

CORRECTION – OCTOBER 2011

An editorial correction has been incorporated into this version of TIP 0304-40. A name had been omitted from the Working Group list.

OLD NUMBER 205-79
ISSUED – 1982
REAFFIRMED – 1994
WITHDRAWN – 2001
REVISED AND REINSTATED – 2002
REVISED – 2011
CORRECTION – 2011
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Reduction or elimination of ink and/or varnish smear when printing and rotary die cutting in one pass

Scope

The technical information contained herein identifies the various methods available to the flexographic converter to reduce or eliminate ink smear when printing and rotary die cutting in one pass.

Safety precautions

Observe all safety precautions suggested by the equipment manufacturers.

Introduction

In the past, one of the most common complaints from converters who have tried to print and die cut in one pass has been that the ink becomes smeared from scuffing against the cutting blanket on the die cutter. This smearing has been more apparent on less absorbent linerboards, such as clay coated and some bleached board than it has been on mottled white or kraft board. If a non-repetitive item, such as a display, is produced on clay coated and or bleached board, it has been virtually impossible to eliminate all of the smearing of the ink. Thus, printing in one pass and die cutting in a second pass has been the recommended procedure. This paper covers the various techniques that are available today to overcome this problem.

Methods available

Drying

With practical consideration to percentage of ink coverage and press speed, today it is possible to eliminate marking and smearing problems when printing, over-varnishing and die cutting in one pass, on clay coated, bleached, mottled or kraft board stock by installing infrared dryers into the press (see TIP 0306-06 “Drying and Curing Techniques for In-line Flexographic Printing”). To install dryers on a flexo rotary die cutter does require vacuum transfers after each flexo printing station. Machines with pull roll transfers can be converted to vacuum.

The addition of a spacer section between the last flexo and the die cut section will allow slightly more time for drying. More importantly, the spacer will eliminate the potential for the sheet to be in the print and die cut nip at the same time. In this situation the die cut section will preferentially pull the printed sheet creating smearing.

Production procedures

For items printed on kraft board or mottled white, there are a number of steps that can be taken to virtually eliminate this smearing of the ink without the installation of infrared dryers. These same steps can also be done on a repetitive item run on bleached board, though one cannot guarantee the same degree of success.

The following suggestions will help to reduce ink smearing:

1. Starting with the design of the print copy of the die cut blank itself, attempt to keep all print copy away from score lines. The scoring rule, more than the cutting rule, causes most of the smearing of the ink on the board. Try to place score lines on unprinted areas.
2. Whenever possible, minimize the amount of cutting through the printed areas of the product.
3. Utilize anvil covers that are of a consistent caliper and in good condition. This is best achieved through a proper rotation program or regular trimming cycles.
4. When it is necessary to have scores running over printed areas and the scores are running in the direction of the travel of the blank through the machine, if the design will permit, the scoring rule should be removed from the cutting die; and the scoring should be done by rotary scores on the scoring section of the press.
5. Work closely with the customer to minimize the amount of perforation cut utilized. Perforation cuts require ejection rubber that can force the printed product into the anvil cover.
6. For chambered or single blade metering, investigate alternate doctor blade materials. Some doctor blade materials meter better than others and can reduce the ink film thickness on the anilox roll. Less ink film on your transfer roll translates into less ink to your printing plate thus less ink to your board.
7. Review the line count and cell volume (bcm) of your anilox rolls. As stated, a thinner ink film is better and if you are carrying too high a cell volume in the anilox, this may result in too thick an ink film to optimize drying characteristics.
8. Consult ink suppliers. Let them know the application, anilox cell counts and volume (bcm). They can advise on anilox configurations to optimize printing performance. Your ink supplier can optimize ink performance by supplying inks with the appropriate pH, viscosity and color strength, to aid drying and help minimize the necessary ink film thickness.
9. Ask your ink supplier whether they are supplying the appropriate ink to suit your application to avoid the need for thinning or addition of alcohol at press side. Such modifications at press side are often used to aid drying but are mere crutches and can affect the printability of the ink.
10. Maintain ink temperature, pH and viscosity, ensuring that there is no random growth in ink transfer, which comes with viscosity increases. Excessive ink temperature changes and pH drops are the most common causes of viscosity increases.

The addition of drying, combined with optimized inks for the application, is the most effective method to overcome the problem of ink and varnish smear when printing on any paperboard substrate and rotary die cutting in one pass. Other than adding drying, it is very likely that a combination of one or more of the above listed recommendations may be required to overcome if not minimize ink smearing.

Keywords

Ink, Smearing, Varnish, Folder gluers, Die cutters, Printing

Additional information

Effective date of issue: September 2, 2011

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