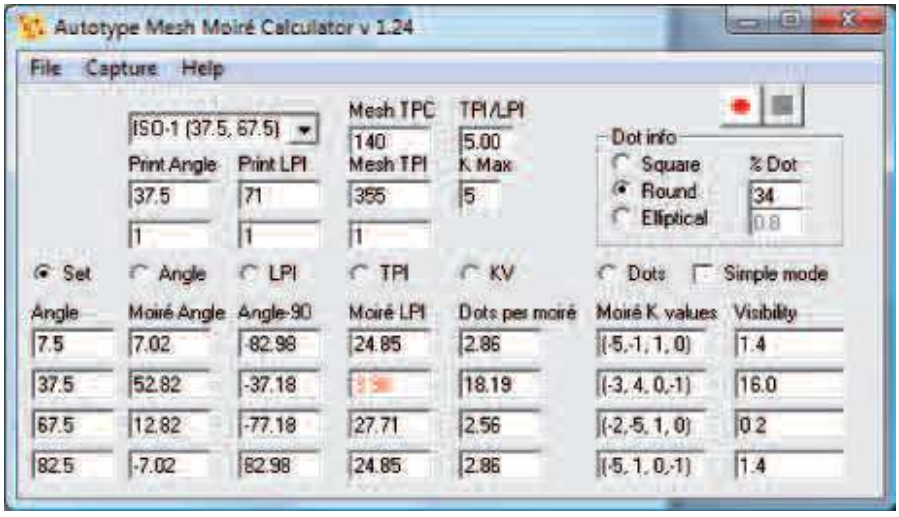


Figure 4

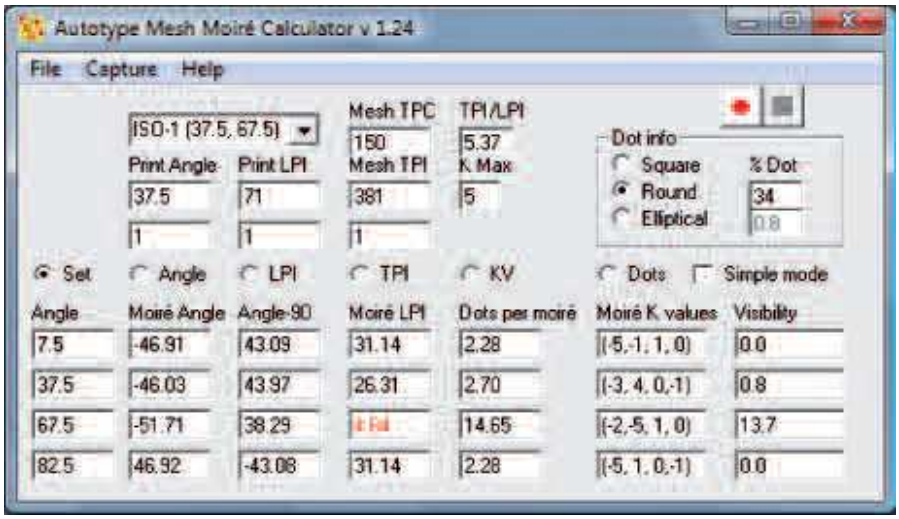


Figure 5

Incidentally, this 355 TPI - 71 LPI set has no problem with three out of the four colours, even though the TPI/LPI ratio is exactly five (see figure 3). The integer ratio myth is busted and should never have existed because when you do the trigonometry, the TPI/LPI ratio of the mesh / dots is anything but an integer.

Given that three out of four of the angles are OK, what should you do to get a moiré-free 37.5º print? My recommendation is something that many printers have found by trial and error: print the bad angle with a different mesh. For example (see figure 4), if you use a 350 TPI mesh there is no moiré for the 37.5º, but don't use the 350 mesh for the 67.5º print as this now has a strong moiré. A theoretical alternative is to change the LPI of the bad angle, but this is highly dangerous: although it will fix the mesh moiré, it's likely to create a ghastly inter-colour moiré.

WORKING WITH SUPPLIERS AND BUYERS

When you get to know the MMC, you will find that as you go to higher LPI prints it gets harder to find a single LPI/TPI combination which gives moiré-free printing (see figure 5). This means that you have to work harder with your print buyer, RIP supplier and mesh supplier to come up with reliable combinations. For example, if your print buyer says: "I want 85 LPI" you must have the courage to say: "I can give you 81 LPI, that should be fine". Or if your RIP supplier only gives you a 78 LPI set and you find you need an 81 LPI set to be moiré-free, you've got a problem.

The best RIP suppliers should understand this moiré maths so you shouldn't have a problem convincing them to give you the freedom you need, and you need to have a mesh supplier who can let you swap in, for instance, a 350 TPI mesh in an otherwise 340 TPI set. If they can't, maybe you can get your RIP to give you some fancy quasi-stochastic halftone at the worrying angle.

The message of this article is that when armed with the moiré science, you are in control. You can't fight the maths because it is what it is, but you can make intelligent choices once you know what the maths is saying – and that's a lot better than relying on myths or blind hope!

ACKNOWLEDGEMENTS

Isaac Amidror's book 'The Theory of the Moiré Phenomenon' has been key to the development of the MMC, as has the sage advice from Mike Ware of Wasatch.

Professor Steven Abbott is Research & Technical Director of MacDermid Autotype

Further information:
MacDermid Autotype Ltd, Wantage, UK
tel: +44 1235 771111
fax: +44 1235 771196
email: sabbott@macdermid.com
web: www.macdermidautotype.com

WHAT DOES A RIP DO FOR AN INK JET PRINTER?

Richard Greaves looks at the different types and benefits of software RIPs

THERE IS A LIMIT TO WHAT A DESKTOP INK JET PRINTER CAN REPRODUCE, BUT RIP SOFTWARE AND PRINTER COMBINATIONS THAT SELL FOR LESS THAN €800 CAN RIVAL THE SCREEN PRINTING POSITIVE OUTPUT OF IMAGESETTERS THAT COST 10 TIMES AS MUCH 20 YEARS AGO (SEE FIGURE 1).

Ink jet printers are designed to reproduce colour photos on white paper, but screen makers need high contrast positive images on clear film with hard, sharp edges and opacity to stop UV energy. This is not easy to do with transparent inks designed to create full colour prints by overlapping and blending CMYK inks on white paper. To increase the ink deposit and to control the dot gain from all that ink – and convert vector image curves into bitmap images that can be printed – you need a software RIP (raster image processor).

COMPUTER FILES

Vector graphic programmes such as CorelDRAW and Adobe Illustrator create images with many individual two-dimensional 'objects' – points in space described with mathematical formulas that can only exist inside computer memory. These objects are combinations of an 'outline' or 'stroke' and individual properties assigned to each object such as fill colour. Because they are built from mathematical formulas, it is very easy to scale them (i.e. change their size) with an instant change of one small part of the formula.

A vector image mathematical formula means that large areas can be described with very small files and if you want an image to be 6 centimetres or 6 metres at its final size, the file is basically the same size and a much smaller file size than raster-based bitmaps from Photoshop or scanners.

Vector images are resolution independent because the resolution is not part of the file as it is with a bitmap; the resolution of the final image is determined by the output device. The only way to make mathematical vector curves visible is to rasterise them – that is, to convert them into a bitmap image that can be output on a monitor or printer. That's why the curves from vector graphics programmes such as CorelDRAW and Illustrator need to be converted to a bitmap, so ink jet printers can produce them.

Figure 1: Epson printer with positive and RIP

TYPES OF SOFTWARE RIPS

In the days before computers separated art, photographs or the actual art were scanned with very expensive equipment and RIP software converted the scan into CMYK positives that were made with a photographic imagesetter.

Most art today is created and separated in computer graphics programmes. If the artist uses spot colours to create the image, the image is already separated and ready to be output. These vector files use the Adobe Postscript language and only need to be translated into a language the printer understands. Modern RIP software can still make CMYK separations or just translate the Postscript output to increase ink deposit, and to calibrate and control halftone size from the increased deposit.

One of the real benefits of a RIP is to fine-tune and calibrate the size of dots so the finished print on the substrate is the dot the designer wanted. With all the steps and conversions an image takes, a 30% dot never starts out as a 30% dot. This is usually done with a densitometer, but can be done with a microscope that can measure actual dot size (see figure 2).

Beware – colour management software to control photos or posters printed in full colour on different types of papers also controls ink deposit, but is of no use to a screen maker because it lacks the ability to shape Postscript halftones.

HISTORY

In the late 1990s, when photographic film companies stopped making diffusion transfer film, someone discovered the 'Ink Jet Back Light Film' media setting on some of the DYE Epson inkjet printers such as the 3000 and 1280. This setting increased ink deposit enough to stop UV energy to make screens. This saved and revolutionised the screen printing business as it searched for a computer solution to replace process cameras and anaemic desktop laser printers that didn't have enough density.

Newer Epson ink jet printers didn't have the 'Ink Jet Back Light Film' media setting. Epson dye or pigment ink rarely measures above 1.6 UV density using the Epson driver, so printers that do not need to make halftones also need a RIP to increase ink deposit. Some laser printers can achieve 2.0 density, but I regularly print 4.5-5.0 UV density images with an Epson R1800 printer – this is something a laser just can't do.

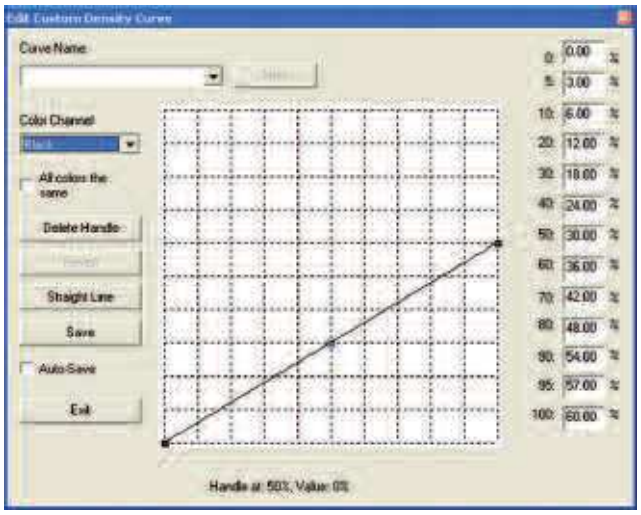


Figure 2: calibration dialogue box

INK JET HEADS, FILMS AND INKS

Epson uses a method of ink ejection called piezoelectric. To print, an electrical signal is sent from the printer to a ceramic printhead which will expand and then contract. The compression causes a drop of ink to be ejected through the nozzles and onto the ink jet film. It is very simple to control the electrical signal to control drop size compared to controlling the heating of the ink to make it eject. The piezo ejection method results in a smoother, more consistent drop.

Ink jet ink needs a top coating on polyester film to enhance ink adhesion, control dot gain, drying time and moisture resistance. If there was no topcoat the ink would smear and bleed like water drops on glass. The coating for dye inks is called swellable, and they look like gelatin or capillary film coatings. They swell and absorb the 100% water-based liquid dye ink, but if you get a drop of water on them, the ink can re-wet and bleed.

Figure 4: Epson 1280 dialogue with back light film media

The author

Colourfast pigment inks for long-lasting photographs were introduced in the late 1990s. In November 2002, Epson stopped making the 3000 as it focused on pigment inks to make photographic images last longer. Pigment inks need a micro porous coating so the pigment particles that can't be absorbed by a swellable coating can get into the coating. You can use dye or pigment ink with a micro porous coating.

WATER-BASED PIGMENT INKS

The water-based pigment ink is absorbed with capillary action and carries the pigment particles into the coating where they can hide under the surface, build up and stick to the sides of the coating particles when the water evaporates, just like any water-based ink. This makes them resist bleeding because they are contained in the coating and appear to be dry. This does not mean the ink is dry, it's just below the surface and can be pulled out of the coating with the vacuum frame if the ink is not allowed to dry. Water can also be absorbed from the air and keep the ink moist and wet. Many people in high humidity conditions experience problems with ink that is pulled out of the film by the vacuum during stencil exposure and it stains the stencil and can't be used again.

Figure 3: densitometer reading 4.9 UV opacity

Often porous, nano porous or micro porous coatings are termed 'waterproof'. If you lick your fingers and pinch a piece of film, you will make one side sticky as it absorbs the moisture with capillary action. Suppliers started selling this more expensive micro porous coating as 'waterproof' to people who wanted to pay for a safer coating. This has always concerned me because all inkjet films are made to absorb water-based inks. Since the inks for Epson printers are water-based, none of the inkjet films are waterproof – they should have been named 'bleed-proof'.

The downside to pigment inks for screen printers is that the irregular shape of pigment particles has to be coated in a clear resin so it will flow smoothly through the inkjet heads. As pigment particles must comingle with nano porous particles, pigment ink must be stacked thicker than 100% dye ink that can flow smoothly and link up when it is absorbed by the swellable dye ink coating.

Ten years ago, ink jet printers were primitive. We are only at the beginning of the age of ink jet printing as membrane switch companies are working on decoration and printing conductive inks. Epson has introduced its 4-colour Stylus Pro 4400 in Europe targeting sign makers; making positives for screen making can only get better. SP

Richard Greaves is Technical Services Webmaster for Ulano

Further information:

Ulano Corporation, New York, USA
tel: +1 718 237 4700
fax: +1 718 802 0188
email: GreavesR@ulano.com
web: www.ulano.com

QUALITY IN SCREEN FABRIC: WHAT MATTERS AND WHY?

Kevin Lewis advises on how to give a better chance at a quality print

WHEN YOU CONSIDER A FABRIC'S QUALITY, YOU ARE REALLY EVALUATING THE QUALITY OF THE 'HOLES'. THE 'HOLE' QUALITY IS ONE OF THE BIGGEST FACTORS THAT HELPS DETERMINE THE PREDICTABILITY OF THE ULTIMATE PRINT AS THE HOLE IN THE FABRIC DETERMINES THE DIMENSIONS OF THE INK CUBE AND THEREFORE THE PRINT. THE CUBE OF INK THAT IS PRODUCED IN THE ACT OF SCREEN PRINTING DETERMINES THE POSSIBLE COLOUR AND DETAIL OF THE PRINT. BUT WHAT MAKES UP THIS 'HOLE'?

Most fabric used commercially is a 'plain weave' in nature as opposed to a 'twill weave'. Twill is not common due to its unpredictable ink deposit and detail / moiré effects. A plain weave is the basic weave pattern of thread (usually polyester) in which the yarn in the weft alternatively goes over one thread in the warp and then under the next. This theoretically creates the squarest hole and most predictable print image quality.

The length, width and depth of the hole are determined by the thread diameter and count, or threads per inch. This combination is critical when considering which mesh is best for the printer's application. Mesh is designated by two numbers: the first number is the number of lines per inch and the second number is the diameter of the individual threads – 305/35 mesh, for example, has 305 lines of thread per inch which are 35 microns in diameter.

EXAMPLES OF VARIATIONS

Here is a classic example of how a single manufacturing (or shipping) flaw can have a dramatic end result in the print: a 35 micron thread product is ordered and a mesh with a 40 micron actual diameter is delivered. A 35 micron thread in this count gives the mesh an open area of 33%. By mistakenly supplying a 40 micron thread the mesh now only has a 25% open area, which is a relative difference of almost 32%. This can easily result in colour weakness, loss of detail and moiré effect.

While quality mills do not weave the wrong thread, they can and often do change the dimension of mesh through its post-weaving treatment. Heat and pressure are applied to stabilise the mesh for elongation properties and in the dying process, which can result in thread width variation. The key is to find a manufacturer that does everything to produce a consistent product whilst keeping such variation to a minimum.

Plain weave 'one over one'

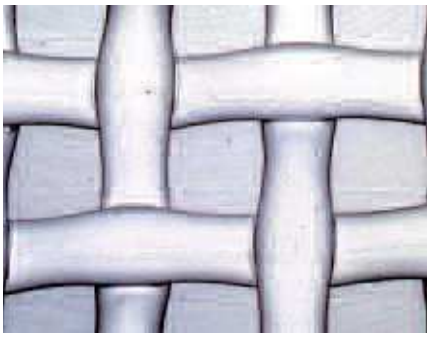
Another example of how variations can occur is in the weaving and post treatment cycle. The warp and weft are woven in a 'balanced' way, so each direction has the proper number of threads in the count specified i.e. 305 lines per inch running both in length and width. When the mesh is heat treated it can receive more tension in the direction in which it is being pulled, i.e. in the warp or length of the fabric. This can change the hole from a square to a rectangle and change the count of the weft threads relative to the warp.

An additional problem can occur later when the mesh is stretched on its frame, because the threads in the weft have not received similar tension treatment in manufacture. The result can be a screen that looked good when it was stretched, but now has a difference in warp and weft tension levels, with irregular shaped holes and unpredictable moiré and colour values. Losses of halftone dots, detail and colour strength can result.

EVALUATING MESH QUALITY

Here are some tips to look for when evaluating mesh for quality purposes:

1. Consult with your mesh supplier to assure your mesh meets the application.
2. Visually inspect your mesh before stretching for physical flaws. All mills produce mesh with flaws – they are inevitable and therefore must be tolerated. Thread breaks occur during weaving and these will result in tiny knots appearing from time to time. Occasionally a line might be present where a thread missed being woven or a reed left a mark during manufacture; most of the time these can and should be worked round. When flaws become too frequent, investigate other sources.
3. The cleanliness of the roll is important as it reflects the mill in which it was produced. A clean mill is usually an efficient mill and an efficient mill usually makes good quality product. Consistently dirty mesh can mean that the mill doesn't care about the product presentation as much as it should. If it is sloppy in this area, might it be sloppy in the weaving?
4. Check your mesh for count and 'squareness' of the holes under a microscope. While it is impossible to get perfectly square openings with round thread, it is reasonable to assume you can achieve a square hole that is equally balanced in dimension (inside length and width) and not a rectangle.
5. Elongation properties should be evaluated in large format and / or tight tolerance printing. Once you have brought the mesh to its proper tension (i.e. that which is recommended by its manufacturer), re-test the screen in both warp and weft directions within 24 and 48 hours. Only a slight relaxation of one or two Newtons should typically occur.



Square holes are not square

By giving your mesh proper thought and scrutiny, you can help assure yourself of a better chance at a quality print and its resultant profit.

Kevin Lewis is manager of the screenprinting department at Industrial Fabrics Corporation

Further information:

Industrial Fabrics Corporation,
Minneapolis (MN), USA
tel: +1 763 746 0529
fax: +1 763 535 6040
email: klewis@ifcfabrics.com
web: www.ifcfabrics.com

WHAT THE JPEG IS THIS? PART 2

In the first part of his article, Michael Lackner gave us an introduction to the world of graphic formats; in this second part he delves into the mysteries of the jpeg

JPEG IS THE MOST WELL-KNOWN AND WIDELY USED COMPRESSED FILE FORMAT IN THE PHOTOGRAPHIC AND GRAPHICS INDUSTRY. IT WAS SPECIFIED IN THE MID-80S JOINTLY BY THE CCITT AND ISO STANDARDS AUTHORITIES WHO CONSULTED A RANGE OF EXPERTS FROM INDUSTRY, UNIVERSITIES AND BROADCASTING AUTHORITIES – THE JOINT PHOTOGRAPHIC EXPERTS GROUP.

Compression in images relies on the similarity between adjacent pixels and therefore the high degree of redundancy in the initial data. JPEG format uses this attribute of images to apply several stages of 'spatial' coding to the original data. This coding is operated on individual 8 x 8 blocks of pixels within the image, with pixel values in the range zero to 255 (see figure 3, for example).

In a path traced through a typical image's data pixel by pixel, abrupt changes will be rare, so in a frequency spectrum representation (Fourier Series) of this trace signal, high frequencies will be of low amplitude compared to low frequencies. A Discrete Cosine Transform is applied to re-order each 8 x 8 block into an overall luminance value for the block (top left in matrix) and a representation

108	110	94	92	84	89	94	89
104	104	110	101	97	103	93	93
106	104	109	100	110	113	106	108
111	100	113	112	102	106	122	125
91	117	105	96	120	112	111	111
108	113	98	97	108	101	91	102
105	94	103	96	97	100	107	113
91	105	94	86	83	100	87	83

Figure 3: Spatial coding in JPEGS

769	2	12	2	-6	-8	1	0
3	15	-1	-0	5	8	0	1
-39	16	5	1	-12	4	2	-8
-6	9	0	1	3	-9	-10	0
-8	-2	4	-4	-8	8	-15	-3
5	-11	10	-3	11	19	4	0
-10	3	0	5	-1	-11	-3	-4
1	-8	-2	5	-5	-7	-1	8

Figure 4: A Discrete Cosine Transform is applied to re-order each block into an overall luminance value for the block and a representation of the different frequencies within the remainder of the matrix

of the different frequencies within the remainder of the matrix (horizontally increasing in frequency from left to right and vertically from top to bottom – see figure 4).

As the high frequencies are generally negligible they can be discarded without any noticeable visual effects when a reverse transform is later applied, since the human eye is not very sensitive to fine detail at low luminance levels.

THRESHOLDING AND REQUANTISATION

Thresholding (discarding the values of components of amplitudes below a certain value) is applied by means of a requantisation table which contains values by which each of the frequencies within the block are divided. These increase as frequencies increase to apply greater thresholding on higher frequencies. As a result, many of these higher frequencies will round down to zero values.

As can be seen in figure 5, the requantised values after applying the requantisation table result in one relatively high luminance value (which can be further reduced by representing as a deviation from the luminance value of the previous 8 x 8 block, thereby also minimising jumps from one block to the next) plus a range of very small numbers. These requantised frequency values are placed in ascending frequency order for horizontal and vertical directions combined by means of following a zig-zag path through the data.

The string of numbers output from the zig-zag scanning through the requantised DCT table will contain long strings of zeros. Run-length encoding is used to represent these more efficiently by alternating a value followed by the number of zeros before the next non-zero number:

(assuming previous block dc value = 113)
116,0,-2,1,2,0,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1

encodes to:
3,1,-2,0,1,0,2,1,1,0,1,14,1,21,1

HUFFMAN CODING

If a statistical analysis is carried out of the pairs of numbers (non-zero, zero) produced by run-length encoding, certain combinations will occur more frequently than others. Huffman coding uses this process to apply a much shorter code word (e.g. 101 in binary) to an often-occurring value and a longer code (e.g. 00001010011) to an infrequent value.

Clearly some of these processes, such as requantisation and the errors introduced by DCT, are irreversible and incur some data loss (by design this is data that will not be missed) and so the process is termed as 'lossy'. The JPEG standard includes algorithms for a 'lossless' compression, using pixel prediction based on previous value, and Huffman coding, but the degree of resulting compression is much less than using the techniques employed above.

The more recent JPEG 2000 file format does not split the image data into 8 x 8 blocks as in standard JPEG, thereby achieving smoother transitions. It uses the mathematical technique of wavelets to cut the data into different frequency components instead of the traditional Fourier methods. As would be expected from a new improved version, higher compression ratios can be achieved and it also retains a lossless algorithm option.

This article was first published in the Durst Process newsletter.

Michael Lackner is Marketing Manager for Durst

The first part of this article was published in issue two, 2008 of Specialist Printing; to receive a FREE copy, please email subs@specialistprinting.com

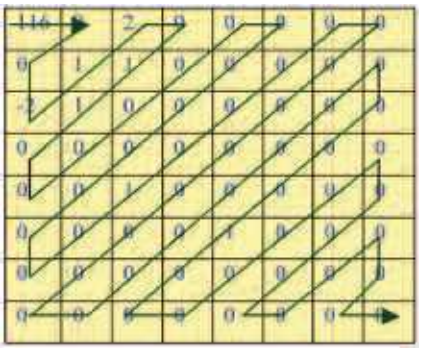


Figure 5: Requantised values result in one relatively high luminance value plus a range of very small numbers

Further information:
Durst Phototechnik Technology GmbH,
Lienz, Austria
tel: +43 48 52 7 17 77
fax: +43 48 52 7 17 77 50
email: office@durst-online.at
web: www.durst-online.com

PRINTING SPECIAL EFFECTS

Johann Bauer outlines the various types of print special effects and describes their uses

SPECIAL FINISHES AND PRINT EFFECTS ATTRACT A LOT OF ATTENTION, THEREFORE THE DEMAND FOR SUCH APPLICATIONS IS INCREASING. DUE TO ITS VARIETY THE SCREEN PROCESS IS ESPECIALLY SUITABLE FOR THE PRODUCTION OF SPECIAL EFFECTS. THERE IS A GREAT VARIETY OF POSSIBILITIES WHEN PRINTING EFFECTS, WHICH WE WILL DIVIDE INTO THREE GROUPS – OPTICAL EFFECTS, TACTILE (HAPTIC) EFFECTS AND SCENT EFFECTS – AND OUTLINE.

OPTICAL EFFECTS

Optical effects are unusual visual impressions such as fluorescent colours, colour shift (interference) effects, bronzes, coarse glitter particles and phosphorescent inks.
Fluorescent colours have been on the market for a long time but continue to offer new and interesting applications, even for special high quality advertisements. These substances show bright, intensive colours: the higher the share of UV-radiation in the light, the more intense the effect is.

Fluorescent colorants transform the invisible UV-radiation into visible light energy. If the UV light is very strong, the fluorescent colours seem to explode. Coates Screen Inks has been offering strong fluorescent colours for a long time (the TL ink range).

Bronze colours (gold, silver and copper colours) have also been available for a long time. Recently, interesting advanced and novel developments to produce optical effects have been introduced, such as 'mirror effect' inks. These are printed onto a transparent plastic material behind glass so that, when viewing the glass from the front, you will see a mirror effect comparable to the results of hot stamp foils.

Interference colours produce a colour shift effect

Interference colours produce a colour shift effect, which is due to pigments that show a very bright optical effect under the influence of light. A special property of many of these pigment types is a significant change of colour depending on the colour of the substrate they are printed on. Some of these pigments result in completely different and exotic colour shades depending on the white, red, blue, green or black substrate colour.

A BETTER WAY TO CLASSIFY

Colour shift pigments change in shade depending on the light angle. Merck's new Colourstream pigments supersede the usual colour shift effect of the Iriodin interference effects. Another special phenomenon is phosphorescent inks, which contain high concentrations of special pigments mixed into the binder system. These pigments can store light energy. Phosphorescent inks are printed with coarse fabrics (approximately 20-60 threads/cm).

The special property of these inks is their ability to glow in the dark; they are mainly used for safety applications such as emergency exit symbols. The symbols store the light energy, which then glows as a greenish light in the dark. These pigments are also used for graphic applications such as buttons, signs and posters with glowing effects for children's rooms.

Another optical effect is the 'wet and reveal' effect. Often used on posters, part of the printed (and often indecent) image is covered with a half-opaque white so that, due to the strong light scattering of the pigments, the image is hardly noticeable; however, if the colour layer is wet with water, the light-scattering effect is eliminated and the covered image becomes clearly visible.

TACTILE (HAPTIC) EFFECTS

Tactile stimuli are everything that we can feel on our skin. Various receptors in the skin feel pressure, vibration, temperature and pain. These receptors are unevenly distributed all over the skin: on the back, for instance, the individual points are quite far apart (>60 mm) whilst the hand has approximately 15000 receptors and the fingertip receptors are only about 1-5 mm apart. Thus we can feel the tiniest differences in surfaces with just our fingertips.

Tactile symbols are increasingly used for safety applications such as Braille writing

Phosphorescent inks are used for graphic applications such as posters with glowing effects for children's rooms

An anti-slip soft touch varnish

In the ancient world the sense of touch was considered to be the most important of all senses, whereas during the Middle Ages it was thought to be of lesser importance. Nowadays, it is again considered very important; products with a pleasant tactile effect are much more accepted than comparable products without positive tactile effects. Automotive, textile and food companies have their haptic laboratories where suitable tactile effects are developed for various products.

When producing printed haptic effects (where 'haptic' is the sense of touch), screen printing is the best technology. The screen process can produce a large number of different tactile effects, such as gloss varnishes with a very smooth surface, and

Tactile effects give eye-catching finishes on, for example, relief motifs

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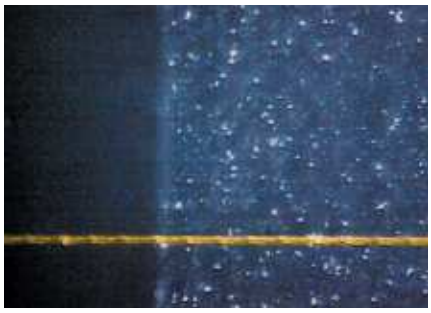

Fine UV structure varnishes are scratch-resistant

High layer thicknesses are possible for haptic effects

structure varnishes with different degrees of roughness ranging from very fine to very coarse. These effects can even include relief structures with significantly elevated lines, points or text contours.

TYPES OF VARNISHES

Hard varnishes can be applied just as well as 'soft-touch' varnishes. These varnishes can be adjusted to give either an adhesive or a sliding feeling. Depending on the varnish type, it is also possible to apply coloured adjustments.

There are various fields of applications for tactile effects. Tactile symbols are increasingly used for safety applications, such as Braille writing or emergency exit symbols coated with anti-slide varnishes. Other examples are serving trays with an anti-slide surface, pencils with soft knobs to achieve a better grip, mouse pads with an anti-slip bottom or keyboard foils with resistant mat structures on the front.

There are even more possibilities for tactile effects for creative design, with combinations of visual effects or tactile effects united with visual effects, giving eye-catching finishes you want to touch. Some examples are relief motifs on coloured, transparent or translucent surfaces or printed on coloured texts, varnishes applied in thick layers with small amounts of bronze, colour or glitter pigments, and coloured anti-slip varnishes in the form of texts or motifs (stars, logos etc.) on floors.

PRODUCT RANGE

There is a large product range for tactile prints; depending upon the requirements, glossy, mat, relief or structure varnishes are available. There are extremely scratch-resistant nano-varnishes, very soft, anti-slip adjustments and also soft plastisol layers with a puff effect. These are mostly used for textile screen printing but can also be quite interesting for some graphic applications.

The screen process is the ideal technique for haptic effects as high layer thicknesses are possible – even huge particle sizes of up to 300 µ can be printed. Tactile effects are mostly produced with UV-curing screen printing inks. Due to their 100% solid content they have the advantage of achieving a maximum dry ink layer resulting from the printed wet ink film determined by the screen fabric.

UV curing speeds up processing: structure and relief varnishes are printed with fabrics of 100 to 20 threads/cm. These transparent thick layers can be cured quickly with UV radiation. Solvent-based inks can also be used. Structured surfaces are especially applied on glass, metal or duroplastics using 2-component solvent-based inks to create, for instance, glass decorations for shower cabins, metal logos used in the automotive industry or screen printed fronts to furniture.

SCENT EFFECTS

The olfactory sense can differentiate up to 5000 different scents, which can be perceived as pleasant, stimulating or soothing depending upon the individual. For advertising purposes printed scents, such as perfume scents in magazines, are quite important. The purchase of a certain product or food can be influenced by corresponding scents. Unpleasant smells are often covered with a stronger, more pleasant scent.

Scented oils or capsules can be mixed into screen inks. There are a great variety of suitable products and anything is possible – spices, plants, vegetables, wood, even Christmas scents. However, the choice and effects of the scents are quite difficult, as individual customer requirements have to be taken into consideration. SP

Johan Bauers, Screen Centre Training Programme at Coates Screen Inks

Further information:
Coates Screen Inks GmbH (a Sun Chemical company), Nürnberg, Germany
tel: +49 911 6422 0
fax: +49 911 6422 200
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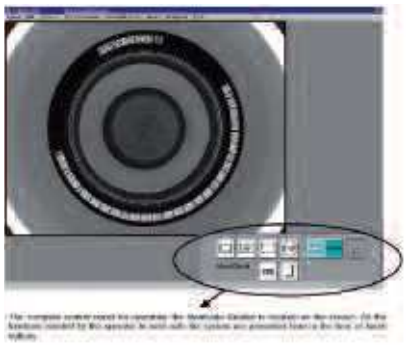
KEEPING THE PRINTING PROCESS ON TRACK

Thomas Wübbers explains how the inspection process can be used for more than quality assurance

AS AN EXAMPLE OF THE USE OF INSPECTION EQUIPMENT IN PRINTING MACHINES, THIS ARTICLE WILL LOOK AT OPTICAL DISC (CD, DVD, BLU-RAY ETC.) PRINTING, ALTHOUGH THE INSPECTION TECHNOLOGY IS ALSO ADAPTABLE TO PRINT MACHINES FOR CONTAINER DECORATION.

As optical discs have developed over many years, the integrated optical disc inspection systems inside decoration printers have played an important role for a long time. At first a simple pass-or-fail decision was given, but as the optical production market became increasingly competitive and sophisticated, better optical resolution, faster inspection time and better user interfacing was required.

The process control functionality of inspection systems is now in focus and allows early recognition of variations within the printing process. This is a cost and time saving factor. Statistical evaluation can alert the operator when printing is running towards the limit of the process window.



The Ident Check user interface with the disc barcode visible

The Ident Check system checking the centre position

QUALITY AND PROCESS

As quality is a continuous function, simple pass or fail decisions are not a sufficient way to describe and ensure printing stability. As any deviation from the target value represents loss of quality, the evaluation of statistical information becomes important. A cost reduction can be achieved by keeping the printer inside the process window and in the start-up phase of the printing process.

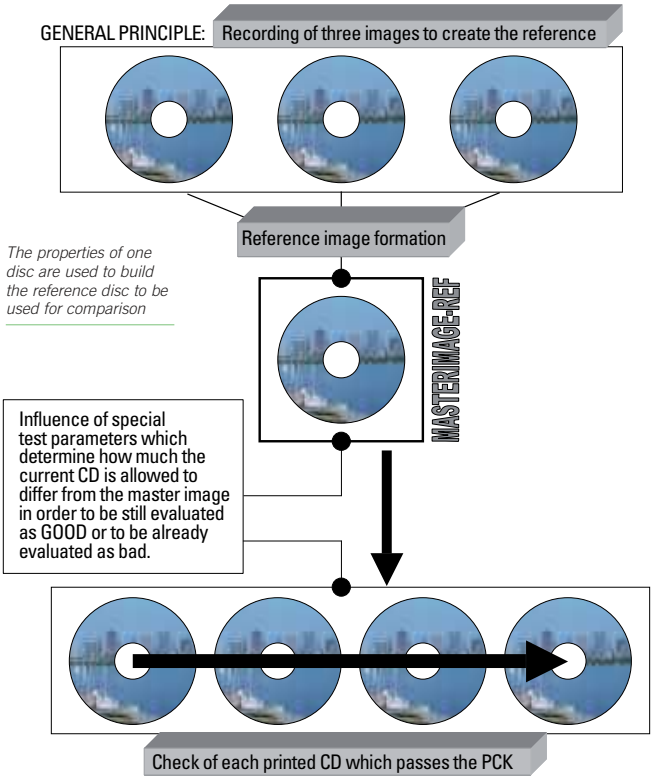
Kammann's printers for container printing can be equipped with Print Check systems, so optical disc manufacturers can rely on up to three stages of inspection which are integrated into the machines: Ident Check, Print Check and Readside Inspection.

Ident Check is an identity code verification system, where a black / white CCD camera identifies bar codes or digital characters. It guarantees the correct print motif corresponding to the correct article (content on disc). To reduce initial configuration work by the user, the system provides automatic adaption to all kinds of characters and bar codes. The standard resolution is 0.1 mm per pixel at an evaluation time of < 200 ms.

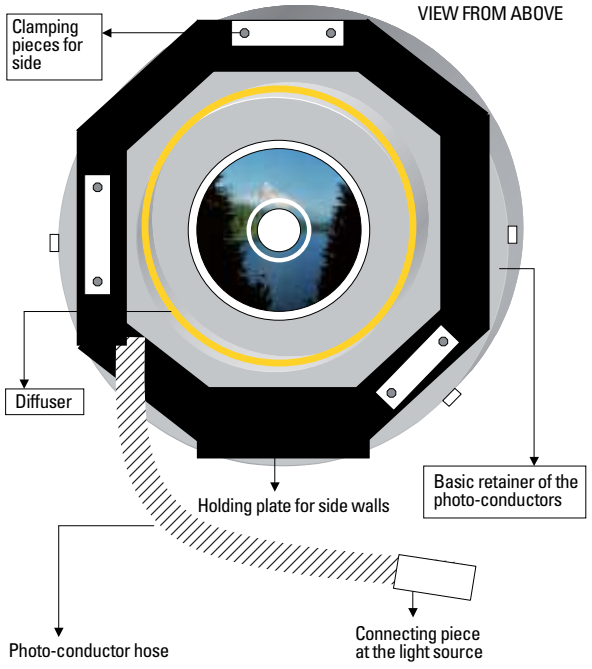
UPDATING TO BLU-RAY

The traditional lighting techniques of older identity code readers are not suitable for the newly-launched Blu-ray optical disc format, so special illuminating units generate a higher contrast picture for evaluation and can now identify CD / DVD / Blu-ray discs in one solution which is updateable to existing print machines.

Print Check inspection is for optical disc and plastic container decoration, with a new system for glass container print inspection available soon. Optical disc print inspection



The properties of one disc are used to build the reference disc to be used for comparison



Detailed schematic of the Print Check lighting unit for illuminating the whole area of the disc

Dirt and ink particles on the optical disc

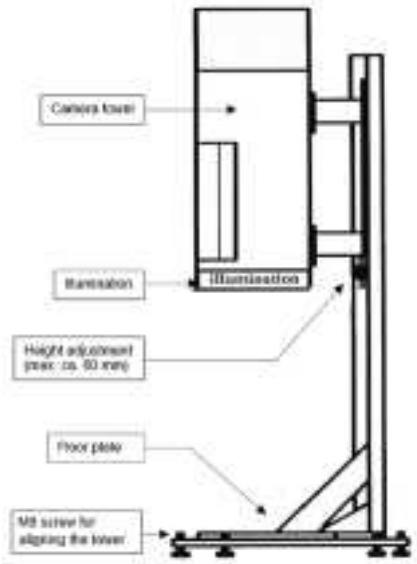
requirements allow the use of a matrix area CCD camera, while container print inspection needs a line-scan camera for high speed and if there are print motifs over the whole circumference. The illumination for these different picture-taking methods will also differ.

While the matrix area camera needs complete lighting of the whole area, high speed line scan camera applications need a very bright line of light. For flat objects the matrix camera application is adequate, but if the containers have tolerances in shape or complicated shapes or motifs, the line scan camera generates more robust evaluation results. Kammann uses this principle for plastic containers and glass containers.

USER-FRIENDLY SYSTEMS

A system should be user-friendly with as little interaction as possible, preferably with in-process brightness control, automatic positioning and simple push-button learning mode operation. With minimal interaction, network software can be trained to reference new images so that once the system has learned the reference, the image will be evaluated by brightness and colour density. Missing colours, squeegee stripes or marks and toning effects will be recognised very accurately.

For specific quality check requirements, the detection area and the corresponding sensitivity, depending on halftone / solid / text areas of the printing image, can be set. Cycle times of approximately 200 ms and vertical



Schematic of the construction of the Print Check system inside the printer

position tolerance of +/- 0.7 mm are typical.

With all this functionality, the benefits are the listing of faults and statistical evaluation for corrective action and the separation of scrap articles. When the system recognises a certain amount of faults, the printer is automatically stopped.

DATA SIDE INSPECTION

Readside inspection became necessary with the advent of the Blu-ray disc. During the handling process though a printing machine, surface defects can sometimes occur on the data side (readside) of the disc. These defects can affect the disc's playback due to the very narrow parameters of the readout head of Blu-ray players.

This requires a post-print check (readside inspection) for this optical disc format. Typical defects are ink splatter, stress cracks, thin hairline scratches or other possible handling defects, which have to be detected down to a size of 300 microns.

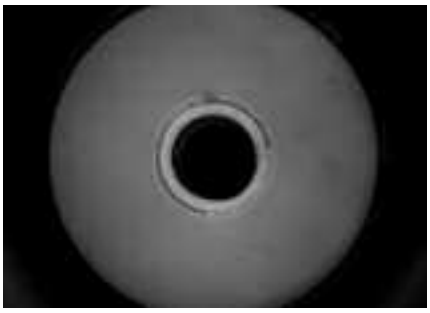
This new disc format presents some challenges, such as optimised illumination for the detection of a wide spectrum of defects, higher camera resolution and faster data processing within the 200 ms evaluation time.

OUTLOOK

Vision inspection systems provide not only a good / bad selection, they are also an efficient tool for controlling print process steps. A new challenge is to have a Print Check system for glass bottles that can handle most of the motifs and surfaces (such as etched or dark coloured glass). These systems also have many light reflections due to an irregular glass surface. There are also new possibilities, such as printing around the seam of the glass bottle due to stable detection of the seam by an optical sensor based on vision technology.

Whether it is screen, offset or digital printing, intelligent optical sensors and systems reduce scrap material and help to keep the print process in its optimal window.

Thomas G Wübbers is Business Development Manager, Marketing & Technology at Kammann



Scratches on the optical disc's data surface

Further information:
Werner Kammann Maschinenfabrik GmbH
& Co KG, Bünde, Germany
tel: +49 5223 181 0
fax: +49 5223 181 130
email: wuebbers@kammann.de
web: www.kammann.de

The Ident Check screen showing Ident character code and barcode

The user interface showing the last archived object, a CD

THE COMMON ERROR OF VISUAL COLOUR CONTROL ON PRESS

Mike Ruff explains why printing to numbers is a more accurate and productive way of attaining correct colour matching

I WILL BEGIN BY SAYING THAT YES, YOU DO NEED TO VISUALLY APPROVE FINAL RESULTS ON PRESS. HOWEVER, LET ME WARN YOU THAT ALLOWING PRINTERS TO CHASE COLOUR VISUALLY WITHOUT THE USE OF A GOOD COLOUR MEASUREMENT INSTRUMENT IS A HUGE DRAIN ON PRODUCTIVITY. COLOUR CAN BE ATTAINED QUICKER AND MORE ACCURATELY BY PRINTING TO THE NUMBERS. AFTER THE NUMBERS ARE ATTAINED, COLOUR CAN THEN BE JUDGED VISUALLY FOR FINAL APPROVAL.

With that said, I want to explain why many printers think they can see colour and visually attain accurate colour faster. I walk into many companies the first day of a consulting project and the production people say they tried my print by numbers method and it didn't work. I normally respond with: "Maybe today we can determine why it doesn't work."

In a day or two they discover that it does work. The reason prints may not match when printing to numbers is relatively easy to identify. I always find two primary moving variables that challenge the pressman's confidence in printing to the numbers: not having an accurate and consistent colour target, and / or not understanding the numbers they are reading on the print and / or the proof.

ACCURATE COLOUR TARGETS

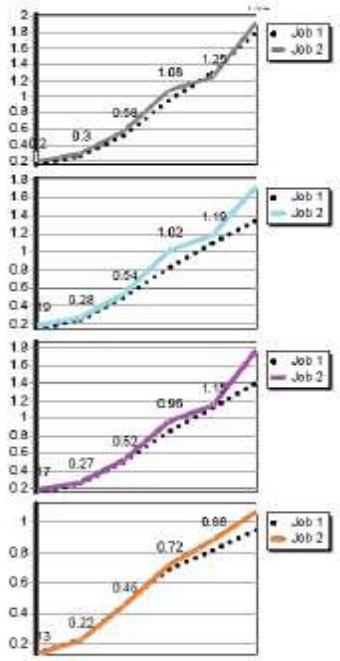
Not having an accurate and consistent colour target is the number one issue. We call it a 'proof' in the four-colour process printing industry. Hours can be lost by chasing an out-of-balance colour target. The printers are challenged with the frustration of attaining colour values they are not calibrated to hit. How can they understand colour control issues if the target they are attempting to match is out of balance and even different, job to job?

So when printers say they hit the numbers and it did not match, I find that one of the most common issues is the printer is printing to pre-determined numbers, when in fact the proof they are attempting to match is not even close to the numbers. See figure 1 – notice the values of the print (the dotted lines) are in balance and showing a normal print curve. The proof the client submitted (the solid lines) is very different in tonal values and densities.

If the printer is attempting to print to an out-of-balance proof submitted by a client, a

Print to Proof Miss-Match

	Patch%	Job1	Job2	Difference	Tolerance	Dot%
BLACK	100%	1.8	1.92	0.12	0.05	100
	90%	1.3	1.25	-0.05	0.05	94
	75%	0.95	1.08	0.13	0.04	91
	50%	0.52	0.58	0.06	0.03	69
	25%	0.27	0.3	0.03	0.02	39
	10%	0.16	0.2	0.04	0.02	23
CYAN	100%	1.35	1.73	0.38	0.05	100
	90%	1.1	1.19	0.09	0.05	94
	75%	0.83	1.02	0.19	0.04	90
	50%	0.5	0.54	0.04	0.03	65
	25%	0.25	0.28	0.03	0.02	35
	10%	0.15	0.19	0.04	0.02	19
MAGENTA	100%	1.4	1.78	0.38	0.05	100
	90%	1.12	1.15	0.03	0.05	93
	75%	0.85	0.96	0.11	0.04	89
	50%	0.5	0.52	0.02	0.03	65
	25%	0.25	0.27	0.02	0.02	36
	10%	0.15	0.17	0.02	0.02	19
YELLOW	100%	0.95	1.07	0.12	0.05	100
	90%	0.82	0.88	0.06	0.05	94
	75%	0.69	0.72	0.03	0.04	86
	50%	0.46	0.45	-0.01	0.03	65
	25%	0.23	0.22	-0.01	0.02	32
	10%	0.14	0.13	-0.01	0.02	14



Notice the values of the dotted line (The Press) is in balance and even. But the proof (The Solid Line) is a proof the client submitted and it is very different in tonal values and densities.

If a printer were to attempt to print to this out of balance proof submitted by a client the printer would say, *"I printed to the numbers and it didn't match".*

Figure 1: Example of target and print misalignment

Common Graphic Arts Industry Absolute Density Value Targets

Assuming the substrate color is close to the anticipated substrate in the "Colour Settings" pallette of Photoshop the following values are typical. You will find that analog proofs that are gray balanced and exhibit accurate dot percentages and densities will be close to these values.

	10%	25%	50%	75%	90%	Solid
Cyan	.15	.27	.50	.84	1.10	1.35
Magenta	.15	.27	.50	.84	1.10	1.40
Yellow	.14	.26	.45	.68	.85	.95
Black	.16	.28.	.52	.86	1.40	1.80

The typical screen printer does not know or attempt to print to any of these values other than the solids. This is another reason they may say, *"I'm printing to the numbers and it doesn't match."* The problem is they do not know or understand all the numbers.

Figure 2: An example of the Graphic Arts Industry standard for absolute density

common response is: "I'm printing to the numbers and it doesn't match." The first rule of print-to-proof matching is: do not print to a target that is unverified and does not have colour bars. Only an approved, in-balance, checked and verified proof with measurable colour bars is acceptable to use as a legitimate colour target.

UNDERSTANDING THE NUMBERS

Not understanding the numbers is the second issue (see figure 1 again). When printers say they hit the numbers and it doesn't match, what they are saying is actually impossible: you can hit some of the numbers and it may not match, however the reality is that if you hit all the numbers, you have a perfect match. There are three keys to being able to apply printing to numbers on press:

- Understand the numbers
- Hit the numbers that are most important
- Compromise on the numbers that are not so important.

In order to understand the numbers and know how to interpret the readings, a printer must be trained in print analysis. Most printers know how to control the press, produce a good dot and print in-register, but unfortunately there is a marked shortage of printers that truly understand print analysis. Print analysis knowledge requires five primary understandings, which we will now examine.

DENSITY UNDERSTANDING

… And not just solid density. The printers must understand absolute density and how it is affected throughout all the tonal areas by ink hue, dot gain and substrate (see figure 2). Most densitometers can be used to measure this on the proof and on the print. The closer these numbers are, the closer the print will match. Be sure and read the print and the proof in absolute density. This means you include the substrate in your values; the substrate is part of your total colour, so include it in your evaluations.

DOT GAIN AND DOT AREA UNDERSTANDING

This is critical to determine if the correct file or film compensation has been applied and how well it matches the proof. You also use dot gain and dot area to set proper 'hybrid curves' (see figure 3). Dot area is computed by setting the substrate at zero and the solid colour at zero, then the dot area is relevant to the actual print values compared to the intended print values. Dot area does the maths for you and 'dot gain' reports the gain difference between the intended and the actual.

ACCUMULATED DENSITY UNDERSTANDING

Using the density feature of a densitometer to read image areas is a valuable and important technique (see figure 4). An image area can be measured in density with the densitometer set to 'all' densities; it will report the total values of the densities of colour in the area read. The same area can be compared print to proof. This is extremely valuable. The closer the numbers are, the closer the print result.

Common Graphic Arts Industry "Dot Area" Targets

The following values are typical numbers of "dot area" values.

	10%	25%	50%	75%	90%	Solid
Cyan	18	38	70	88	95	100
Magenta	18	38	70	88	95	100
Yellow	18	38	68	87	94	100
Black	18	38	71	88	96	100

Figure 3: An example of typical dot area on a balanced Graphic Arts Industry proof

UNDERSTANDING SUBSTRATE EVALUATION

The printer must be able to measure and understand the exact effect the substrate is having on the print in comparison to the colour target (see figure 5). The substrate values are easier for a printer to understand when they see them in C, M and Y values. In the final result of the print, the substrate can be adding a cast to the print. If the substrate is adding a cast, it will mostly affect the colours from the 25% tonal areas and down because the substrate is a larger part of the total colour value.

NEUTRAL GREY UNDERSTANDING

A print that is 'neutral' has no cast and it truly represents the intended file. The 'all' feature of a densitometer set to 'absolute' values will report any cast in a neutral grey bar (see figure 6). ISO specifies that a nominal neutral grey colour bar mid-tone patch file is approximately 50% cyan, 40% magenta and 40% yellow. When it is printed, the 'absolute density' should read exactly the same value of C, M and Y; however, remember this build will only produce neutral grey if your overprint ink hues, densities and substrate align to neutral values.

If we print to a neutral value, we have guaranteed the client that our print is accurate to the file. By understanding this and measuring the neutral grey, this prevents the printers from the guess-work of: "Is my print or proof accurate to the file?"

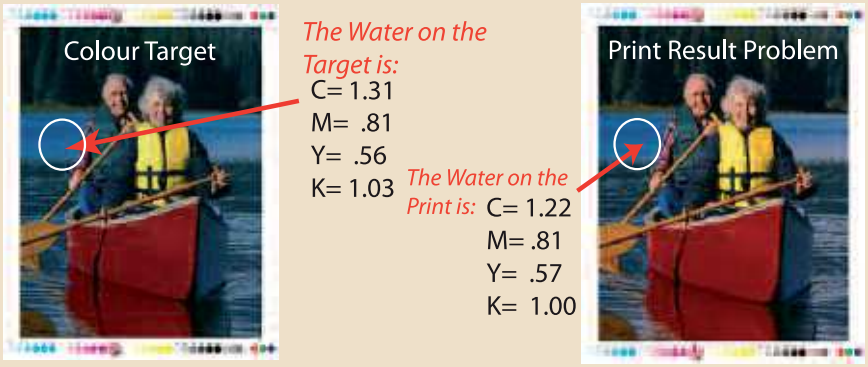
IN CONCLUSION

One of the most common errors in producing good four-colour process prints is attempting to balance colour visually. There is no way your eye can determine colour cast issues involving so many blending colour variables. A colour that appears 'too red' could be too red because the cyan is low, the magenta is high, the yellow is low or a combination of any of the values.

Learn to understand the numbers and then set up by the numbers. After the numbers are attained, then visually evaluate the final result. Common sense says that if the numbers on the proof and the print line up, it will match. In fact, it has to match if you are using absolute density settings and the ink hue and substrate are in tolerance.

Therefore, the final conclusion is if a printer says: "I hit the numbers and it does not match," then the true problem is not in the printing, it is in the understanding of the numbers. The use of instruments in measuring

Accumulative Density Example



A colour result can be measured in the "all" function of a densitometer. The result reported is a very good indicator of what colours might be out of balance. The value is an "accumulation" of all the colours overprinting and this is a very accurate and useful technique in trouble shooting.

Figure 4: An example of an accumulative density evaluation

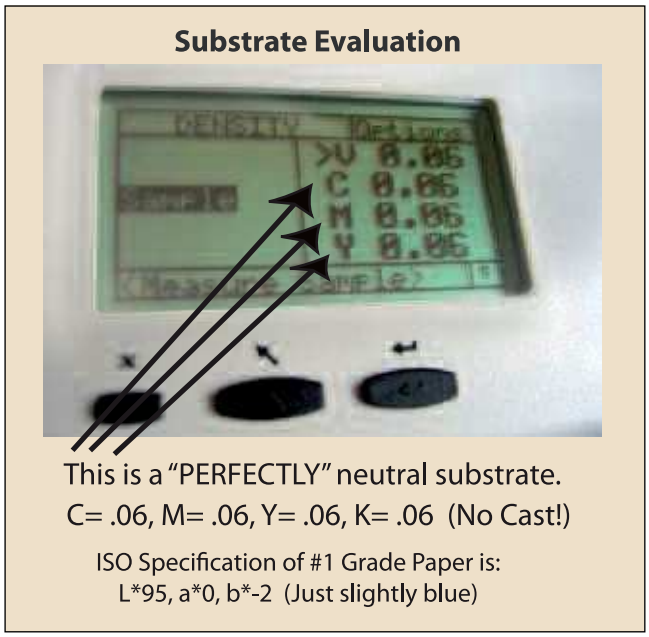


*Figure 5: An example of ISO neutral substrate in L*a*b* and then converted to absolute density numbers*

the numbers and proper training in print analysis knowledge will ensure an accurate result.

I hope this article has encouraged you to make sure your printers are properly trained in these simple but effective understandings.

Mike Ruff is Chief Technology Officer, Nazdar Consulting Services

This is the third in a series of articles in which Mike Ruff offers advice on how to avoid making common mistakes in all areas of the printing process. For free copies of the issues containing the first and second articles in the series, please email subs@glassworldwide.co.uk

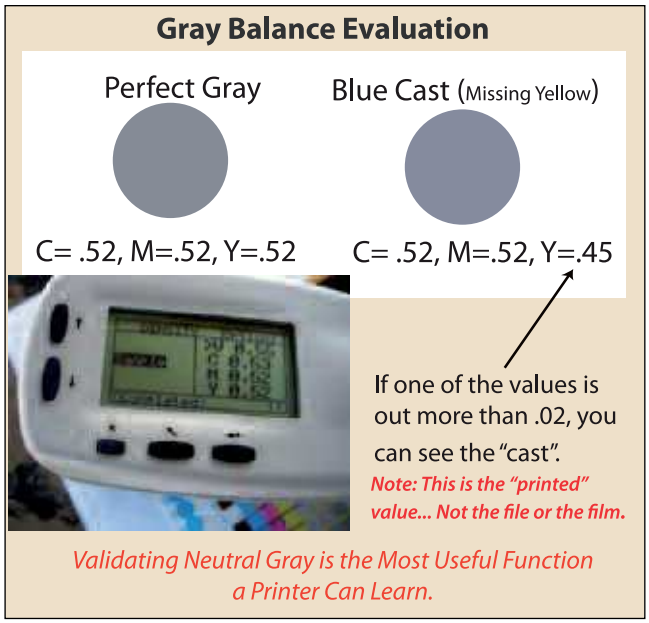


Figure 6: An example of how to evaluate neutral grey using a common densitometer

Further information:
Nazdar, Shawnee (KS), USA
tel: +1 816 304 9595
email: mruff@nazdar.com
web: www.nazdar.com

DEVELOPMENTS IN INKJET INK

Marco van Niekerk describes a customer-driven technology development that offers new business opportunities

IN 2003 EPSON BROUGHT TO MARKET A PIGMENT-BASED INK WITH THE COMBINED CHARACTERISTICS OF BOTH DYE-BASED AND PIGMENT-BASED INKS. BASED ON MARKET RESEARCH AND CUSTOMER FEEDBACK THAT WAS GATHERED FROM VISITS TO CUSTOMERS, IT WAS CLEAR THAT THE PRINTING MARKET – AND ESPECIALLY THE PROOFING MARKET – NEEDED AN INK THAT WOULD GIVE IT THE WIDEST POSSIBLE COLOUR GAMUT. THIS INK WOULD ALSO STABILISE IN A VERY SHORT TIME, PREVENTING FURTHER COLOURSHIFT AND THEREBY GIVING A BOOST TO PROOFING PRODUCTION BY ELIMINATING THE WAITING TIME NEEDED BEFORE MEASUREMENT COULD TAKE PLACE (AS DYE-BASE INKS NEED A LONG TIME TO STABILISE).

UltraChrome™ ink, a 6-colour inkset, brought repeatable and consistent print image quality that was unusual from an inkjet-based device. It also marked a secondary effect on the photo market where the transition from analogue to digital printing had started. Epson's UltraChrome ink is recognised today as having been instrumental in making this change happen.

It was now possible to print in-house, with quality comparable to, or in some ways even better, than silver halide. UltraChrome inks made it easy to print on various kinds of media, including fine art material such as canvas, with a light-fastness comparable to silver halide. This opened the way for numerous new applications that could benefit from using a cost-effective inkjet device printing with UltraChrome ink. But this was just the start.

CUSTOMER FEEDBACK

After listening to its customers, Epson realised that there was a whole new range of clients who were building their business on Epson products and it was clear the company needed to develop its UltraChrome ink further; this led to the introduction of UltraChrome K3, an 8-colour inkset with three blacks, in 2005, which produces some of the world's best black and white prints.

Simultaneously the art world recognised the potential of using Epson-based printers with UltraChrome K3 inks as being a good match for producing short run, limited edition reproductions of original work. The quality of the reproductions are so exceptional that today a new standard is recognised for this type of artwork, which is called DigiGraphie by Epson.

As a result of further development and customer feedback from proofing customers, a further enhancement to UltraChrome ink was needed to make it easier to profile defined colours needed by the industry, such as reflex blues and vivid reds. This led to the introduction in 2007 of the fourth generation of UltraChrome, K3, with vivid magenta technology. This was accompanied by the introduction of Epson's first 64-inch printer, the Stylus Pro 11880 with a TFP MicroPiezo printhead. In recognition of this combination's quality, Epson received the European Digital Press (EDP) Association Awards 2008 'Best Photographic Printer of the Year' award for the Epson Stylus Pro 11880.

NEW BUSINESS OPPORTUNITIES

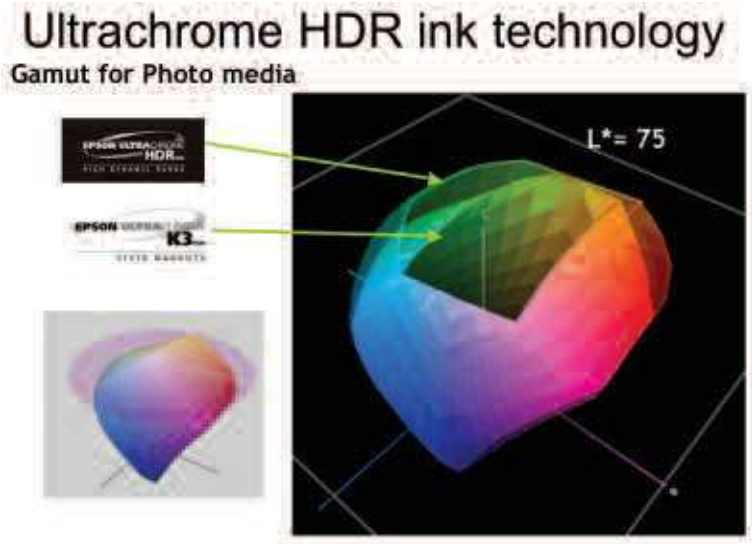
In 2008 two new versions of UltraChrome ink were launched – the UltraChrome HDR and UltraChrome GS – as well as two new printer platforms to support the new inks: the 24-inch wide Stylus Pro 7900 and the 44-inch wide Stylus Pro 9900 with Ultra-Chrome HDR, and the 64-inch wide Stylus Pro GS6000 with UltraChrome GS. These new printers and inks are giving businesses new ways of addressing their needs to the benefit of both them and their suppliers.

The UltraChrome HDR reaches the limits of chemical ink chemistry; with the addition of green and orange inks to the colour gamut, the demands of the packaging industry, where specific spot colours are required, are now being met.

To support this Epson, in co-operation with the Rochester Institute of Technology, developed a new way of converting RGB into CMYK, which it called Epson LUT Technology. This is an advanced math which maximises the colour gamut without sacrificing print quality. Ink efficiency is improved by seamlessly integrating hi-fidelity ink primaries. The new LUT technology optimises grain reduction, colour constancy under different light conditions and gamut smoothing, and enables smoother transitions between colours.

EXTENDED FEATURES

The UltraChrome HDR has extended features to UltraChrome K3 with a vivid magenta ink set of Pk, Mk, Lk, LLk, C, VM, Y, Lc, Lvm + Orange + Green. It supports flexographic printing markets and is further expanding the colour gamut with new orange and green inks, and especially bright or vivid green to yellow and yellow to red.



Left: Slide showing the difference between the latest ink technology and the current Ultrachrome K3 with vivid magenta

The UltraChrome GS gamut in relation to the European prepress standard gamut

The orange ink helps reduce the graininess in skin tone. The wider colour gamut can be used on a variety of media, addressing the spot colour requirements that are in high demand.

Another development that resulted from customer research was the new 8-colour UltraChrome GS, an environmentally-friendly solvent ink set developed using Epson's UltraChrome ink technology. With the addition of new orange and green inks to the colour palette, it offers an ultra-wide colour gamut that reproduces photographic printed images as well as custom spot colours with greater accuracy than before.

The inks are also quick drying and highly resistant to abrasion. The ink merges the quality of a pigment-based ink and the robustness of an eco-solvent type ink. This environmentally-friendly version of a solvent ink has virtually no emitting VOCs (volatile organic compounds) in order to address environmental concerns regarding air pollution and hazardous materials, as well as current and future regulations.

ELIMINATING NICKEL COMPOUNDS

The IARC, Proposition 65, NTP (National Toxicity Program in the USA) and EU directive 1999/45/EC compliance make it necessary to eliminate any chemical that is potentially hazardous to humans and the environment, and nickel compounds are known carcinogens.

UltraChrome GS has no nickel compounds and fewer harmful VOCs, resulting in less eye and skin irritation, and is a virtually odourless solvent ink so there is a reduced need for ventilation in the workplace. It is an eco-solvent type ink which does not have the hazardous label on the packaging, giving business the opportunity to relocate closer to customers and eliminating the need to invest in costly closed print rooms with heavy-duty ventilation. The inks bring savings to the production environment from reduced running costs and reduced CO_2 emissions.

UltraChrome GS is an 8-colour inkset, with orange and green inks in addition to black, cyan, magenta, yellow, light cyan and light magenta inks, giving a wide colour gamut compared to other available eco-solvent type inks.

HIGH QUALITY DEMANDS

The combination of the Stylus Pro GS6000 with a dual array of Epson MicroPiezo printheads and UltraChrome GS ink offers a tool for businesses to address applications with high quality demands whilst making use of existing materials such as adhesive vinyl, banners, backlits and canvas.

The printer produces images with Epson's variable droplet and microweave technologies and has a droplet size of 3.7 pl for revealing the smallest details in the image and supporting smooth gradations. High quality art reproduction will no longer need further treatment after printing, and other possible uses include decorative art reproduction for hotels, high quality backlit features in airports, high quality backdrops in tradeshows, fashion or jewellery point of sales material, and many indoor or outdoor environments.

UltraChrome GS inks have an extremely wide colour gamut with eight colours: C, M, Y, K, Lc, Lm, Or, Gr. They have a low impact on health and environment as there is no nickel compound, which also means fewer irritant substances. As they have fewer harmful VOCs and are virtually odourless, no special ventilation or air purifiers are required. The inks print on both uncoated and coated media, have a faster drying time and good scratch resistance. They come with a large capacity ink cartridge (950 ml per colour).

Ultrachrome is a registered trade mark

Marco van Niekerk is Senior Product Manager LFP, EMEA for Epson

Further information:

Epson Europe, Amsterdam, The Netherlands
tel: +31 20 314 5409
fax: +31 20 3145609
email: marco_van_niekerk@epson-europe.com
web: www.epson-europe.com

HOW CAN WE PRINT TO INTERNATIONAL STANDARDS?

Laurie Mullaney outlines the use of proof match software to achieve a single standard for screen printing

THIS INSTRUCTION IS BORROWED FROM BOTH LITHOGRAPHY AND PHOTOGRAVURE AND TO SOME EXTENT FROM THE DIFFICULTIES OF PLATE MAKING IN THE FLEXO-GRAPHIC PROCESS. I WILL DETAIL THE VARIABLES IN SCREEN PRINTING RESOLVED BY USING THE SCREENREADER.

The image is usually exposed onto the stencil by contact with a set of films. However the most modern methods include Computer to Screen (CTS) but both processes require the control of the RIP (Raster Image Processor).

PROBLEMS CAUSED BY MESH

Any film to stencil or computer to stencil imaging has serious problems that are caused by the mesh. This is because the mesh has a greater area than the open spaces and your image has to accommodate the fact that between 0 and 50% of it is undercut during exposure, and above 50% the image is spread.

This is perfectly shown in the Sefar manual where you have no image below 20% and over exposed from 50% to 100%. Add this to the loss of image that is reduced by the mesh and you find that the image used by offset companies is completely destroyed. You may have the perfect films but, unfortunately, the mesh and the stencil will ruin them.

So how do we match the image from a lithographic job to a screen job? First we linearise the stencil with the ScreenReader, exactly the same way as the litho plate is linearised. We create on the stencil (by either film to stencil or computer to stencil) the measured values required by the RIP (called nominal values i.e. 5%, 10%, 15%, 20% etc.) and by using the ScreenReader; these values are measured and then entered into the RIP.

RIP CALCULATIONS

This allows the RIP to calculate what it has to do to give you the correct value on the stencil (this is the same method for film to stencil and computer to stencil). So the RIP may think that it has given you a 50% but when you tell it that it is actually a 40%, it can then calculate what exposure is needed to give you a 50% on the stencil.

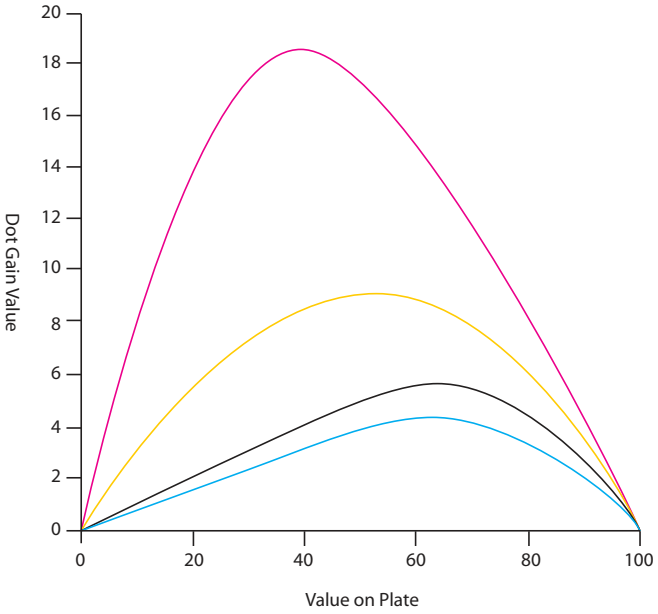
We now save this linearisation (whether it is for film or computer to stencil) and use it to produce the next job. We print this job as normal but make sure that we do not use inks that are adulterated or are manufactured to compensate for the high dot gain in the screen process.

Ideally the dot gain when printed should be around 20% to 25%. This high dot gain is needed because all other printing processes have gain around this area and if we are to match other standards, we must be able to bring it down in the reproduction process and not at the end of a press. If you have ink which gives you 10% dot gain, you will never meet any international standard. You can compensate and reduce dot gain in the reproduction process, but you cannot increase it to match a standard.

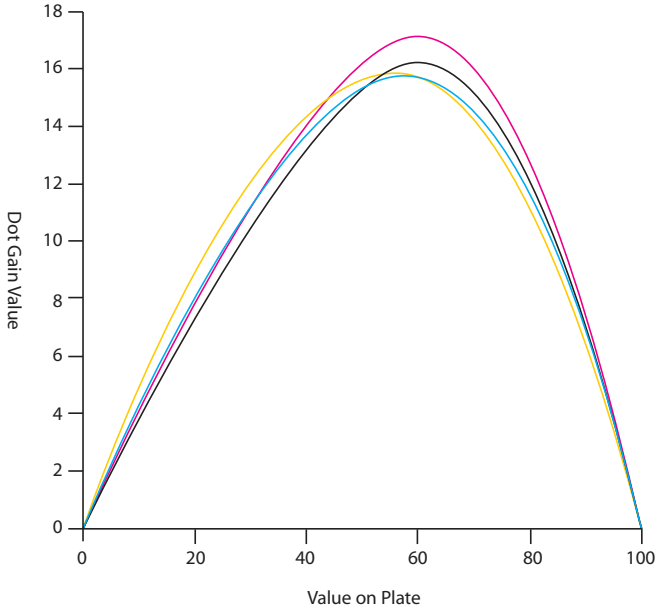
PROOF MATCH SOFTWARE

Now we have the printed result (which will be too heavy), we can analyse it by measuring it with a densitometer and make a correction in the RIP to bring down the dot gain via the films or the CTS. By using proof match software we can enter the actual printed densities and compare them with the required standard. This might be ISO or SWOP but this doesn't matter as the software can make a correction for any of the standard curves used anywhere in the world. Once we have chosen the standard we want to match, we output a correction (a series of values that correspond to the standards to be matched) and enter these values into the RIP.

The RIP now uses these values to make a new set of films or to expose a stencil using CTS, and we then take the corrected stencils and reprint the job. As we have allowed for the dot gain or dot loss by using the



The four colour curves measured before correction



The four colour curves measured after a correction has been applied via the RIP

correction, we can now rely on the stencil to print the required standard.

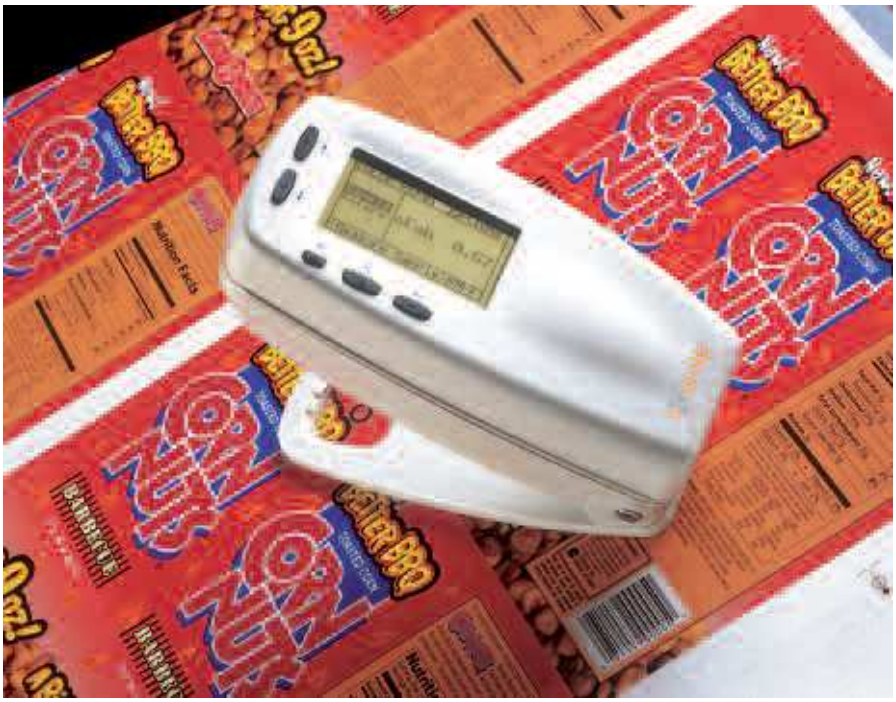
These tone curve corrections are widely used in all other processes but not in screen. This is because you cannot measure a target on the printed job because the original value on the stencil was incorrect simply because you could not measure it. In litho you can measure at all stages so it is easy. In gravure you cannot measure the cylinder or the plate in flexo, but these systems do not use a mesh, so the lack of control is far less than in screen. Indeed, it is a wonder how screen has survived.

APPLYING STANDARDS

There are so many standards that it is difficult to choose. These days the client is also involved and sometimes demands a certain standard which will allow them to print internationally and keep the same result. Let us take a typical standard such as the Eurostandard, which is widely accepted, has a symmetrical curve and is used for many magazines.

For many years people derived curves from the average of many printing presses. This is fine but these curves also display the problems of the presses that are averaged. If any curve you choose is not symmetrical then it almost certainly embodies the problems in the process of printing. That is the reproduction and the printing. Many standards bodies are advocating these average curves: stay clear of them – get your jobs correct.

Currently we are testing proof match software to see if we can help ink manufacturers to adjust the rheology of the ink and get a product that will be the same as the last batch and will be as reliable as the Euro scale inks that many offset printers use.



A good quality densitometer is necessary if you require accuracy

It is not unusual to find that manufacturers have many hundreds of standards inks matched to different clients. Offset has one standard – is it any wonder that we cannot get a standard for screen?

CONTROLLING THE WHOLE PROCESS

We are in the business of meeting our clients' requests and they will want all the different processes to come together with the same image. This is not unreasonable but screen has failed to do this. Not any more – we are now able to match and control all the process and save time and effort by not trying to balance the job on press (this did happen in litho and gravure but not for the last 20 years).

We have estimated that downtime on press is around 70% and ink wastage about 50%+. All you will need to do is in the reproduction process and not on press. So make more money and save time. SP

Laurie Mullaney is Managing Director of Laurie Mullaney Associates Ltd

Further information:

Laurie Mullaney Associates Ltd, Ipswich, UK
tel: +44 1473 836214
fax: +44 1473 836220
email: sales@lmal.co.uk
web: www.lmal.co.uk

DIRECT SCREEN PRINTING ONTO COSMETIC JARS

Harald Gavin outlines the use of a three-dimensional decorating machine in the design of containers

Figure 1: The RS 5480 is for decorating jars for cosmetics and caps for lip care products

MANUFACTURERS WITH STATE-OF-THE-ART EQUIPMENT FOR INJECTION MOULDING, BLOW MOULDING OR INJECTION STRETCH MOULDING CAN OFFER PACKAGING DESIGNERS MORE OPTIONS FOR PRODUCING COSMETIC JARS, SUCH AS STRAIGHT SIDES, SLIGHTLY CONVEX OR CONCAVE SIDES, OR TAPERED SIDES. THESE INTERESTING SHAPES PRESENT CHALLENGES TO DECORATORS, AND DECORATORS LOOK TO SCREEN PRINTING MACHINE MANUFACTURERS TO PROVIDE COST-EFFICIENT SOLUTIONS FOR DIRECT SCREEN PRINTING ONTO THESE SHAPES.

Pollena Cosmetic Packaging Factory is a major Polish design and manufacturing company of plastic packaging for cosmetics, food, household and chemical products. The company is proud of its ability to create new packaging design in co-operation with customers. The modern production machines – injection moulding, injection-stretch blow moulding, blow moulding – offer customers a wide range of options and give Pollena flexibility in meeting market expectations.

AWARD-WINNING PRODUCTION

A range of decorating machines enables Pollena to provide very cost-competitive decoration using screen printing, pad printing and hot stamping on a wide variety of shapes. Recently the company started decorating its jars and lipstick caps using its new ISIMAT RS 5480 (see figure 1). ISIMAT is a supplier of high quality screen printing machines for printing onto three-dimensional items.

Pollena produces lightweight, eye-catching jars with high impact resistance. Last year it won an award for the first production of injection stretch blow moulding (ISBM) of matte polypropylene. But consumers might find it difficult to empty jars of interesting shapes, therefore Pollena offers jars with insert bowls; these inner bowls can be emptied easily with a finger.

CENTRING AND HOLDING AN OBJECT

Jars with insert bowls are difficult to hold in a fixture of a screen printing machine because an insert bowl can move slightly relative to its outer jar, especially after flame treatment of a jar prior to printing. Centring and holding is therefore separated: the insert bowl is only used to centre a jar on a vacuum fixture and the vacuum hold is created by holding onto the outer jar. This provides a secure hold of the jar on its way through the machine.

However, centring and holding a jar in this way can create another problem. The centre axis of the insert bowl needs to coincide with the centre axis of the jar; the rotation of the jar would be off-centre if the axes are parallel but do not coincide, and an off-centre rotation would cause printing problems.

Plastic jars and plastic insert bowls are manufactured with tolerances in the range ±0.2 to ±0.5 mm. Any variation of the movement of the jar surface from a circular movement will be small and the effect of a variation can be reduced with an automatic squeegee pressure control system such as ISIMAT's floating squeegee system.

DIFFERENT TYPES OF SQUEEGEE

A floating squeegee automatically keeps the squeegee pressure constant during printing onto a jar that rotates slightly off-centre. An off-centre rotating jar could cause a change in squeegee pressure when it pushes the squeegee up – a movement that would increase squeegee pressure – or when it allows the squeegee to move downwards – a movement that would decrease the squeegee pressure.

Shaped squeegees are being used for printing onto jars with slightly concave sides. The screens in the printing stations can be set at an angle for printing onto slightly tapered jars (see figure 2).

ON-LINE PRINT INSPECTION

Pollena is using on-line print inspection. The camera has a resolution of 0.1 to 0.2 mm per pixel; the smallest detectable error would have an area of approximately 2 x 2 pixels. The combination of a high-speed servo-based screen printing machine with a print inspection system enables Pollena to offer customers high quality decoration and 100% inspection. SP

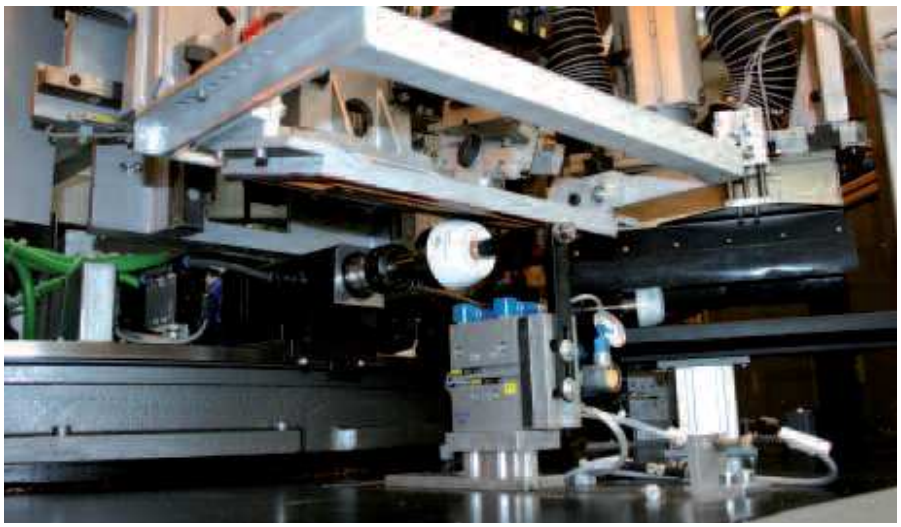


Figure 2: The screen printing station of an RS 5480 – the screen is held in a mother frame that allows operators to angle the screen so it does not collide with other machine parts during printing

Harald Gavin is Director of International Sales and Marketing at ISIMAT

Further information:

ISIMAT GmbH Siebdruckmaschinen,
Ellwangen, Germany
tel: +49 7961 88625
fax: +49 7961 88644
email: harald.gavin@isimat.de
web: www.isimat.de

VERIFYING THE DRYING AND CURING PROCESS OF SCREENPRINTED INKS

In the first of a series of articles on drying and curing within the screenprinting industry, Alan Shaw outlines the best process for verifying dryer settings

Analytical equipment

UNDERSTANDING THE DRYING AND CURING OF SURFACE COATINGS APPLIED BY SCREEN PRINTING IS NOT EASY. THIS IS NOT A TANGIBLE OR EASILY VISIBLE PROCESS; USUALLY IT TAKES PLACE INSIDE THE DRYING CHAMBER OF A CONVEYORISED DRYER AND IS THEREFORE UNSEEN. IT IS ONLY AFTER THE EXAMINATION AND TESTING OF THE PRINT WHEN IT EMERGES FROM THE END OF THE DRYER THAT CHANGES CAN BE MADE TO THE SETTINGS OF THE DRYER TO INFLUENCE THE DRYING PARAMETERS.

However, if the print is dry and passes any tests that may be required, then in most cases the dryer settings are accepted as being correct. Those same settings continue to be used for months, years and in some cases even decades without question. In the pursuit of the perfect screenprint we make endless adjustments to the printing process itself, selecting different film angles, mesh sizes, stencil types and squeegee hardness, as well as changing squeegee pressures and peeling off heights to get the ideal printed image or coating, but the dryer settings are mostly left unchanged and neglected.

Why is this? Why is it that the temperature controller is set at the same parameter for most jobs that are printed? Why is it that at most customers I visit, the hour meters on a 2 lamp UV system read almost the same as each other? I would suggest that this is because the drying process cannot be seen; it is hidden inside a big long box, it goes into the inlet wet and comes out of the outlet dry (hopefully) and we are relieved.

IMPROVING YIELD AND INCREASING PROFITS

I would suggest this is not good enough for the 21st century, when energy prices and wages are rising, when we need to be even more competitive with other types of printing processes and low-cost economies are taking away our traditional business. If we can optimise the drying process, understand what is happening within the dryer, identify when the ink is actually dry and determine how consistent the drying is within the dryer, then we can improve the yield from the process, lower rejects and increase our profitability. It is only if we can have a better knowledge of our drying processes that we can make changes to the drying profiles with confidence, knowing what the results will be.

How do we do this? It is going to need investment in time and materials and possible investment in some testing equipment. This investment, however, will pay you back time and time again. If you can determine what the limiting parameters are, what the highest printing speed at the lowest temperature is, how much of a safety margin is there at that speed, and at what setting is the ink over or under-cured – if you can carry out tests to confirm this information, document it and ensure that the optimum settings are used on that job

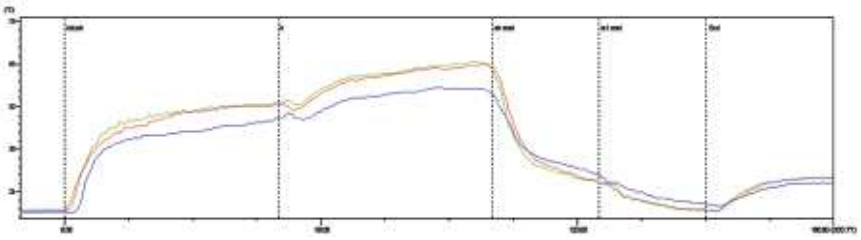


Figure 1: a thermal graph taken from an unspecified dryer

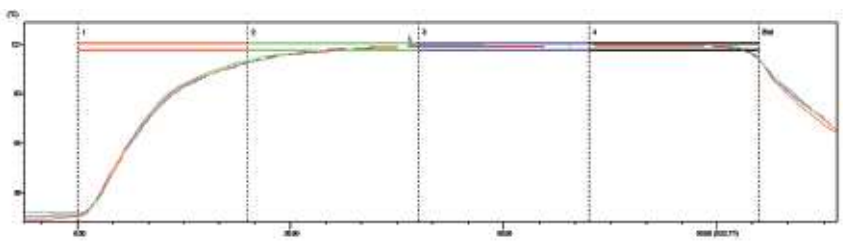


Figure 2: a 3D thermal graph from Natgraph's air force dryer

A handheld tachometer for confirming belt speeds

in the future, then the savings can be substantial.

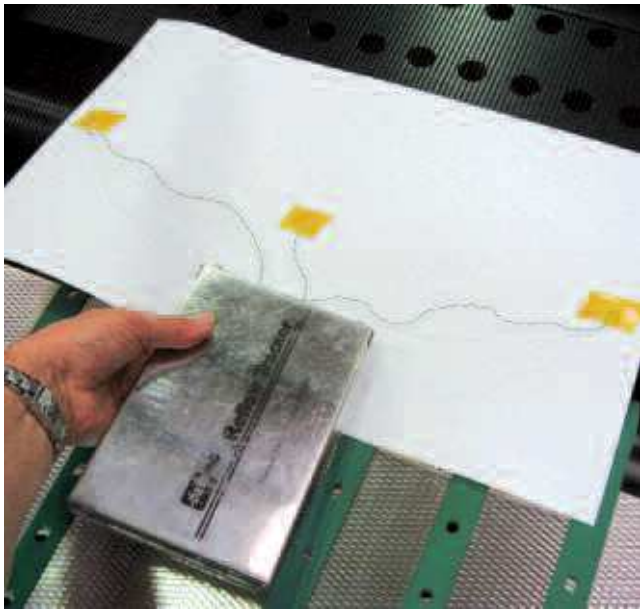
So we need to verify what is happening within the dryer. To explain how to do this I will firstly cover dryers in general, solvent-based inks and then UV curable inks. I should also explain that whilst Natgraph uses certain testing devices, there are many other similar items of equipment available; Natgraph is not endorsing these devices over others, it is just that the company has had success with these particular instruments.

INK DATA SHEETS

To see what the ideal drying conditions are, we should first look at the ink data sheet provided by the ink manufacturers; however, this information has to be conservative and safe. The figures given on a data sheet are, therefore, generally for guidance only, and this is not unreasonable – after all, how can the ink makers know the efficiencies of each and every dryer type on the market, or the characteristics of every substrate? The drying times and conditions indicated by the ink manufacturers can usually be improved upon, sometimes dramatically, and so these should be considered as a start point only.

CORRECT OPERATION OF THE DRYER

It is sensible to ensure that your dryer is functioning to its optimum capabilities. Carry out a maintenance check of the complete dryer



A temperature profiler fitted with three thermocouples

before doing any tests: check that the electrical heating elements for the hot air are all functioning (resistance and current check), all the infra-red elements (if any) are working, that any fans and air filters are unblocked, that UV lamps are within their usable life and that UV reflectors / quartz filters are clean. If they are all OK, it is OK to start.

SOLVENT-BASED INKS

Firstly verify the belt speed, whether with an old-fashioned numbered dial (potentiometer) control or a digital readout of belt speed. You need to verify what the belt speed is to confirm the readout is accurate or what belt speed is achieved when the dial is in a particular position (as often the readouts are inaccurate). Mark out a given distance (1 metre) on the inlet of the dryer and use a stopwatch to confirm how long the belt join takes to cover this distance. If it takes 3 seconds to cover a metre then the belt speed is 20 metres/minute (60/3 = 20). If you have several dryers then it may be worth investing in a hand-held tachometer, which are not expensive and will be more accurate.

In a multi-module dryer the air temperature setting in each module can be set to give either a 'lazy' slow ramp up to the peak temperature, or 'steep' quick ramp up, depending upon the ink type (there will be more discussion of this in future articles). In our experience the air temperature setting of the module will almost definitely not be the same as the substrate temperature as it passes through the dryer. In a very efficient dryer with high air speeds at the substrate and high volumes of recirculated air, the temperature of the heated air and the substrate can be close, but they will not be the same.

UV output testing

If we can confirm the substrate temperature for a given setting, then the dryer settings can be adjusted to give more time at the required temperature. There are some crude and inaccurate (low cost) ways to check the temperatures within a conveyorised dryer. Self-adhesive temperature tapes can be stuck to the substrate, but these will only record the maximum temperature that is achieved and are not very accurate. A handheld digital thermometer attached to a very long thermocouple can be sent down the dryer and the readings noted as it passes through the dryer; this could be done at measured spacings across the belt, but is very time-consuming and not very accurate.

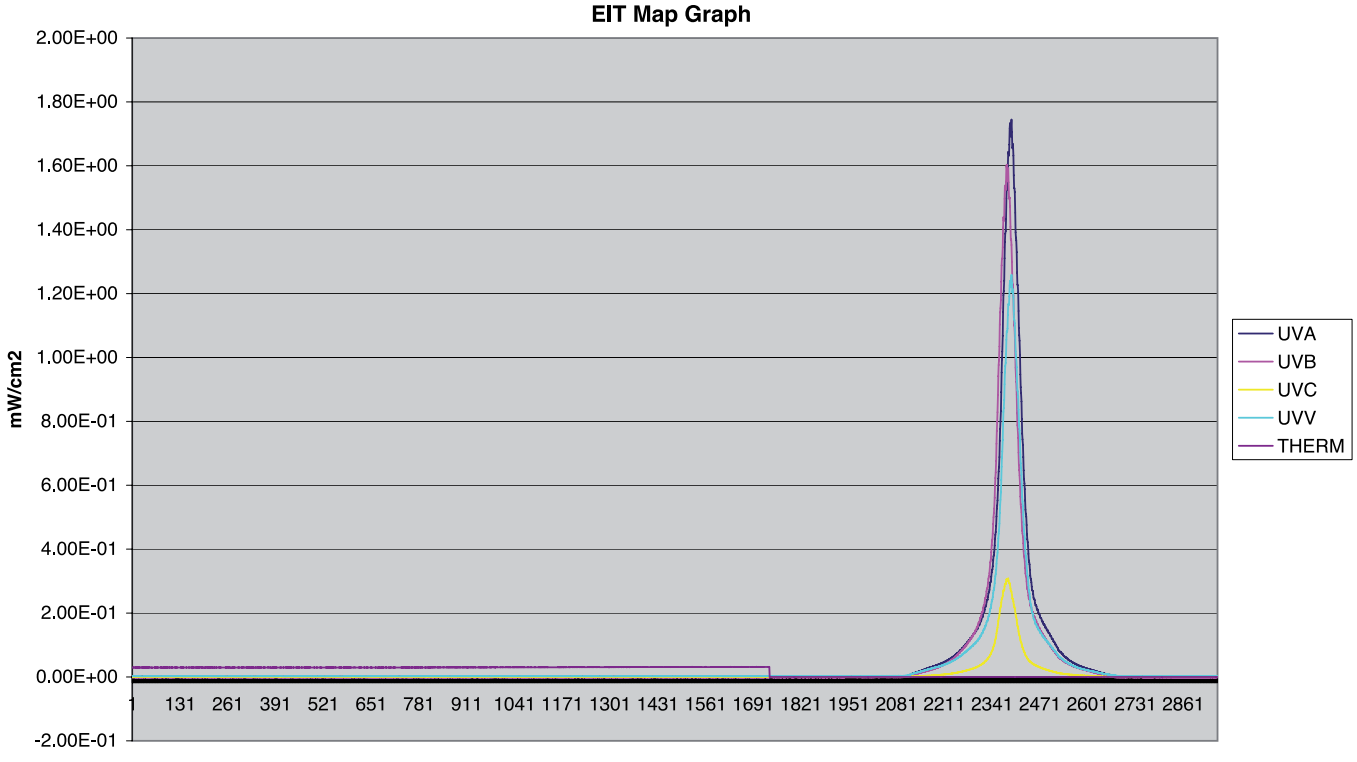


Figure 3: a high efficiency UV output graph from a Natgraph UV dryer

OBTAINING ACCURATE THERMAL DATA

In our experience there is only one way to obtain accurate thermal data and that is to use a multi-channel temperature profiler. This device is a temperature recorder capable of being sent through the dryer with up to six thermocouples attached to the substrate at measured spacings across the complete belt width. This will give you a graph showing a 2D or 3D 'thermal journey' of the substrate as it passes through the dryer (see figure 1). The ramp-up time, time at temperature and the 'side to side' accuracy of the dryer can be confirmed using this type of device, and the thermal effect of any infrared systems within the dryer can also be confirmed with it.

The information can be exported as data into a spreadsheet or saved in a graphical format. At this stage you will know the accuracy and efficiency of your dryer, if it is accurate to its own temperature settings and also how even the performance is across the belt width. If this performance is acceptable, you can continue with the drying trial; if not, you can try to improve it by maintenance, modification or replacement.

During drying trials a new graph can be taken each time the settings are changed, giving an accurate technical and visual record of the drying conditions within the dryer at that time. Experimenting with different settings and cross-checking against the final results to see how, for example, at a higher belt speed the peak temperature is lowered, will then enable you to adjust the dryer settings with confidence because you can now 'see' what is happening inside the dryer. Time set aside for testing will enable you to explore as many variables as you want to optimise the drying process (see figure 2).

UV CURABLE INKS

Having confirmed the accuracy of the belt speed, we now need to know how efficient the Ultra Violet lamps are, to give the best cure at a temperature below the 'thermal threshold' of the substrate. UV lamps require very large power supplies to operate, so if we can verify the amount of UV energy required to fully cure the UV ink, then just reducing one lamp to a lower power setting can result in massive savings and thereby lower the unit cost and improve yield. As with solvent-based inks, there is no exact figure that will automatically give good results and so we need to verify the efficiency of the UV technology within the dryer and then carry out tests to confirm the effect of each adjustment.

There are some crude and inaccurate ways to measure UV: self-adhesive UV strips that change colour to indicate the level of UV output can be used, but these do not give a very dependable result. The most practical and accurate way to confirm UV energy levels on a conveyorised dryer is with an electronic light 'bug' or 'puck' that can be passed through the dryer at a given belt speed.

There are many different types of UV bugs available on the market – the level of sophistication will depend upon price. They all give a reading of the integrated light output within a given part of the UV light spectrum as a figure in milijoules/cm^2 (mJ/cm^2), this figure being the total light gathered by the optics of the UV bug as it passes underneath the UV lamp(s) at a given speed. The more sophisticated instruments also measure peak intensity giving a reading in miliwatts/cm^2 (mW/cm^2). In difficult UV curing applications (heavily pigmented inks or low adhesion substrates, for example), this figure is very important. The high-end devices also measure the peak temperature as they pass beneath the UV lamps, which can be very useful.

The inside view is not available when in production

CONFIRMING UV OUTPUTS

Passing the UV bug through the dryer at a typical belt speed and at all of the different lamp power levels available, as well as with multiple lamps selected, will confirm the complete range of UV outputs available from the dryer; these need to be documented for later use. Testing the UV inks to establish the optimum setting can now begin; it should be discovered that the same readings can be obtained from different combinations of lamps and / or lamp power settings, so the most economical in terms of power usage should always be chosen.

These UV drying tests will verify the dryer settings that over-cure the ink or overheat the substrate (or both), and also those which under-cure the ink. The heat output of the UV technology in the dryer will usually determine the minimum speed that can be run – the cooler the dryer, the slower you can run (still above the output speed of the press) and the better the through cure.

Therefore the most important figure to be confirmed is the peak intensity (mW/cm^2) – the higher this figure, the better the cure will be (see figure 3). The peak intensity is a result of the lamp power and the efficiency of the reflector design. It should be noted that if more than one UV lamp is selected, the first lamp should always be at the higher setting to ensure a better cure and substrate adhesion whilst preventing any 'skinning' of the ink.

UV BUGS AND MILIJOULE READINGS

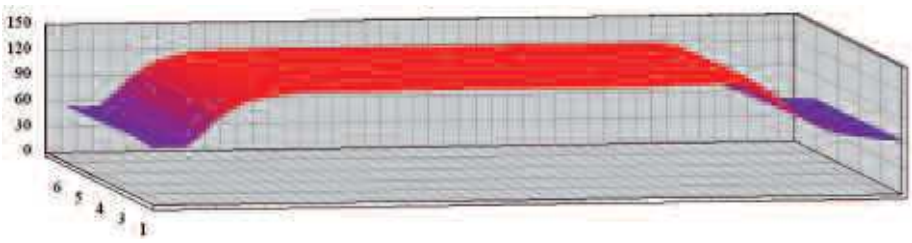
Several different types of UV bugs are available, but unfortunately they will all give different milijoule readings from the same dryer (we know because we have tested several different manufacturers' units at the same time). These devices are very useful in verifying the efficiency of UV dryers, but they should only be used as comparators.

That is to say, if the same device is used repeatedly on the same UV dryer, or the same device is used on more than one UV dryer, then the data can be reliably used. However if mJ/cm^2 figures are quoted from different UV bugs, these cannot necessarily be used as an accurate comparison – the only true way is for the exact same type (and series) of UV bug to be used as the ultimate verification of UV output. (The instruments used above can be relatively expensive, so it may be worthwhile either hiring one or persuading your dryer manufacturer or ink maker to undertake the trials with you.)

When Natgraph has worked with a customer to verify their drying processes, considerable improvements have been achieved in optimising the drying process, resulting in an increase of output and therefore efficiency. So how fast can you print? As fast as you can dry.

In the next issue I shall write an in-depth article on drying and curing.

Alan Shaw is Sales Director of Natgraph



A perfect 3D thermal graph

Further information:
Natgraph Limited, Nottingham, UK
tel: +44 115 979 5800
fax: +44 115 979 5700
email: info@natgraph.co.uk
web: www.natgraph.co.uk

A MULTITUDE OF FINISHING OPTIONS

The ProCut 53 die cutter

Chris Dillon details some finishing options for die cutters and folder-gluers

AT THIS YEAR'S DRUPA, A LEADING TRADE FAIR FOR THE PRINTING INDUSTRY, KAMA, BASED IN DRESDEN (GERMANY) DEMONSTRATED THE VERSATILITY OF ITS MACHINES BY SHOWING THE BEAUTIFULLY FINISHED PRINT PRODUCTS THEY CAN PRODUCE. THE SAMPLES INCLUDED HIGHLY DEMANDING PRODUCTS SUCH AS CAPACITY PRESENTATION FOLDERS WITH GLUED POCKETS, CD POCKETS WITH EMBOSSING AND HOLOGRAMS, AND CROSS FOLDERS WITH LUSTROUS HOT FOIL STAMPING, SOME WITH MICROSTRUCTURES.

Kama's multi-functional finishing die cutters and folder-gluers are robust and have been designed to take up the minimum amount of space with a multiplicity of applications and short set-up times. Importantly, in a digital age, these machines can make the processing of small runs a profitable affair.

MULTI-FACETED FINISHING

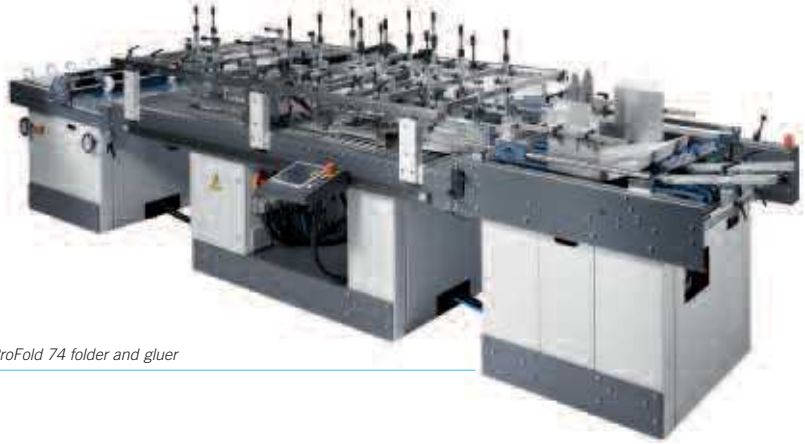
Kama's ProCut 74 finishing die cutter is for the 740 x 600 mm format. The engineering of this 'hybrid die cutter' makes it equally skilled at die cutting, creasing, kiss-cutting, perforating and cold embossing, as well as creative finishing options such as hot foil stamping, combined hot foil stamping and embossing, hologram stamping and the hot cutting of plastics at a high level of quality. With multi-level reliefs and hot foil effects with coloured metal-coated or transparent foils, the Kama die cutter can give printed products glamour and can increase their levels of protection against forgeries.

A further advantage is that set-up times between different jobs are very short. Changing from hot foil stamping to die cutting, for example, only takes 10 minutes. The new quick-change heating plate system for hot foil stamping makes the change-over between different hot foil jobs even faster. While the machine is still processing a hot foil job, the stamping tool for the next job can be set up: the mounting plate is simply exchanged, with fitting screws positioning the mounting plate on the heated carrier plate. For repeated jobs the blocks can remain on the carrier plate.

MOVEABLE UPPER TABLE

The ProCut die cutters ensure excellent quality through the tried and tested principle of the movable upper table, where the sheet is treated very gently by being kept at one level throughout the entire production process. Immediately following the die cutting, the sheet is treated especially gently. The fast upward movement of the upper table creates a negative pressure that carefully separates the sheet from the die and carries it out of the cutting station on a cushion of air. This means that only a few nicks are necessary – or even none at all.

With the option of the motor-driven pressure control system, the cutting force of ProCut die cutters can be adjusted automatically and reproduced with a high degree of precision, which is good for frequent engagement and disengagement during hot foil stamping. The tolerance for the cutting force adjustment is below one micrometre. The operator can enter the feed information on the swivel-mounted touch panel in increments of one tenth of a millimetre. A three kilowatt servo drive motor moves the worm shaft and immediately disengages the head if there are any misfed sheets, preventing any stamping on the platen and protecting the clichés or formes.



The ProFold 74 folder and gluer

FOLDING AND GLUING

Kama's ProFold 74 folder-gluer fits in after the die cutting process and takes die cut, creased and finished cuts and makes them into a wide range of products, such as CD and DVD sleeves, capacity presentation folders and glued pockets, credit card sleeves, cross folders and ticket envelopes.

The difficult production of capacity folders is carried out reliably by the ProFold, a process that often has to be done by hand. All folding and gluing can be carried out without changing the basic machine structure. The tool mounting grid enables the operator to arrange the folding and gluing tools quickly and easily in any order; the operator, for example, can choose whether a longitudinal or a cross fold is carried out first. The areas that are folded can have any kind of shape, whether with rounded edges or cut in a zigzag.

The maximum performance of the machine is 36,000 operations per hour, which applies to products such as folders and ticket envelopes. For repeated jobs it is possible to reproduce the set-up of the machine using the tool mounting grid.

MULTIPLE APPLICATIONS

The PLC control of the Kama folder-gluer has eight channels for air and glue nozzles. Additional processing modules can be easily integrated and programmed directly into the control software. The user-friendly operation console with its graphic user interface is mounted on a rail to allow the operator to push it to one side. With a defined length of 5.5 metres and a well designed system for storing tools, the ProFold 74 requires relatively little space.

The multifunctional Kama finishing machines are currently in operation in more than 40 different countries.

Chris Dillon is Joint Managing Director of Kama UK

Further information:
Kama UK Ltd, Oxon, UK
tel: +44 844 567 5201
fax: +44 844 567 5200
email: sales@kamauk.info
web: www.kama.info

SOUND THE FIRE ALARM

Jim Hingst offers some valuable advice in fire prevention and safety

WHO COULD FORGET THE HORRIFIC IMAGES OF PEOPLE LEAPING TO THEIR DEATHS TO ESCAPE THE INFERNO OF THE TWIN TOWERS IN NEW YORK (USA) IN 2001? LITTLE, IF ANYTHING, IS MORE EXCRUCIATINGLY PAINFUL THAN SEVERE BURNS, YET NOT UNTIL TRAGEDY STRIKES DO MOST PEOPLE TAKE FIRE SAFETY SERIOUSLY.

SOLVENT HAZARDS

Fire is undiscriminating – it can flare up at any time and can happen to anyone. After finishing a vinyl graphics application job, my former colleague and mentor, John, had loaded the back seat of his car with rags which had been soaked in solvent for cleaning before heading down the road. As John drove, he attempted to light one cigarette with another that he had just finished smoking. After getting a light, he threw the old cigarette out the window. Unbeknownst to John, the cigarette blew back into his car, landing in the pile of rags. Shortly thereafter the rags ignited. As long flames trailed out the back windows of the car, alarmed motorists frantically sounded their car horns to alert John of his precarious predicament.

Many of the solvents that are used in sign making or screen printing are either flammable or combustible. Flammable solvents are those that can have a 'flash point' at temperatures lower than 100°F (37.7°C). The flash point is the lowest temperature at which a solvent can catch fire – the lower the flash point, the more dangerous the solvent.

Combustible solvents can catch fire at temperatures higher than 100°F but lower than 200°F (93°C). This is a list of some common solvents that might be in your shop:

Acetone (flammable)
Adhesive remover (highly flammable)
Brush cleaner (flammable)
Denatured alcohol (highly flammable)
Enamel reducer (extremely flammable)
Lacquer thinner (extremely flammable)
Mineral spirits (combustible)
Paint conditioner / flow enhancer (combustible)
Turpentine (flammable)
Wax and grease remover (highly flammable)
Xylene (flammable).

Fire extinguishers should be located within 75 feet (23 metres) of an exit and should be inspected every 12 months

Without good ventilation, solvent vapours can become concentrated near open containers of liquid solvent. These invisible vapours are very dangerous – remember, the vapours burn, not the liquid. It only takes a spark or high temperatures to start a fire.

WHAT YOU CAN DO

"The best way to keep the incidence of fires low is to conduct regular fire inspections in your business," says Katy Lellelid of the Specialty Graphic Imaging Association (SGIA). "The purpose of conducting fire inspections is to identify the problems so that you can correct any violations and bring the plant into compliance with fire regulations."

In conducting your inspections, here are some hazards to look for:

- Keep solvents and other hazardous materials in clearly labelled containers with the name of the chemical or brand name. To minimise the risk of fire, if you have more than a few quarts of solvent in your shop, store any flammable liquids in a fireproof cabinet that meets your local fire code. Solvent-soaked rags should also be stored in covered metal containers. Never store any type of combustible material in a furnace room.
- Keep a fire extinguisher mounted within 10 feet (3 metres) of your storage cabinet and make sure that it is regularly inspected and kept in working order. A commercial-grade multi-purpose fire extinguisher will cost less than $75 in the USA. To remind your employees not to smoke where the flammable liquids are stored, post 'no smoking' signs in your shop.
- Mount fire extinguishers along the walkways to your emergency exits; extinguishers should be within 75 feet (23 metres) of an exit.
- Have fire extinguishers inspected every 12 months.
- In the USA, every workplace must have at least two separate fire exits. These fire exits should be located far apart, so if a fire blocks one exit, workers can safely exit through the other. Illuminated 'exit' signs must be in place and in working order.
- Never lock or block any exit door. Aisles should be free and clear of anything that could hinder evacuation. While this may sound like stating the obvious, each year needless fire deaths occur because exit doors are locked.
- Battery-powered emergency lights should also be installed in areas such as stairwells to provide lighting if the electrical power goes out. Batteries should be regularly checked and replaced as needed.

LEAD BY EXAMPLE

If you want your employees to follow your shop's safety rules, lead by setting a good example. As fire marshal in my home town, my father often pontificated about fire safety but he didn't always practice what he preached. One rule that he regularly broke was never to use gasoline as a cleaner.

A gallon of gas has the explosive power of 20 sticks of dynamite; its fumes are extremely flammable and easily ignite with a spark. My father learned this when his hands went up in flames, resulting in second-degree burns. He also learned to extinguish his cigarette when working with solvents.

WHAT IS FIRE?

When I was asked what the right type of fire extinguisher is to have at hand, I couldn't answer the question. So I called Jack Roughgarden, R Tape's Director of Information Technology and former Fire Chief of his home town in New Jersey (USA). Jack educated me on what fire is, the different classes of fires and which type of fire extinguisher is best for each class of fire.

The simple definition of fire is rapid oxidation of a material at a high temperature. At an elevated temperature the solid fuel turns to a gas and combines with oxygen. When heat is introduced, a chain reaction occurs and the fuel visibly ignites.

The fire tetrahedron is a four-sided geometric representation of the four factors necessary for fire: fuel (any substance that can undergo combustion), heat (heat energy sufficient to release vapour from the fuel and cause ignition), oxidising agent (air containing oxygen) and uninhibited chemical chain reaction (sufficient exothermic reaction energy to produce ignition). The fuel / air ratio

must be within flammable limits, which describes the amount of vapour in air necessary to propagate flame. Removing any of these four factors will prevent, suppress or control the fire.

FIRE EXTINGUISHERS

Companies in most countries are required to provide an adequate number of the right type of fire extinguishers and to ensure that this equipment is inspected regularly. Everybody should know where the fire extinguishers are and how to use them. Screen printing plants are vulnerable to a variety of different fire hazards that may require different types of extinguishers. Using the wrong extinguisher can be dangerous and in some cases deadly.

Pressurised water is great for putting out wood, paper and trash fires. Water works by cooling down the burning material below its ignition point and is defined as a 'Class A' fire. 'Class B' fires involve combustible liquids such as gasoline, grease and oils – water should never be used. The same goes for electrical fires. Water conducts electricity, which can cause the fire to spread and you could also electrocute yourself in the process. A 'Class C' CO_2 gas extinguisher is the only safe approach.

Dry chemical extinguishers can be used for wood and paper fires, electrical fires and combustible liquid fires; these fall under the classification of 'ABC type extinguishers'. These multi-purpose extinguishers, however, are only good for one use – after that, you need to have them recharged. Dry chemical extinguishers also have a limited shelf life and should be inspected annually.

"In a screen print plant, the multi-purpose dry chemical extinguishers are great for nearly every type of fire," says Katy Lellelid. "Fires in a UV curing unit are a different story – the dry ammonium phosphate chemicals can screw up the electronics. For UV, a CO_2 extinguisher is the way to go."

ELECTRICAL FIRES

The best advice in fighting electrical fires is to cut the power first. Carbon dioxide extinguishers work best in quickly smothering the fire, replacing oxygen with CO_2. Be careful when using this type of extinguisher in tight confines – carbon dioxide can suffocate a fire, but in high concentrations it can also suffocate you.

Using pressurised water to extinguish combustible metal fires can result in disastrous and explosive results. Combustible metals include, but are not limited to magnesium, titanium and potassium. For combustible metals use a 'Class D' extinguisher. These extinguishers contain a pressurised dry powder formulated to smother a burning metal and are designed to be operated differently than other types of extinguishers. Before using a 'Class D' extinguisher, you must first open the valve on the nitrogen cylinder to pressurise the tank.

"When a fire starts, your first responsibility is to sound the alarm and call the fire department," Jack Roughgarden says. "After you do that, provide assistance to anyone in your immediate area who may be in need of help to exit the building immediately."

According to Roughgarden, the next step is to contain the fire. Closing doors, windows and exhaust vents as part of your exit procedures helps control the spread of fire to other parts of the building. At this point, those individuals trained in the identification and classification of fire and the proper use of the appropriate extinguishment methods may proceed with the containment and suppression of the incident.

CONCLUSION

Fire extinguishers and first aid kits are essential tools for use after a fire or accident occurs. "Ultimately, though, the key to any successful safety programme is prevention," says R Tape President and CEO Mike Roughton. "As part of a broader safety protocol, you must regularly demonstrate to your organisation that you take fire prevention and their safety seriously."

Roughton recommends writing a formal fire safety plan and reviewing it regularly with your employees. Your plan should include fire inspections, evacuation drills and most importantly, employee education. Because there are different types of fires along with different fire-fighting procedures, your employees must be trained.

"Only those trained in fire suppression techniques should engage in fighting a fire," Roughton says. "Leave the dangerous work to the professionals and don't risk employees' lives in a valiant attempt to save assets. Too often many employees unnecessarily risk life and limb, even though they have not been adequately trained in fighting fires." SP

Jim Hingst is Business Development Manager for R Tape

Further information:
R Tape, South Plainfield (NJ), USA
tel: +1 219 929 5581
fax: +1 219 929 1527
email: jhingst@rtape.com
web: www.rtape.com

EXPLORING THE ECO JUNGLE: PART 2

In the second part of their article, Robb Schneider and Paul Roba ask what we can do to pursue green technology in the graphics industry

What can the graphics industry do to help the planet?

IN THE FIRST PART OF THIS ARTICLE, PUBLISHED IN THE LAST ISSUE OF *SPECIALIST PRINTING*, WE REVIEWED THE EMERGING LANGUAGE OF GREEN TECHNOLOGY AND INTRODUCED THE 'CIRCLE OF GREENING'. THE CIRCLE SHOWED HOW FOUR SECTORS – REGULATORY AGENCIES, CONSUMERS, BUSINESS AND GOVERNMENT – ESTABLISH ACTIONS AND ACTIVITIES TO FOSTER THE GREENING OF THE ENVIRONMENT, AND HOW THEIR ACTIVITIES IMPACT THE PLANET. THESE ACTIONS AND ACTIVITIES INCLUDE:

The carbon footprint is a measure of the amount of greenhouse gas emitted and accumulated over the full life-cycle of a product or service

- Recycling: recovering and reprocessing waste into usable products.
- Stewardship: the responsible management of resources in order to prolong their availability and minimise the impact on the environment.
- Landfill reduction: the use of products which can be, or are, made from recyclable sources, as well as those items which are biodegradable, compostable or dissolvable in order to reduce overall volume in landfills.
- Elimination of toxic materials: the reduction of hazardous chemicals, heavy metals, toxins, chlorine compounds and other dangerous items.
- Sustainability: using resources that can be renewed and will not be depleted with continued use.

Our focus in this, the second part of the article, will be on the impetus of these activities as used by the graphics industry, as well as the concept of the carbon footprint. The selected documentation of activities is based on public knowledge and does not reflect any endorsement of a specific company, technology or regulations. Each company or product illustrated in this article only recognises the product for its green merit, and not necessarily the final performance of the product.

CARBON FOOTPRINT

One of the key initiatives taking place in the market is the 'carbon footprint' calculation. The carbon footprint is a measure of the amount of carbon dioxide (CO_2) and other greenhouse gases emitted and accumulated over the full life-cycle of a product and / or service (Wiedmann and Minx, 2008). Carbon footprinting has been divided into two categories: the primary footprint and secondary footprint.

The primary footprint is a measure of the direct emissions of CO_2 from the consumption of fossil fuels, energy and transportation; an individual or organisation has direct control of these factors. The secondary footprint is a measure of the indirect emissions from the life-cycle (manufacture and breakdown / decomposition) of products and services consumed; an individual or organisation exercises control over the secondary footprint through market demands and buying power.

There are many companies that provide services to calculate an individual's or organisation's carbon footprint - a quick search on the internet will display a myriad of companies and free calculators for use. These rudimentary tools give a baseline to determine their affect on the environment, and some ideas on how to reduce the impact of their carbon footprint.

CALCULATING A CARBON FOOTPRINT

To further expand on the concept, we will examine Paul's primary carbon footprint based on calculations provided by ReduceImpact.com, an online organisation that provides one of the many available calculators for this purpose.

Questions for the calculator include:

- How many people live in your home?
- What are your average monthly electric, gas and heating oil bills?
- How much waste (trash) do you produce?
- How much recycling do you perform?
- How many miles per year do you drive your car?
- What is the gas (petroleum) mileage of your vehicle?
- How many miles do you fly a year?
- What are your meat-eating habits?

In an amazing summary, Paul's household accounts for over 25 tons of CO_2 per year. In addition, a few tips provided by a ReduceImpact.com webpage for reducing a carbon footprint are as follows:

- Reduce driving by 50 miles per week; this can reduce CO_2 emissions by over

1 ton (based on 21 mpg fuel economy).

- Look for locally grown foodstuffs, as reduced transportation costs will be incurred, resulting in less fuel usage.
- Try flying direct instead of connections; take-offs and landings use more fuel than cruising speeds, thus creating more CO_2.

An individual's primary carbon footprint is relatively simple to determine. However, when we look at larger organisations with manufacturing capabilities, the variables involved in the calculation become very complex. To calculate the secondary footprint requires more time and effort to effectively determine how an organisation impacts the environment.

Typically the use of a dedicated staff or hired consultants is strongly recommended to ensure accuracy and effectiveness in making decisions and evaluating the impact of an organisation on the environment. Of course small and simple changes which are implemented, as shown in the example, make an impact and yield larger results based on the size of the organisation.

One of the key initiatives in managing environmental impact is the use of recycling

RECYCLING

One of the key initiatives in managing environmental impact is the use of recycling. The incorporation of recycled components into production reduces the use of virgin raw materials, energy, water and air pollution as well as the need for 'conventional' waste disposal. This effort results in lower greenhouse gas emissions as compared to virgin production. Within the graphics industry, the uses of recycled and recyclable materials are growing.

The following chart highlights some products and manufacturers from the various graphics industries which provide eco-friendly resources.

COMPANY	PRODUCT	WHAT	CONTACT INFO
Avery Dennison	Offset papers	recycled content	www.averygraphics.com
Cooley Digital	Coolflex PR3 (banner)	recyclable	www.cooleygroup.com
DuPont Inkjet	Tyvek (banner)	recyclable	www.dupont.com
Lamitech	Earthboard (rigid board)	recovered fibres and recyclable	www.lamitech.com
Triangle Digital	ECOS Flexlite (PE)	recyclable	www.triangledigital.com

This is not a full compendium of all suppliers, but a snapshot of a few environmental partners. Many of these and other suppliers have worldwide presences and may offer different products in various regions which meet the regional requirements for recycling;

contact the specific manufacturer for its green policy and ask for details about its programmes.

A last word on recycling is that many organisations have instituted internal programmes to reduce waste and recycle. The efforts highlighted below reduce materials going to landfill:

- Fujifilm uses waste to formulate aluminium sulphate, a recycled product used in waste effluent treatment. This recycling practice has reduced the company's waste stream by over 1 million pounds of aluminium sludge per year.
- A Nazdar plant began a cardboard recycling programme in 2006; over 24 tons of cardboard have so far been diverted from landfills and recycled.
- Many organisations have instituted the use of recyclable and / or reusable packaging. This reduces the waste stream from going directly to landfill.

STEWARDSHIP

Many organisations foster stewardship, or the management of resources for continued availability of the resources in future years. Many steward organisations are prevalent on the internet, and many industry support organisations have established directions and support systems for their specific industry.

Two prominent stewardship programmes involved in the graphics world are the Forest Stewardship Council (FSC) and the Sustainable Forest Initiative (SFI). These organisations promote the responsible management of the world's forest regions. Forests and products seeking certification are reviewed to ensure that the "forests are managed to meet the social, economic and ecological needs of present and future generations" (see the FSC webpage at www.fsc.org).

Typically independent, for-profit groups support the enforcement and accreditation of organisations to meet the standards as set forth by FSC and SFI. Once a group or product has been certified, a stewardship logo is permitted on the packaging to ensure the user is aware of the environmental stewardship met by the product.

LANDFILL REDUCTION

In order to reduce the amount of mass deposited into landfills per year, many products are incorporating technology that allows them to be degradable, biodegradable or compostable. The difference between being degradable, biodegradable and compostable is related to the change in mass over time.

More specifically, compostable plastic is capable of undergoing biological decomposition and breaks down to carbon dioxide, water, inorganic compounds and biomass, and leaves no toxic residue. The EN13432 standard requires 90% reduction in mass within 90 days.

The definition of biodegradable plastic is a plastic which will degrade from the action of naturally occurring micro-organisms without a timeframe. Degradable plastic is a plastic which will undergo a significant change in its chemical structure under specific environmental conditions resulting in a loss of properties. A plastic, therefore, may be degradable but not biodegradable, or it may be biodegradable but not compostable. Besides decomposition, the use of recycled material also reduces the amount of material incorporated into the landfill.

Bioplastics are a new generation of biodegradable and compostable plastics derived from renewable raw materials such as corn

ELIMINATION OF TOXIC MATERIALS

Within the graphics industry there has been government legislation regarding the elimination of hazardous chemicals; the most notable are Restriction of Hazardous Substances Directive (or RoHS), Toxics in Packaging Clearinghouse (commonly referred to as CONEG) and Registration, Evaluation, Authorisation and restriction of Chemicals (REACH).

RoHS took effect in 2006 and restricts the use of six materials in the manufacture of various labels for electronic and electrical equipment. RoHS is often referred to as the lead-free directive, but it also restricts the use of Cadmium, Hexavalent Chromium, Polybromimated biphenyls (PBB) and polybrominated diphenyl ether (PBDE).

In 1989, the Toxics in Packaging Clearinghouse (TPCH) was drafted by the Source Reduction Council of CONEG in an effort to reduce the amount of heavy metals in packaging and packaging components that are sold or distributed throughout the USA. The law is designed to phase out the use of mercury, lead, cadmium and hexavalent chromium in packaging materials. This effort is to lower their harmful presence over time in the environment.

REACH is a European Union regulation that addresses the production and use of chemicals and their impacts on health and the environment. The REACH legislation was initiated in June 2007, with a phased implementation over the next decade across the European Union.

SUSTAINABILITY

Bioplastics are a new generation of biodegradable and compostable plastics, derived from renewable raw materials such as starch (e.g. corn, potato etc.), cellulose, soy protein, lactic acid etc. These materials are not hazardous in production and decompose back to carbon dioxide, water and biomass.

As a result of the increasing production of bioplastics, the term 'non-food crops' has become mainstream. Non-food crops are the raw materials grown for the production of bioplastic resins. The field of bioplastics is constantly evolving with new materials and technologies being worked on and being brought to market.

The most famous bioresin is polylactic acid (PLA), which is a biodegradable thermoplastic derived from corn or sugarcane. PLA has been identified for many years; it has grown dramatically in recent years as a result of commercial demand for green products. In the graphics industry, two examples of the use of bioplastic are Inkware's BioWare corn-based inks for Vutek (BioVu) and Mutoh (MutohBio) printers. Platiprint Sales Company has also introduced a removable film comprised of PLA.

CONCLUSIONS

In summary, we have briefly reviewed the primary green concepts of recycling, stewardship, landfill reduction, elimination of toxic materials and sustainability in the industry, and their impact in the graphics industry. A few examples have been shown to demonstrate how leaders in the graphics industry have adopted new processes and green statements to reduce their impact on the environment.

Through organisational effort and a combination of these concepts, the graphics industry can reduce its carbon footprint, eliminate toxic chemicals, utilise sustainable resources and thereby reduce everyone's impact on the environment.

The graphics industry can reduce its carbon footprint, eliminate toxic chemicals and utilise sustainable resources

Robb Schneider is Future Technology Researcher and Paul Roba is Manager of Technical Services in the Graphics and Reflective Products Division of Avery Dennison

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Further information:

Avery Dennison, Pasadena (CA), USA
email: GreenTeam@averydennison.com
web: www.averydennison.com

The UV dryer

UV technology for dryers

German company Beltron manufactures customer-specific UV dryers with PLC, stepless power control, online UV measurement, selective filter and quartz glass, in lines from 7 cm to more the 2 metres working width. The UV dryer can be supplied with or without shutters. Standard machines are supplied with 1, 2 or 3 lamp sections although, due to its compact modular design, UV machines with 8 or more lamps are also manufactured.

As well as the Teflon belt, Beltron also supplies a dryer with metal belt and edge conveyor and roller conveyor. The UV dryer with edge conveyor was particularly well-received when it was first exhibited at Productronica 2007 in Munich. The dryers are manufactured according to SMEMA, CE and DIN and are width-adjustable.

The UV dryer is mainly used for single-sided applications (usually from above) and is also manufactured as a double-sided dryer. These dryers are equipped with metal or small conveyor belts and are used by many printed circuit board manufacturers in Europe. Beltron also manufactures infrared dryers with glass bulbs or ceramic heaters, the UV integrator, exposure systems, drying cabinets and special systems.

Wall graphics for wide format printers

MACtac is offering two new self-adhesive constructions for wide format printers. Wallwrap 100 has been specifically designed for graphics to be applied directly onto brick walls. The high tack opaque adhesive and 55 µm PVC film gives excellent adhesion on clean brickwork, good visibility of the graphics and no edge lifting. It is intended for promotional graphics, informative posters and directional signage.

Wallwrap 200 is designed for short (six months) indoor wall graphics to be applied on smooth, flat surfaces. The 150 µm white matt semi-rigid PVC film is coated with an ultra-removable clear acrylic adhesive. It allows sign-makers to apply, reposition and remove the graphics without leaving adhesive residues on the substrate. Both constructions have been optimised for solvent based, eco-solvent, mild solvent and UV inkjet printing on wide format printers.

New UV-curable graphic adhesives

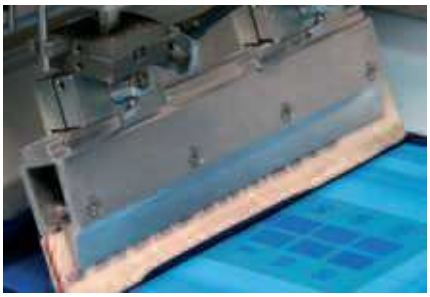
Kissel + Wolf has introduced Kiwoprint UV 33, a new UV-curable pressure-sensitive adhesive for permanent foil and reverse glass print displays, as well as colour transfers for dry and wet application. Typical applications are for permanent advertising displays, ink transfers for vehicle decoration and labels and stickers for indoor and outdoor use.

Fast curing results in shortened cycle times. As Kiwoprint UV 33 is solvent-free, there are no VOC problems or other relevant environmental issues. When printing large format foil displays, either blotch or half-tone, there is no danger of the adhesive drying up in the screen, even with the finest mesh. Other advantages are good water and ageing resistance and good compatibility with many printing inks.

Ink transfer

Wet transfer

Dry transfer



The Kiwoprint UV 33 being used with a screen printing press

Standardised stretching for screenprinting

Grunig's new G-Stretch EQ has been launched to standardise the stretching process during screenprinting. It can be used for all stencil-making processes in the glass industry to give better printing results due to the resulting better screens.

The EQ is part of the High Definition (HD) concept to "guarantee" an elimination of the moiré effect during printing: the G-Stretch EQ concept (stretching based on the number of threads per cm) is the first step, with ScreenSupport's exposure process, data compilation and preparation / RIP suggested as the other two steps. The EQ is suitable for retrofitting onto most Grünig stretching machines and is offered as an option for all new stretching machines manufactured by Grünig.

Bulk inks and system for printer series

Mutoh Europe, manufacturer of wide-format piezo inkjet printers, has announced the immediate availability of a bulk ink system (BIS) and a new set of CMYK mild solvent inks for its Blizzard series of printers. Mild Solvent Plus (MS Plus) is a second generation of Mutoh mild solvent inks which will improve performance and cost for print figures on the Blizzard series.

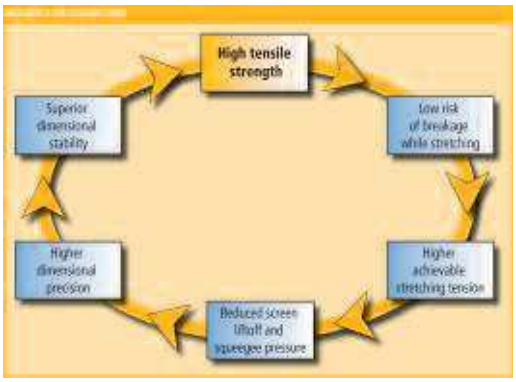
The new MS Plus inks have the same colour gamut and UV resistance (up to 3 years without lamination) as Mutoh's existing mild solvent inks and profiles made for Mutoh's existing mild solvent inks remain usable – new profiling is only required for new print modes and for newly-compatible media. They are available in 1 litre bottles for use in combination with the BIS, as well as in 440 ml ink cassettes.

Mutoh's BIS has been developed specifically for speed-intensive volume-orientated users requiring a high-end, high-volume ink delivery and refill system that offers long unattended printing capabilities with minimum user intervention. BIS for Blizzard has four ink bottles with a total capacity of 4.3 litres each. The bulk ink system comes with eight permanent ink supply cartridges.

The MS Plus and BIS

Stronger mesh thread

Sefar has developed a monofilament thread with a higher modulus of elasticity and generally higher tensile strength. Stronger threads significantly reduce the risk of the mesh tearing and increase the achievable tension. It is also possible to print with a smaller gap between the printing form and the substrate, and use less squeegee pressure.



The benefits of PME

Sefar's PME offers more precise print imaging and superior dimensional stability. The PME 120-35 fabric targets high-end industrial screen printing applications such as etch resist, solder masks and identification printing on rigid and flexible circuit boards, printing logos, lettering and symbols onto equipment covers, operating panels and keyboards, vehicle stickers, speedometer dials and plastic cards.

Sefar's PME product line will be expanded to include fabric types such as 100-35, 100-40, 110-35, 130-30 and 150-30 in addition to the 120-35 fabric type currently in white or yellow, available in widths of 115, 136, 142 and 158 cm.

Printing line exceeds expectations

After researching the market, Dave Hale, managing director of First Class Finish in Crowborough (UK), decided to add a new SPS Vitessa XP2 printing line to cope with increased orders for high end finishing of pre-printed offset sheets. After a short learning curve, the machine is in full production at running speeds of over 3000 iph.

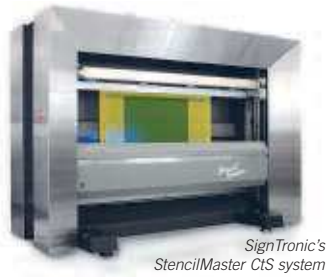
"We needed a reliable production machine with a back-up system that would not let us down," Dave said. "The ease of operation and the high output of the SPS Vitessa XP2 machine were the main reasons for this investment. Although we are demanding the best possible print quality at high output rates, the SPS cylinder machine is exceeding our expectation level." Dave is planning to change an existing printing line for another new SPS line next year.


The SPS Vitessa XP2 printing line

CtS and CtP in combination

Swiss company SignTronic manufactures a wide range of high resolution direct UV exposure Computer-to-Screen (CtS) systems for all types of stencil making and screenprinting applications.

SignTronic's StencilMaster is obtainable as a combination CtS and CtP system; this allows both exposure processes on screens and litho plates for consistent and accurate dpi exposure resolution at a production speed of up to 27 square metres per hour using standard emulsions. No film or other consumables are required. Standard output and exposure resolution is 1270 x 1270 dpi.


SignTronic's StencilMaster CtS system

For high resolution and top quality technical screenprinting applications, SignTronic also offers a CtS StencilMaster model with an exposure resolution of 2400 x 2400 dpi. All StencilMaster units are equipped with an integral printing frame conveyor system to allow an in-line connection for fully automatic screen coating, drying, imaging, developing and final drying system of any wet-line manufacturer.

Production optimisation

Hurtz is to optimise production from mid-September, with the installation of an additional CNC processing centre. This will allow the company to serve its customers even faster in the future. Hurtz will then be able to manufacture and deliver even larger formats and customised products at short notice and on time. The Hurtz team is looking forward to continuing its successful collaboration with all its customers in the future.


Hurtz has installed an additional CNC processing centre


The Screeny digital screen printing plate

Integrating screen printing into the digital workflow

Printers can now use an end-to-end digital workflow that extends all the way from design to prepress, so the next logical step is to integrate screen printing into the digital workflow of a modern label printer.

Screeny digital is the latest generation of screen printing plates; they are robust, flexible and can be digitally imaged. They offer excellent ink flow characteristics, as well as outstanding stability and flexibility. The plates are coated with an ablation layer (LAMS), which is laminated onto the photopolymer. The ablation layer is applied digitally by a point laser. The screen is then exposed, washed out and assembled in the conventional manner; other printing processes remain the same.

The ablation layer has been adapted to make it compatible with well-known point laser equipment in order to integrate Screeny digital into the existing digital flexographic workflow and thus avoid high investment in additional equipment. Screeny digital makes it possible to begin CtP with rotary screen printing without the extra costs and process uncertainties involved in changing over, removing the need for analogue film.
A digital version of all the relevant Screeny types, including Screeny S-Line, will be available soon.

New academy for distributors

MACtac has created a Performance Graphics Academy to help MACtac and Multi-fix distributors' sales teams better understand and solve digital printers' problems. The teams can benefit from the new advanced training facilities and printing equipment at the MACtac Europe site in Soignies, Belgium.

The training programme includes colour and colour management, the basics of ICC profiling and its installation in the printer's software, the most common defects in printing, laminating and applying digital graphics and how to avoid them. All training sessions are run by experts in digital printing and / or in self-adhesive technology.

THIEME'S OPEN HOUSE FOR SWEDISH SCREEN PRINTERS

Swedish screen printing experts gathered information at Thieme's 'Open House' event

THIEME WELCOMED AN ARRAY OF SWEDISH SCREEN PRINTERS TO ITS 'OPEN HOUSE' EVENT IN AUGUST THIS YEAR SO THEY COULD GATHER INFORMATION ABOUT THE CURRENT STATUS OF SCREEN PRINTING TECHNOLOGY.

Many Swedish printing operations have screen print machines that are becoming outdated and will have to be replaced in the next few years with modern equipment to keep pace with today's requirements for print quality and productivity. At Thieme's open house event, representatives of some Swedish screen printing operations were able to gather information about the current technical innovations in screen printing and peripheral machinery.

LECTURES AND DEMONSTRATIONS

The event comprised a diverse two-day programme with lectures and machine demonstrations. In the factory's technical centre, guests could experience several Thieme printing lines in operation, with machines ranging from the three-quarter automatic machine Thieme 3020 (equipped with special options such as automatic screen cleaning and a dual anti-drip system for printing squeegee and flood bar), to the single colour line Thieme 5020 and the multicolour line Thieme 5070 XL for large format graphic applications.

Guests were also able to catch a glimpse of Thieme's semi-automatic machines, the 500 and the 1000, as well as the TSC squeegee cutting machine. Thieme's role in specialised industrial applications was documented by the display of a fully-automated printing line for the coating of crystalline solar cells.

The event was not restricted to the display of Thieme machines, but also covered the complete service spectrum of screen printing from the topic of colours to screen preparation, through to the actual printing process. Several partner companies were therefore invited from the relevant sectors: Marabu / Spacio (colours), Sefar (mesh and CTS systems), Grünig (screen coating and cleaning) and Kiwo (screen cleaners).

THE SWEDISH SCREEN PRINTING MARKET

Large print shops are the exception in the Swedish screen printing market, which is characterised by predominantly small family and mid-sized companies with around 3-50 employees, primarily specialising in niche applications in the technical sector. Estimates show that over 50% of Swedish print shops are active today in the sector of technical screen printing.

"As a rule, smaller companies cannot afford a complete multicolour line, but would still like to utilise the productivity gain of these machines in order to increase their competitiveness. A Thieme 5000 print station – or rather, one of our semi or three-quarter automatic machines – would bring them to the desired level of productivity," Nadine Gabrysch, sales representative in the Graphic Printing Systems Division at Thieme, suggested.

Karl Erik Asp, president of the Swedish Screen Printing Association, reported on the trend away from graphic toward technical screen printing applications. "Since the early 1990s," he said, "the focus has shifted more and more to specialised applications while standard products have been adopted by digital and offset printing." He sees the potential of screen printing today above all in the printing of special materials such as plastic, metal, glass or wood, as well as with special effects and electronic applications.

Thieme screen printing installations and peripherals, from screen preparation to squeegee cutting, were examined

"Who would have thought that foils for bicycle helmets or photovoltaic modules can be manufactured as screen prints?" he asked. "Every day is a new day. We must see that we locate new niche markets, since here still lies a great future potential for screen printing."

APPLICATIONS FOR LARGER COMPANIES

Several large companies were also at the open house, including SCA Packaging which, with more than 24,000 workers and 300 subsidiaries in 30 countries, is the second largest European producer of corrugated board. SCA produces and prints cartons and corrugated board packaging of all types, as well as advertising materials such as point of sale displays.

"Corrugated board is a complex material for printing, since it is neither flat nor stable," explained Boerje Bjurstroem, SCA Packaging Production Manager. "At the moment we have two older screen printing multicolour lines from Svecia in operation, the first of which we purchased in 1995." For the printing of displays, SCA Packaging is now evaluating production alternatives. "We also print digitally but only for runs of 150 sheets or less in large formats of over 1600-3300 mm."

Brand Factory, with 300 employees in Scandinavia and the Baltics, has a technical application focus, printing predominantly plastic foils for street signs or vehicle advertisements, for example. "We work with both screen and digital printing," explained Marcus Katorp and Anders Ekhagen from Brand Factory. "In the screen printing sector, we have had until now only single-colour machines in operation and would like for this reason to learn more about the current state-of-the-art machinery. The event offers an excellent opportunity to gain a complete overview of the newest technologies, which pleases us greatly."

The Swedish guests at the open house event were especially pleased with the presence of several Thieme partner companies, allowing them to catch a glimpse of the entire screen printing process. SP

Further information:
Thieme GmbH & Co KG, Teningen, Germany
tel.: +49 7641 583 108
fax: +49 7641 583 110
email: simon.hebding@thieme.eu
web: www.thieme.eu

FESPA DIGITAL PRINTING INDIA 2008

14–16 December 2008; Mumbai, India

FESPA DIGITAL PRINTING INDIA 2008 WILL BE HELD AT THE BOMBAY EXHIBITION CENTRE IN GOREGAON, MUMBAI (INDIA) IN DECEMBER THIS YEAR.

According to the organisers, FESPA Digital Printing India 2008 is set to achieve a new milestone of success. After the huge success of FESPA 2005 and FESPA 2007, the organisation realised and understood that digital printing has gained much popularity in the Asian market.

THE INDIAN MARKET

In the Indian printing business digital printing is just coming into focus; it is with that focus and attention that a dedicated show for digital wide-format printing – FESPA Digital Printing India 2008 – is being organised.

India has the fastest-growing print industry after China; the digital printing market, which was worth US $600 million (€406.5 million) in 2006, is projected to become worth $2.3 billion (€1.5 billion) by 2012, a growth of 24.8%.

DIGITAL PRINTING

The application of digital printing is growing at high speed in businesses because it facilitates short-run prints in less time, allowing personalised and customised communication, as well as web-based printing. Digital printing is a good way to offer different kinds of advanced services to clients and is seen as something that will complement offset printing rather than replace it.

FESPA WORLD EXPO ASIA PACIFIC 2008

28–30 November 2008; Bangkok, Thailand

THE FIRST EVER FESPA WORLD EXPO ASIA PACIFIC EVENT WILL TAKE PLACE IN BANGKOK (THAILAND) IN NOVEMBER. SCREEN AND DIGITAL PRINTING IN ASIA-PACIFIC IS A BOOMING INDUSTRY WITH A LOT OF OUTDOOR ADVERTISING TAKING PLACE THROUGHOUT THE REGION.

FESPA Asia Pacific is an international exhibition to help visitors source new ideas, products and techniques and improve profitability and market share. It is directed towards people and companies who are looking to move into screen or digital printing for the first time, as well as leading experts in the field.

The organisers predict that around 200 of the world's leading suppliers of screen and digital wide-format products and solutions will exhibit at FESPA World Expo Asia Pacific 2008.

Exhibitors

A selection of exhibitors who are supporters of the magazine and members of its sponsors, ESMA and NASMA, include: Avery Dennison, Dubuit, Durst, Epson, Fimor, Fotec, Fujifilm Sericol, Grünig, HP, Kiian, M&R, MacDermid Autotype, Nazdar, Nor-Cote, Oce, Roland, Saati, Sefar, Ulano and VFP. Visit the website for a full list of exhibitors.

Further information:

FESPA, Reigate, UK
tel: +44 1737 240788
fax: +44 1737 240770
email: info@fespa.com
web: www.fespadigitalindia.com
www.fespaasia.com

CTS AND DIGITAL WORKFLOW 2008 – conference programme released

Neuss / Düsseldorf, Germany; 4–5 November 2008

CTS AND DIGITAL WORKFLOW 2008 IS A TWO-DAY DUAL ENGLISH-GERMAN LANGUAGE CONFERENCE WHICH WILL PROVIDE PRINTERS WITH THE LATEST ADVANCED TECHNOLOGIES FOR COMPUTER-TO-SCREEN APPLICATIONS AND ACHIEVING A BETTER DIGITAL WORKFLOW.

CTS imaging systems have allowed printers to vastly increase screen production and quality at reduced costs. Other advantages include repeat jobs being made easier and decreasing exposure time. But there is still much to consider and evaluate for first-time investors, as well as for those looking to upgrade their present CTS system.

CONFERENCE PROGRAMME

At the time of going to press, the following conference presentations will be made simultaneously in English and German:

4 NOVEMBER (DAY ONE):

Time	Title	Company
10.00 am	Registration and opening of tabletop exhibition	-
1.15 pm	Welcome and introduction	ESMA
1.30 pm	Keynote presentation: CTS in an industrial application	M Berwinkel, Sonopress
2.00 pm	Benefits of pre-press work flows for screenprinting	Colorgate
2.30 pm	Evaluation of CTS systems	CST
3.00 pm	Coffee break in tabletop exhibition	-
3.30 pm	Blue laser technology in CTS – how it can save time and money	Luescher
4.00 pm	Perfect stencil materials for CTS systems	Kiwo
4.30 pm	Halftoning technology – a move to digital screen printing	ScreenX
5.00 pm	Day one roundup and tabletop exhibition	ESMA
7.00 pm	Tabletop exhibition closes	-
8.00 pm	Dinner	-

5 NOVEMBER (DAY TWO):

Time	Title	Company
8.00 am	Registration and tabletop exhibition	-
9.00 am	Keynote presentation: can screen and digital co-exist?	Graphicworld
9.30 am	Choosing the right fabric, frame and squeegee	Hurtz
10.00 am	Resolution and addressability – advantages and pitfalls of digital to screen systems	Mantel
10.30 am	Coffee break in tabletop exhibition	-
11.00 am	Total solutions using most advanced screen stencil technology	Murakami
11.30 am	Why screenprinters should invest in CTS systems	SignTronic
12.00 pm	Optimised digital workflow	K-Flow
12.30 pm	Lunch and tabletop exhibition	-
2.00 pm	Emulsion stencil problem solving	MacDermid Autotype
2.30 pm	How to match a standard proof in screen printing!	L Mullaney
3.00 pm	RFID controlled work flow management for screen print processing	RFID project group
3.30 pm	Final roundup and tabletop exhibition	ESMA
4.30 pm	Event closes	

Programme is subject to change. Visit the website for latest updates.

CTS and Digital Workflow 2008 will expand on the successful inaugural CTS event in February 2007, which exceeded the expectations of delegates and exhibitors who were keen to see a follow-up event. The 2008 conference will grow to also cover digital work flow specifically for screen printing and CTS.

DUAL-LANGUAGE PRESENTATIONS

To ensure that the event appeals to both the domestic German market and an international audience, all presentations will be simultaneously presented in English and German languages.

So that presentations are impartial and offer the latest reliable information, presenters will not only be suppliers to the industry, but also printers using the technology. Suggestions from 2007 attendees have also been acted upon, and this year's conference programme will include more coverage on all aspects of supporting and using CTS.

QUESTIONS ANSWERED

These presentations will provide attendees from throughout the world with an insight into the systems available, the screen and stencil considerations and the in-house requirements. Expert speakers will offer printers, managers, owners, designers, print buyers and suppliers with answers to the following questions and more:

- How do I benefit from CTS?
- What's the payback time?
- Do I need to change my existing system?
- Inkjet, wax, laser LED?
- Is it faster to get a print job done than with my present system?
- What guarantees do I have that my investment will be sound?
- Do I need to employ more people?
- Can I reuse the screens?
- What training support can a supplier give me?
- What if it goes wrong?

The event will be staged in Neuss, Germany from 4-5 November 2008 in the easily accessible Swissotel Hotel, located conveniently close to the well-connected Düsseldorf Airport. Special room rates have been negotiated and an evening dinner reception at the hotel will offer an excellent networking opportunity.

EXHIBITION

The conference programme will be supported by regular intervals dedicated to the accompanying tabletop exhibition of leading manufacturers of machinery and consumables, including:

- ColorGATE Digital Output Solutions
- Color Scanner Technology
- Grünig-Interscreen
- Hurtz
- Heinrich Mantel
- K-Flow
- Kissel + Wolf (KIWO)
- Laurie Mullaney Associates
- Lüscher
- MacDermid Autotype
- Sefar
- SignTronic
- Sun Chemical

Contact details and areas of activity for these exhibitors can be found at www.esma.com

Delegate registration is available on the event website for only €495, including access to the keynote presentations, technical papers, exhibition, refreshments, lunch and dinner. Immediately after CTS and Digital Work Flow 2008, the European Membrane Switch Symposium 2008 will be staged at the same venue; delegates attending both seminars qualify for a 10% discount on each event.

EUROPEAN MEMBRANE SWITCH SYMPOSIUM 2008

Neuss / Düsseldorf, Germany; 6 November 2008

EUROPEAN MEMBRANE SWITCH SYMPOSIUM 2008 IS A ONE-DAY CONFERENCE PROVIDING PRINTERS AND MANUFACTURERS IN THIS IMPORTANT NICHE INDUSTRY WITH THE LATEST ADVANCED TECHNOLOGIES FOR MEMBRANE SWITCH AND INDUSTRIAL GRAPHICS MANUFACTURE.

In recent years, processes, supplier capabilities and competitive pricing have established membrane switches as the preferred technology across a wide range of applications, covering many different products and industries.

European Membrane Switch Symposium 2008 will recognise the functional, aesthetic and integration advantages of membrane switches by offering a series of educational presentations covering market trends, current technologies and future opportunities. Delegates will also benefit from sessions covering best practice in operating and production for lean manufacturing.

The event will be staged in Neuss (Germany) on 6 November 2008, a day after the CTS and Digital Work Flow 2008 event.

CONFERENCE PROGRAMME

Printers, managers, owners, designers, OEMs and suppliers from throughout the world will be presented with a conference synopsis including:

- Keynote addresses
- Routes to best practice in production
- Advances in functional coatings
- Advanced machinery technology
- Pre-press technology
- Advanced post-press testing
- Process control
- Environmental issues.

At the time of going to press, the conference programme will include specific presentations covering:

Substrates: selection, designs, end use, applications, influences, coatings, functionality and environmental factors.

Pre-press: computer-to-screen, stencil technology, mesh selection and environmental factors.

On press: machinery advances, drying technology, squeegees, print technology and environmental factors.

Inks / adhesives / conductives: graphic inks, conductive inks, dielectric inks, functional coatings, adhesives (wet and tape) and environmental factors.

Post-press: drying, curing, finishing, cleaning, reclamation, testing and environmental factors.

Once again, all presentations will be simultaneously presented in English and German languages and the programme is subject to change. For latest updates, visit the website.

EXHIBITION

The conference will be accompanied by an exhibition of specialist suppliers displaying the latest developments in:

- Pre and post-press technology
- Inks and substrates
- Printing and finishing equipment.

DELEGATE REGISTRATION

Registration, which includes access to the keynote presentations, technical papers, exhibition, refreshments and lunch, is €395. Delegates attending CTS and Digital Workflow 2008 as well as European Membrane Switch Symposium 2008 will qualify for a 10% discount for both events.

Delegates can complete their registration on the website or by emailing info@specialistprinting.com

ORGANISERS:

ESMA specialist printing in focus

www.esma.com

ESMA is an Association of European Manufacturers of machinery and consumables for the specialist printing industry, including screen, digital and pad printing processes

Chameleon Business Media Ltd

www.cbm-ltd.com

Chameleon Business Media is a dynamic provider of global solutions in business to business media, and publisher of *Specialist Printing* magazine – an international reference source for users of screen and wide format digital printing systems

Further information:
tel: +44 1342 315032
fax: +44 1342 322664
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DRUPA SEES SUCCESS IN DIFFICULT CLIMATE

DRUPA 2008, THE WORLD'S LARGEST EXHIBITION FOR THE PRINTING AND MEDIA INDUSTRY, WAS HELD OVER 14 DAYS IN DÜSSELDORF, GERMANY, EARLIER THIS YEAR. THE FAIR ATTRACTED 1971 EXHIBITORS FROM 52 COUNTRIES, WHO ANNOUNCED DEALS CONCLUDED AT THE SHOW THAT WERE WORTH MORE THAN €10 BILLION (US $14.6 BILLION).

Around 391,000 visitors from 138 countries and 3000 journalists from 84 countries travelled to Düsseldorf to gather information on innovations, further developments and new fields of business. The proportion of international visitors reached 59%, a rise of 4% from the last event held four years ago. This figure included 7% from South and Central America, 6% from North America and 15% from Asia.

"We had anticipated slight drops, not only because of the high level of the Euro," said Werner Matthias Dornscheidt, the CEO of Messe Düsseldorf. "Given the difficult economic climate this is a remarkable success."

EXCELLENT RATINGS

Visitors to Drupa gave the exhibition excellent ratings (97% rated the event positively) and also increased their average stay at the fair to 3.2 days from the 2004 event figure. More top managers were seen at Drupa 2008 – 45% compared to 42.2% in 2004.

A higher number of visitors and exhibitors than at previous shows – around 39% compared to 35% at the 2004 exhibition – used public transport. "Our strategy of reducing car traffic was a total success. This makes it all the more important to complete line U80, the so-called trade fair circle line, by Drupa 2012," urged Werner M Dornscheidt.

REACTION FROM GERMAN TRADE ASSOCIATIONS

The German Engineering Federation, VDMA, was pleased with the event. "We were unsure in the run up to Drupa what customer behaviour to expect. However, the last two weeks showed that investments are planned and implemented even in a difficult market climate," confirmed Kai Büntemeyer, President of the Printing and Paper Technologies Association within the VDMA.

"From the point of view of German print companies, Drupa is the most important trade fair for new print technologies – it increasingly acts as a source of ideas for new products and services," added Thomas Mayer, General Manager of the German Printing and Media Industries Federation (Bundesverband Print und Medien). "Through application examples, demonstrations and not least the Compass Sessions, trade visitors were shown how the new technologies can be used for innovative print products and customer solutions."

A positive verdict was also given by the paper industry associations. The German Pulp and Paper Association (Verband Deutscher Papierfabriken – VDP) and the Business Associations for Paper Processing (Wirtschaftsverbände Papierverarbeitung – WPV) felt their joint appearance proved successful.

The member companies of the National Printing Inks Association took a predominantly positive view of Drupa 2008. The level of visitors from the Far East, India and South America was above average, and the industry was impressed with the intensity and quality of the trade conversations held with visitors. Conversations focused on the continued tight situation in the raw materials markets, and the impact this has on printing ink manufacturers and their customers.

THE DRUPACUBE

With over 130 exhibitors in the digital supplies sector, the Drupa innovation park proved to be extremely successful. The new drupacube at the exhibition centre provided a symposium centre for print buyers at the fair, with the 'Outstanding Print Products from throughout the World' exhibition going down very well with visitors and companies.

The next Drupa exhibition will be held in Düsseldorf, Germany from 3-16 May 2012.

Further information:
web: www.drupa.de

There now follows a gallery of pictures showing the stands of advertisers in this magazine who were members of ESMA at the time of the event (for a full list of exhibitors, please visit the website):

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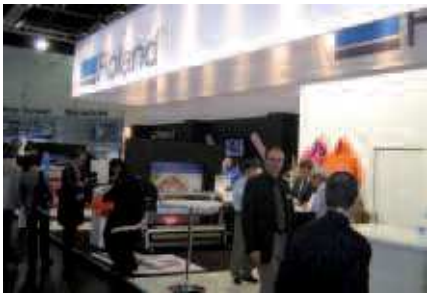

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www.remco-chemie.de

www.technigraf.de

For a full list of companies who exhibited at Drupa, visit www.drupa.de

SGIA '08

15–18 October 2008; Atlanta (GA), USA

THE SPECIALITY GRAPHIC IMAGING ASSOCIATION (SGIA) WILL STAGE THE 59TH SPECIALTY PRINTING AND IMAGING TECHNOLOGY EXPO AT THE GEORGIA CONVENTION CENTER IN ATLANTA, GEORGIA, (USA) FROM 15-18 OCTOBER 2008. SGIA '08 REPRESENTS THE FULL RANGE OF SPECIALITY IMAGING TECHNOLOGY. LEADING SUPPLIERS WILL EXHIBIT THE LATEST TECHNOLOGICAL INNOVATIONS IN SPECIALITY IMAGING, INCLUDING SUBSTRATES, INKS AND PROCESSES.

The website also contains a new section, 'New Products for SGIA '08', which gives attendees a sneak preview of the products and technologies that will be on show, as well as giving delegates a planning tool to help them prepare for the expo.

Chameleon Business Media, publisher of this magazine, is a proud member of the SGIA and will be exhibiting at booth number 756. We will be distributing free copies of *Specialist Printing* as well as the sister journal, *Glass Worldwide*, and the *Annual ESMA Glass Publication 2008* – a unique 28 page guide to decorating all types of glass.

Further information:
web: www.sgia.org

Exhibitors
Supporters of this magazine and members of its sponsors, NASMA and ESMA, who will be exhibiting at SGIA '08 include:
3M Graphics Market Center: 1831
3M Industrial Adhesives & Tapes Div: 3511
AWT World Trade Inc: 3257
American Ultraviolet Company: 3003
Avery Dennison Graphics & Reflective Products Div: 331
Brother International Corp: 161
Chemical Consultants Inc: 1221
Clearstar LP: 2123
Dubuit: 3313
Durst Image Technology US LLC (Durst US): 1861
EFI VUTEk: 1807
EPSON America: 753
ErgoSoft: 234
Fimor North America: 1321
Fujifilm Sericol USA Inc: 941, 641, 741
Gerber Scientific Products: 719
Grünig Interscreen AG: 465
Hewlett Packard Company: 2203
IKONICS Imaging: 136
Industrial Fabrics Corp: 2428
Intercontinental Chemical Corp: 1013
International Coatings Co: 3131
KIIAN Spa: 1461
KIWO (Kissel + Wolf): 1741
M&R Printing Equipment: 1431, 1425
MacDermid Autotype Inc: 2041
MACtac / Morgan Adhesives Company: 231
Marabu (on the Clearstar booth): 2123
Mutoh America Inc: 419
Nazdar Consulting Services: 1334
Nazdar Inks & Coatings: 1241
Nor-Cote International Inc: 2353
Oce Display Graphics Systems Inc: 1041
Pleiger Plastics Company: 1653
R Tape Corporation: 2031
Roland DGA: 731
Rutland Plastic Technologies: 2659
SaatiPrint USA: 2821, 2921
Sakurai USA: 431
Sefar Printing Solutions Inc: 465
Siasprint Service: 3641
Sign-Tronic AG: 465
Spartanics: 3013
Sprayway Inc: 2723
Sun Chemical: 1719
ST Media Group: 3221
Thieme Corporation: 447
Ulano Corporation: 1741
A full list of exhibitors can be found on the website.

FUTURE EVENTS

SEPTEMBER
24-26 Viscom Europe (Paris, France)

OCTOBER
15-18 SGIA '08 (Atlanta, GA, USA)
30 October - 1 November Viscom Frankfurt 2008 (Frankfurt, Germany)

NOVEMBER
4-5 CTS and Digital Workflow 2008 (Düsseldorf, Germany)
6 European Membrane Switch Symposium 2008 (Düsseldorf, Germany)
13-15 Viscom Italia (Milan, Italy)
14-17 All in Print China (Shanghai, China)
28-30 FESPA World Expo Asia-Pacific (Bangkok, Thailand)

DECEMBER
14-16 FESPA Digital Printing India (Mumbai, India)

FEBRUARY 2009
3-4 Media-Tech Conference 2009 (Los Angeles, CA, USA)
15-17 Sign & Graphic Imaging Middle East (Dubai, UAE)

APRIL 2009
16-18 ISA International Sign Expo 2009 (Las Vegas, NV, USA)
21-23 Media-Tech Expo 2009 (Frankfurt, Germany)

MAY 2009
12-14 FESPA Digital Printing Europe 2009 (Amsterdam, The Netherlands)
12-16 China Print 2009 (Beijing, China)

SEPTEMBER 2009
23-26 Label Expo Europe 2009 (Brussels, Belgium)

OCTOBER 2009
6-9 Print Expo Hungexpo (Budapest, Hungary)
8-11 Gamatex 09 (Istanbul, Turkey)

NOVEMBER 2009
25-26 GlassPrint 2009 (Darmstadt / Frankfurt, Germany)
18-21 SGIA '09 (New Orleans, LA, USA)

For more event listings, visit the Events page on www.esma.com

VISCOM IN FRANCE, GERMANY AND ITALY

THE VISCOM SERIES OF INTERNATIONAL TRADE FAIRS BRINGS TOGETHER TECHNOLOGICAL INNOVATIONS IN LARGE FORMAT DIGITAL PRINTING, SCREEN OR TEXTILE COMMUNICATION, SIGNAGE AND PRODUCTS AND FUNCTIONS LINKED TO VISUAL COMMUNICATION.

Viscom Europe 2008

(24-26 September 2008; Paris, France)

The complete range of manufacturers, suppliers and service providers within the visual communication industry will be exhibiting at Viscom Europe in Paris (France), including products or services for digital printing, digital media, finishing, screen printing and cutting.

There will be 50 speakers during the programme of 17 conferences, which will touch on the major issues in the market today: innovation and sustainable development, printing on textiles and new technology. The show will be spread over 20,550 m^2 of exhibition space, with organisers expecting 250 exhibiting companies (45% from outside France), with 12,700 attendees and 27% of foreign visitors coming from 97 countries.

Viscom Frankurt 2008

(30 October – 1 November 2008; Frankfurt, Germany)

Viscom Frankfurt 2008 will take place in Hall 3 of the Frankfurt Exhibition Centre. The organisers are expecting 200 international exhibitors and 7500 visitors from 30 countries. It will feature seminars, workshops, presentations and practical examples from the entire field of visual communication.

Industrial inkjet printing is also represented, with a special show with innovative materials and information on manufacturers, possible uses and processing methods. The show, 'Industrial Inkjet meets Material', is subdivided into three segments: materials, inks and paints for industrial inkjet printing, examples of printed materials from various industries and new experiments.

Viscom Italia 2008

(13-15 November 2008; Milan, Italy)

Viscom Italia 2008 is celebrating 20 years with a record number of exhibitors. Around 600 suppliers and 20,000 attendees will do business and learn about the impact of new technologies and communication trends.

The Visual Communication Forum will offer three dedicated sessions, including a hands-on demonstration that will allow visitors to take home at least one new idea ready to put into action. The technical sessions consist of light saving, profiles for digital printing and innovative screen printing techniques.

Further information:
Viscom Europe: www.viscom-paris.com
Viscom Frankfurt: www.viscom-messe.com
Viscom Italia: www.visualcommunication.it

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AS OF AUGUST 2008

Avery Dennison Graphics & Reflective Products Division, Painesville
Tel: 440 358 3943 www.averygraphics.com

Peter Holland
Brother International, Corp
100 Somerset Corp Blvd
Bridgewater, NJ 08807
Tel: 908 252 3262
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www.brother.com

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Tel: 909 735 5095 www.ccidom.com

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West Chicago, IL 60185
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Tel: 302 378 3100
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Richard Bowles
Nazdar
8501 Hedge Lane Terrace
Shawnee, KS 66227
Tel: 913 422 1888
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James Elliott
Pleiger Plastics Company
Circle Road
Washington, PA 15301
Tel: 724 228 2244
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Steve Sheridan
Saati Print USA
247 Route 100
Somers, NY 10589
Tel: 914 232 7781
ssheridan@saati.com
www.saati.com

Dave Koebcke
Sefar Printing Solutions, Inc
120 Mt Holly By-Pass
Lumberton, NJ 08048
Tel: 609 613 5000
david.koebcke@sefar.us
www.sefar.com

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