Quad/Graphics Presents

An Introduction to Gravure Imaging

2007

Gravure Imaging
Cylinder Engraving

Gravure is an intaglio printing process.

That means, the image is cut or etched below the surface.
Copper Cylinders

- Copper is used to cover cylinders because it's soft and pliable, making it easy to engrave.
- Each cylinder weighs approximately 2,500 pounds — about the same weight as a VW Beetle.
- Cylinders last for tens of millions of impressions, so gravure is used for long press runs.

Gravure Workflow

- Copper polished
- Indent Form Station
- Cylinder is engraved
- Building
  - Removes copper barns
  - Closes end finish for non-image area
  - Lubricates the doctor blade on press
- Depressed
- Cylinder is chrome plated
- Cleaned
- Cylinder gets inspected
- Cylinder goes to press
- Director for base repair, then back to inspect base
Cylinder Preparation

- The gravure imaging process begins with the cylinder coming off press.

- Gravure cylinders come in various circumferences.

- The cylinder size is determined by:
  - Final size of the page
  - Number of pages in the form
  - Repeat of the design

Stripping Station – Removing Ballard Shell

- After the cylinder is cleaned, the top layer of copper and chrome is removed from the cylinder.

- This is called the Ballard shell, which allows the cylinder to be reused many times.
Copper Plating

- After the cylinder is cleaned, it’s moved to a copper plating tank, and the steel cylinder is electroplated with a thin layer of copper.
- The cylinder is stored in racks to use for future jobs.
- The copper is only 80 microns thick – about the thickness of a human hair.
- Later, the copper will be removed from the cylinder and replaced, so the cylinder can be used over and over.

Copper Polish

- To prepare for engraving, the copper surface is automatically polished.
- Polishing removes any imperfections and smoothes out the cylinder.
- Polishing also adds a roughness to the surface so it can retain the ink that will lubricate the cylinder.
Helio Form Station

- A press imposition form needs to be created before we engrave the cylinder.
- The form positions and aligns pages according to the book layout.
- Forms are digitally transferred to the engraving station.

Cylinder Engraving

- Now the cylinder is ready to be engraved (after imposition form stage).
- Digital data for text and images feed these engraving heads, that images the copper cylinder.
- The printed image consists of honeycomb shaped cells that are engraved into the copper cylinder using a diamond-tipped engraving head.
- The un-etched areas of the cylinder represent the non-image (unprinted) areas.
K6 Fully Automated Engraving Technology

- Engraving the image onto the cylinder is a high-speed, fully automated process.
- Diamond tips engrave hundreds of thousands of individual cells into the surface of the cylinder.
- The depth and size of the cells control the amount of ink that gets transferred to the paper.
- The size and shape of the cells also depend on the color of the ink and the type of paper it will be printed on.

K-6 Advantages

- Fully automated cylinder engraving
  - *HelioSprint* High speed electro-mechanical engrave heads
  - *CellGuard* Pre-engrave & post-engrave verification of cells
  - *GipsyNT* High speed processor of digital page information
- Enhanced productivity (shorter setup times; reducing client cycle time)
- 40-44 cylinders engraved per 24 hrs. (2 engravers)
- Consistent quality (automated ribbon balance verification)
Pre-Chrome Polisher

• After engraving, the cylinder is polished for a consistent surface, and removes burrs (imperfections).

Cylinder is Degreased

• The cylinder is electronically cleaned to remove all grease and oil from the surface.

Cylinder is submerged into degreasing tank
Chrome Plating

- Once the cylinder is engraved, it’s cleaned and coated with a final layer of chromium.

- Chromium:
  - Provides a hard surface layer that helps prevent the doctor blade from wearing out during printing.
  - What is a doctor blade?
    - Device that removes excess ink from the non-engraved portions of the cylinder.
    - Allows cylinders to be used for press runs of over one million

Chrome Polisher

- Chrome polisher looks similar to the pre-polisher.

- The chrome-plated cylinder is polished once again to “rough up” the surface, making the ink act as a lubricant.

- After the final chromium surface is polished, the cylinder is inspected.

- If it’s okay, it’s ready to go to press.
Cylinder Handling & Storage

- The cylinder is stored in racks to use for future jobs.
- Lomira stores up to 2,000 cylinders.

Cylinder Handling & Storage

- Cylinders are automatically transported from one step to the next – from imaging to the press room and back to storage.
- During makeready, the press operator carefully loads the printing cylinders into the press.
Cylinder Goes to Press

One of Quad/Graphics’ Gravure Plants
What Type of Customer Fits Gravure?

- Gravure prints high-quality images with intense, rich color with one pass through the press.

- That’s why it’s often used for high-volume printing such as advertising pieces like inserts, magazines and catalogs.
# K6 Installations

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87% Improvement - Reduction in Press Correction Downtime

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Thank you