



THOMSON REUTERS CORE PUBLISHING SOLUTIONS

GUIDE TO BOOK MANUFACTURING

BUILDING RELATIONSHIPS FOR
A QUALITY EXPERIENCE

Thomson Reuters, *Guide to Book Manufacturing* is a reference book intended for Thomson Reuters Core Publishing Solutions customers to give them a better understanding of the processes involved in creating, shipping, warehousing and distributing millions of books, pamphlets and newsletters produced annually.

Project Lead

Greg Groenjes

Graphic Design

Kelly Finco

Vickie Jensen

Janine Maxwell

Contributing Writers

Kelly Aune, Lori Clancy, Greg Groenjes, Brian Grunklee, Bob Holthe, Val Howard, Christine Hunter, Vickie Jensen, Sandi Krell, Linda Larson, Jerry Leyde, Kris Lundblad, Janine Maxwell, Walt Niemiec, John Reandeau, Nancy Roth, Jody Schmidt, Alex Siebenaler, Estelle Vruno

Contributing Editor

Christine Hunter

Copy Editor

Anne Kelley Conklin

© 2018 Thomson Reuters. All rights reserved. July edition.



THOMSON REUTERS

TABLE OF CONTENTS

Thomson Reuters

Core Publishing Solutions Overview

- Thomson Reuters CPS 1-2

Manufacturing Client Services

(Planning & Scheduling)

- Service and Support 2-1
- Roles and Responsibilities 2-2
- Job Planning Process 2-3
- Teamwork Is the Key to Success 2-5

Material Sourcing

(Purchasing & Receiving)

- Purchasing 3-1
- Paper-Making Process 3-2
- Receiving and raw materials warehousing 3-3

Safety & Engineering

- Overview 4-1
- Production Maintenance 4-2
- Engineering 4-2
- Safety 4-4
- Recycling 4-5

Prepress

- Overview 5-1
- Computer-to-Plate 5-2
- Electronic File Delivery 5-3
- Fonts 101 5-3
- How to Create and Send PDF Files 5-4
- Supported Applications 5-5
- Electronic Merge Area 5-6
- Preparing and Revising your Textbook 5-7
- Softbound and Hardbound Cover Specifications 5-8
- Proofs 5-9

Digital Print

- Overview 6-1
- NEW InkJet Presses 6-2
- Black & White Digital Cut-Sheet & Web Digital Printers 6-3
- Color Digital Printers 6-4

Press

- Printing Background 7-1
- Offset Presses 7-2
- Single-Color Web Press 7-2
- Web Press Components 7-3
- Multi-Color Sheet-Fed Presses 7-6
- Sheet-fed Press Description 7-6
- Sheet-fed Press Components 7-7
- Color Printing 7-8
- Colored Ink 7-8
- Considerations (Sheet-fed vs. Web) 7-9
- Thomson Reuters Web Press Specifications 7-10

Bindery

- Overview 8-1
- Softbound 8-1
- Hardbound 8-3
- Other Operations that Support Hardbound and Softbound 8-6
- Product Finishing 8-7
- Folding Diagrams 8-8
- Hardbound Process Flow 8-11
- Pamphlet Process Flow 8-12
- Perfect Bound Process Flow 8-13
- Pocket Part Process Flow 8-14
- Supplemental Pamphlets Process Flow 8-14

Subscription Services

- Overview 9-1
- Mailing Area 9-2
- Sorting/Packing Lines 9-3
- Packing Bench — Special Handling 9-4
- Subscription Fulfillment Process Flow 9-5

Distribution

- Overview 10-1
- Picking Areas 10-2
- New Order Processing 10-3
 - Picking
 - Packing
 - Shipping
- Shipping — Outbound Fulfillment 10-4
 - Returns
 - Inventory Control
 - Third-Party Logistics
 - Typical Order Fulfillment Flow

References

- History 11-1
- Glossary 11-2



OVERVIEW

Thomson Reuters Core Publishing Solutions

Thomson Reuters Core Publishing Solutions is part of the Thomson Reuters Legal organization.

West

West is the foremost provider of integrated information solutions to the U.S. legal market. Since the company's founding in 1872, West has been a trusted partner in the practice and business of law, providing comprehensive, authoritative information resources, research tools, and business and practice management applications and services.

Facility

Thomson Reuters Manufacturing is located at the Legal headquarters in Eagan, Minn. It is one of the largest printing facilities in the U.S.

Manufacturing facility: 1.3 million sq. ft.

Employees: 400+ full-time, 3 shifts, 5-7 days/week

Products: 54 million produced annually

Recycling: Over 6,000 tons of material annually

Strategic Focus

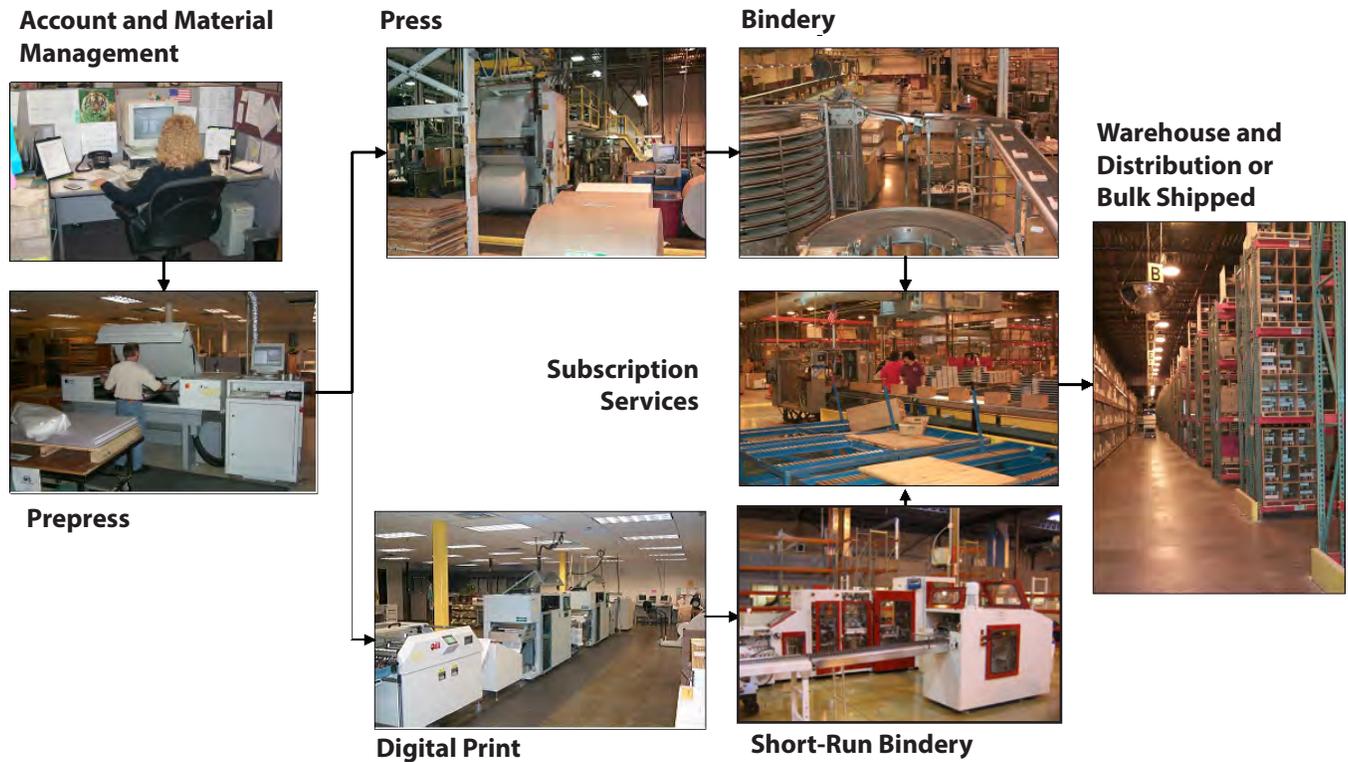
Single-color 9-inch, 10-inch, 11-inch hardbound, softbound and loose-leaf books, 2-color 11-inch books

Web and digital print

Full-service bindery

THOMSON REUTERS CORE PUBLISHING SOLUTIONS

Basic Workflow



Thomson Reuters Core Publishing Solutions consists of eight operational departments:

Manufacturing Client Services

Manufacturing Client Services (MCS) coordinates work for all Thomson Reuters, Thomson Reuters affiliate customers, and third-party partners serving as the liaison between the customer and manufacturing. MCS production planners create production and material specifications for all manufacturing jobs, and capacity planners schedule, prioritize and organize daily workloads for the manufacturing operating departments.

MCS account managers work with their customers throughout the manufacturing process to ensure their expectations are met with quality products.

Prepress

The Prepress department's main function is to transform a book's content, provided by customers as digital files, to aluminum plates used for printing. It is the first stage of book manufacturing, followed by the actual printing by the Press department.

Press

The Press department is made up of web and sheet-fed presses. Their main function is to transform images from aluminum plates that are made in Prepress onto stock paper.

Digital Print /Print-on-Demand

Digital Print or Print-on-Demand operation provides its customers with the opportunity to produce short-run, high-quality print products more cost-effectively than our competitors.

Print-on-Demand uses state-of-the-art digital printing equipment and imaging software to transform a product from file to print in less than 24 hours. Print-on-Demand prints bound volume products, loose-leaf binder subscription products, newsletters, circuit court slip opinions, advertisements for shipment inserts and other miscellaneous products.

Bindery

The Bindery department's main function is to take the printed signatures from Press and bind them into a finished product. The binding methods include the following: loose-leaf; saddle-stitch; side-stitch; soft-bound pamphlet; and hardbound binding. More than 100 different processes or machines are used daily, including folding, perforating, stitching, cutting, binding, case-making and drilling.

Subscription Services

Subscription Services packs and ships product to subscription customers as well as bulk product orders for other Thomson Reuters businesses such as RIA, PPC, Barbri and Carswell. Shipments include hardbound and softbound books, pamphlets, loose-leaf materials, newsletters, CDs, advance sheets, legislative service pamphlets and pocket parts. Products are shipped in cartons, polybags, envelopes, shrink-wrap, kraft paper and self-mailers. This area is also responsible for the mailing of all customer invoices and all Thomson Reuters first-class mail.

Distribution

The Distribution department picks, packs and ships single orders to customers of West Group and numerous Thomson Reuters-affiliated companies. It makes up half of the 1.3 million square feet of the manufacturing facility in Eagan, Minn. Six million units are processed annually, averaging about 21,000 units a day.

Inventory Control

Inventory Control uses ABC analysis for materials management, an industry best practice, to strive for carrying the optimal level of inventory at any given time. Finished goods inventory is maintained via a cycle count program, whereby materials are counted on a cyclical schedule throughout the entire year.

Engineering & Manufacturing Technology

The Engineering & Manufacturing Technology department serves manufacturing and distribution operations by performing preventative maintenance, equipment repairs, recycling and engineering modifications.

Safety Department

Thomson Reuters is committed to achieving the highest performance in occupational health and safety with the aim of creating and maintaining a safe and healthy work environment enterprise-wide.

Manufacturing Sourcing and Services

Manufacturing Sourcing and Services is a service and support group that provides for the needs of the Manufacturing, Distribution, and Engineering operations through the fulfillment of four major functions: procurement, receiving/warehousing SAP support, and Manufacturing Learning Center.

Procurement

The main responsibility of this team is to ensure that the manufacturing facility has the supplies it needs, when it needs them, and that those supplies are acquired in the most cost-effective manner possible.

Receiving

The material-handling professionals on this team provide Thomson Reuters Manufacturing departments with timely delivery of raw materials supporting a 24/5 customer-focused book manufacturing operation. Their main function is to receive all incoming products, maintain accurate warehouse inventories on the \$6 million of raw materials in the warehouse, and deliver these materials to the production floor as needed.

Systems Applications & Products (SAP) Support

There are three main roles on this team. The operations consultant provides leadership to the facility's SAP business experts, and manages the new release and enhancement implementations from the MD&E perspective. The team's industrial engineer supports the plant through continuous review and improvement of operational processes. Lastly, the report writer provides operational report development and data analysis services to all MD&E departments and manages manufacturing's interest in the corporate data warehouse.

Manufacturing Learning Center

The Manufacturing Learning Center (MLC) strategy is driven by a number of factors, all of which are intended to maximize both organizational and individual effectiveness and meet the changing needs of the business. The primary guiding principles of this strategy are based on the strategic theme to develop the organization and drive efficiencies.

Supporting Departments

Manufacturing Business Support

Manufacturing Business Support comprises Finance, Cost Accounting, Process Improvement and Estimating. The department's primary goal is to ensure the financial integrity of the manufacturing area as well as to serve as consultative specialists.

Human Resources

Human Resources aims to align employees with business priorities and responsibilities - supporting the framework for optimal individual contribution and driving business success. At Thomson Reuters, high-performing talent functions in an environment that:

- Is customer-focused.
- Has employees personally aligned with business objectives.
- Is marked by accountability/ownership and employee engagement.





MANUFACTURING CLIENT SERVICES (MCS)

SERVICE AND SUPPORT

MCS includes 42 professionals, who are responsible for scheduling, prioritizing and organizing production along with managing inventory of raw materials for manufacturing. MCS releases and tracks approximately 50,000 projects annually. Each team works hard to ensure on-time, high-quality production of each of its projects. The department also provides the short-term and long-term capacity forecasts to ensure that customers' needs are met.

The various roles in the department include:

- Account managers
- Production planners (spec writers)
- Buyers
- Schedulers

Teams include an account manager, production planner and a buyer.

ROLES AND RESPONSIBILITIES

Account Manager

The account manager is the liaison between customers and production. Detailed communication and organizational skills support account managers in overseeing each project – from when it first arrives to Thomson Reuters until customers receive the finished product. Account managers are responsible for obtaining information needed to forecast and schedule each project, and they also answer questions from customers, production planners, schedulers and from the production floor.

Production Planner

The production planner translates the specifics of a project by creating a production order (job spec), which describes the process, materials and information needed to get the project completed. In order to do this, the planner needs to assign the correct equipment and materials for the specific trim and run quantity of each project.

Schedulers

Schedulers organize and schedule production orders, according to materials and equipment that are available to meet customers' needs.

Buyers

The buyers review the demands placed on raw materials, by the production orders and determine which materials need to be ordered. Buyers identify sources of supply, negotiate pricing, coordinate and track shipments of raw materials to ensure they arrive on-time. They also closely follow industry news to ensure they are up to date on pricing trends, lead times and new raw material offerings.



JOB-PLANNING PROCESS

How exactly does a project get through manufacturing? What does MCS do to help this process?

Assignment of Title to Thomson Reuters

The projects come to MCS in two ways. A Thomson Reuters legal product is often forecasted from our own list of titles, or an outside product is bid on and won (contract work). This contract work includes products such as college textbooks and reference publications, as well as the right to publish and/or print state government products.

Jobs are Forecast and Released in SAP

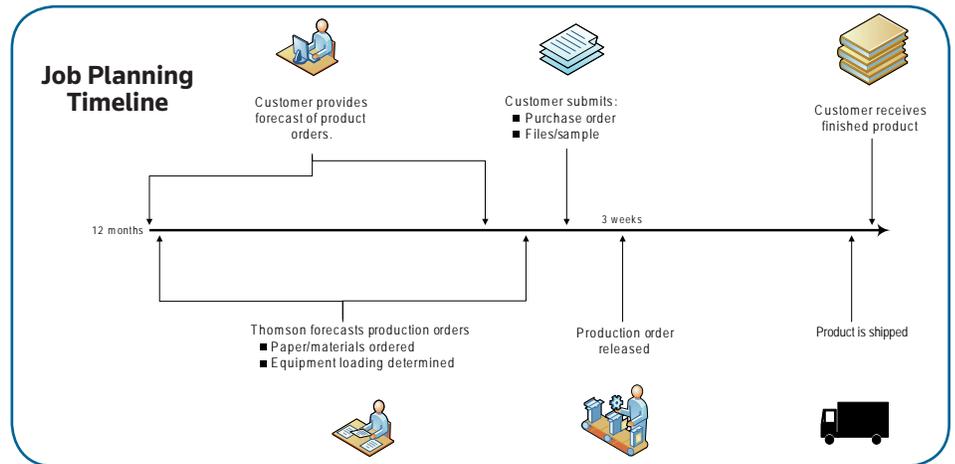
The titles are entered into SAP to reserve a spot in the schedule and assign raw materials to produce each title. The production orders (job specs) document the equipment and materials necessary to produce each project.

The information needed to forecast each project includes the following:

- Title
- Run quantity
- Desired schedule
- Trim size
- Estimated page count
- Type of binding
- Desired text and cover papers
- Ink colors for text and cover
- Any necessary miscellaneous information

The account managers gather this information for the contract work so the production planner can forecast each project into SAP. A copy of the form used for forecasting and releasing production orders is on the next page.

The majority of Thomson Reuters legal work is forecast into SAP by



in-house forecasters and is then reviewed by MCS's production planners. Thomson Reuters Content and Editorial teams provide the specific information to the forecasters. Much of the legal work is forecast two to three years in advance. A portion of the legal work is government contracts, and all of this is forecast by MCS.

Correct customer information is essential. This helps to ensure that each product is forecast correctly so it will effectively progress through the plant. The importance of forecasting cannot be overemphasized, to ensure that the appropriate materials and equipment are available to produce each publication. Clear and concise requests or instructions help produce production orders (job specs) that are easy to read and clearly understood by manufacturing personnel.

Account managers and production planners work with Scheduling and Procurement to help ensure that the desired ship date is met and to arrange for any special-order materials needed. Scheduling and Procurement run SAP reports to find areas of concern, such as overbooking of equipment or shortages of raw materials, such as paper. Production account coordinators track the

projects through the plant to ensure that each project stays on schedule.

The role of the schedulers is to prioritize, schedule and organize workloads for the manufacturing facility. The schedulers provide direction to ensure timely and efficient processing of projects that meet ship dates, revenue goals and contract requirements. Capacity forecasts are created for each manufacturing department to determine both short- and long-term staffing and equipment requirements. The schedulers work with various departments throughout the organization; troubleshooting problems experienced in the editorial, manufacturing and distribution processes.

Information Required by Customer to Pre-Schedule a Title

By providing this information you are communicating your requirements and assisting us to meet your printing needs without delay.	
Today's Date:	Run Qty:
Requested Ship Date:	Purchase Order #:
Customer Information	
Customer Name:	
Author and Title Information	
Title:	
ISBN:	
Author:	
Text Design & Materials	
Files: Scan or Electronic	Text Paper/weight:
Trim Size:	Color:
Page Count:	Head Margin:
Binding Method:	Back Margin:
Bleed Tab Range:	End sheets:
Cover Design & Materials	
Hardbound or Softbound	
Printed: Cover Stock:	Binder Boards:
PMS Color:	Cover Finish:
Stamped: Material:	Foils:
Proofs	
Text Proofs: _____ Cover Proofs: _____ Hard/Soft	
Other	
Printed End sheets	
Bind In Cards	
Inserts	
3-Hole Punch	
Perforations	
Ship To:	

TEAMWORK IS THE KEY TO SUCCESS

Each department in Thomson Reuters Manufacturing is committed to producing high-quality products for all of our customers.

MCS has helped contribute to this success by working with our customers to make sure that we are responsive to their needs. We have a "must ship" system to help ensure that our contract projects as well as our own priority projects ship on time. MCS works with Forecasting and the Content Centers to establish a consistent tracking system for these priority projects. Our contract projects are routinely entered onto the "must ship" list.

MCS also led the way in developing and supporting Thomson Reuters Manufacturing Process Awareness

Workshops. Employees from all manufacturing departments attend these classes to learn about each of the major areas of our facility – Content, MCS including Material Sourcing, Engineering, Prepress, Press, Bindery, Sub Services and Distribution. Informal presentations as well as hands-on sessions are used to teach employees at all levels about the complexities and challenges of areas outside their own departments. Critical discussions have surfaced during these sessions, which have led to better workflow procedures, as well as an overall appreciation of the entire manufacturing process.

The MCS leadership team continually evaluates its team to make sure employees' talents are fully

optimized. Team members are trained to back each other up as needed. The fluidity of these skills is important so resources can be focused on areas that need extra help. The account managers are in a different position, because each account manager services his or her customer's specific needs. The account manager takes time to become familiar with the requirements and expectations of each customer.

MCS creates value in the organization by linking our customers' needs to our manufacturing core competencies. The result of our effort improves the performance of others and anticipates our customers' current and future needs, while fostering new business opportunities.



Paul Galaski



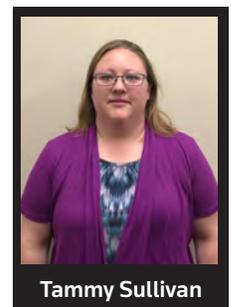
Sharon Kavanaugh



Nancy Roth



Barb Anger



Tammy Sullivan



Mary Kay Peterson



Bev Manship



Marissa Dressely



Denise Royal



Monique Longcor



Paul O'Neill



Christy Taylor



Linda Larson



Anita Monson



Jodi Schmidt

MANUFACTURING SOURCING AND SERVICES

MATERIAL SOURCING OVERVIEW

The Materials Sourcing group is responsible for making sure that the right raw materials are available at the right time to support production needs. At its most basic level, this is the group that reviews production requirements and orders the necessary raw materials.

However, Materials Sourcing is much more than just ordering materials; this group helps to meet customer needs by:

- Negotiating raw materials prices
- Monitoring and managing supplier performance
- Identifying sources of materials to reduce risk of supply interruption
- Working with suppliers to improve product quality
- Working with other manufacturing departments to improve productivity

Two of the most obvious materials that are visible in a finished book are the paper and the cover material. The following sections provide background information on the production of these two key raw materials.

Paper

The grades stocked here at our Eagan facility are Offset, light weight hybrid Opaque, coated Groundwood and Directory. Our heritage as a law book publisher continues to dictate that we use only the highest quality materials in our process. With the exception of directory, light weight hybrid Opaque



and coated groundwood, our papers are acid free archival quality made to last hundreds of years without yellowing or degrading.

When planning a publication it is important to consider the advantages of using materials that we inventory for our own products. Special order papers can take up to 8 weeks for delivery and depending on type carry between a 20 and 60 ton minimum order, enough to do 15,000-45,000 typical books.

Our stocked paper also carries negotiated volume contract pricing whereas special orders are market price. Multiyear contracts also provide greater price stability for budgeting purposes.

Cover Material

There are two categories of non-printed cover materials, woven (cloth) and non-woven which is made predominantly of paper. We have a long history of working with these types of materials which are decorated using a hot foil stamping

process. The resulting cover (case) is very high quality and has long been one of our major core competencies.

Lead time on cover materials can vary from 10 days to 6 weeks depending on supplier and the material used. Approximately 200 materials are stocked at our Eagan facility and these could offer you a solution in eliminating lead time. We buy the highest known quality materials for our law books because they are made to withstand the test of time.

Because we buy these materials in high volume, it gives you the unique opportunity to use the best materials available at little or no additional cost over the least of the economy grades. Over 75 cover materials are considered "standard" at our facility and using them can offer you a solution with a shortened lead time. Normal lead time on "non-standard" cover materials can vary from 4-6 weeks depending on supplier and material used.



Sampling of Summit grade cover material

PAPER-MAKING PROCESS

Types of Paper Available

At Thomson Reuters Manufacturing, we use both roll stock and sheet stock paper. Following are the types of paper we keep in stock:

Roll Stock (for web presses)

- Offset
- Coated Groundwood
- Lightweight hybrid opaque
- Directory/Catalog papers

Our papers are 20.9-lb. to 80-lb. basis weights and have a 10,000-lb. minimum order quantity. Standard roll stocks require an average lead time of six to eight weeks. Custom orders may carry up to a 60 ton minimum.

Sheet Stock (for sheet-fed presses)

In our sheet stock paper, we carry a variety of types and shades of paper.

- white offset 50-80 lb.
- index 90-lb.
- white cover stock, coated one side (C1S) 10 & 12 pt
- matte 65-lb.

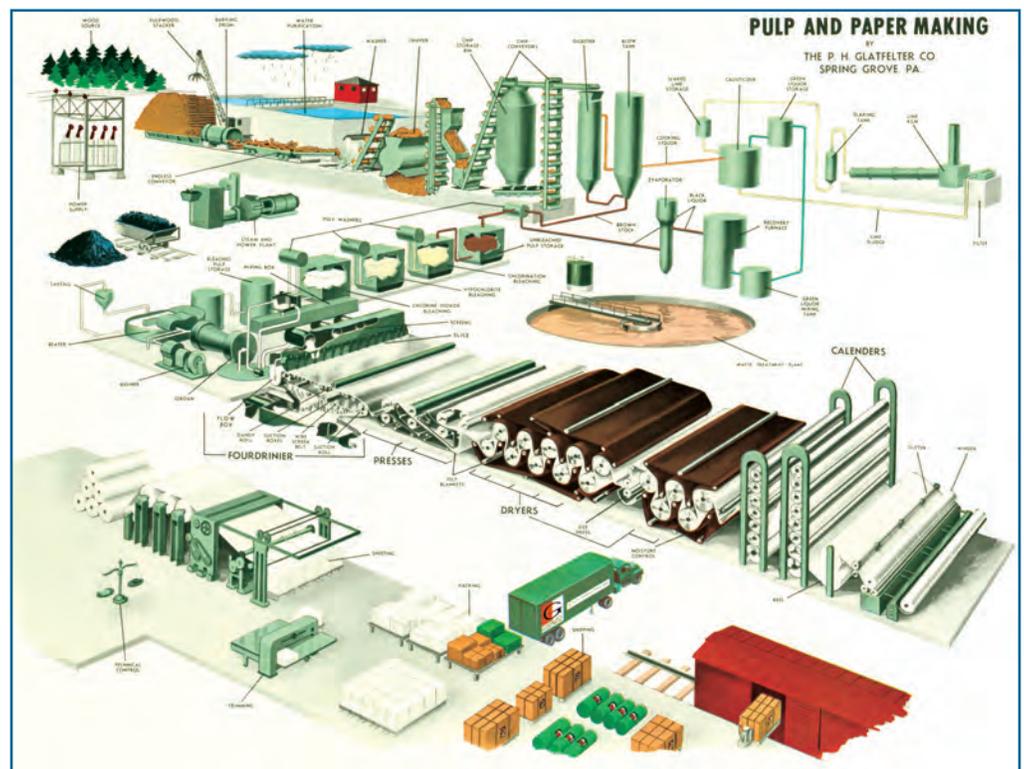
We have the following standard sizes:

- 22 by 25 inches
- 23 by 29 inches
- 11 by 17 inches
- 12 by 18 inches
- 20 by 14 inches
- 8 1/2 by 11 inches

Our common grades of paper require an average lead time of two weeks.

A paper-making machine measures the length of two football fields and consists of two primary sections, the wet end and the dry end. Prior to arriving here, a group of processes take place to extract wood fibers for the paper. This includes separating the lignin from the wood fibers to get a good quality pulp. The pulp is then bleached to the desired shade and made suitable for publications designed to last for hundreds of years without yellowing. The resulting mixture is commonly known as furnish.

The furnish, which is 99 percent water and 1 percent pulp, is moved to a head box, where the diluted pulp is sprayed on a moving mesh wire. About 20 percent of the water drops through the screen, leaving the pulp mat behind. This mat is then pressed between water-removing fabric rollers at a speed of more than 3,000 feet per minute, or about 60 miles an hour, and reduces the water content to about 65 percent. It is then moved to the drying section where more water is removed, down to about 5 percent. After the paper is at its desired consistency, it has additional coatings applied or is calendered before being rolled for storage. The paper rolls can weigh as much as 4 tons, and the workers can start a new roll without stopping the machine.



What We Buy

Paper (\$14 million spend)
Printing plates, ink, glue, cover material, cover boards, shipping materials, binding materials

Company forms and stationery
Services outside our manufacturing capability

RECEIVING AND RAW MATERIALS WAREHOUSING

This 10-person team ensures that departments across manufacturing receive raw materials quickly to meet customers' needs, 24 hours a day. The team's main function is to receive all incoming products, maintain a raw material inventory equivalent of 5 million dollars and deliver these materials to the production floor as accurately and efficiently as possible.

Approximately 140,000 square feet are used to store raw materials. Receiving uses SAP to manage the inventory in the warehouse.

Raw materials are brought in every day by truck and rail car, rail car being utilized primarily for paper. Receiving can process up to 600,000 pounds of paper per day.



Each day, the department can process up to 600,000 pounds of paper per day. The raw materials warehouse is over 140,000 square feet and the inventory is managed through SAP.

MANUFACTURING OPERATIONS SUPPORT

The Manufacturing Operations Support group ensures that the business systems used by Manufacturing are stable for uninterrupted production. The group also prioritizes and implements key system enhancements which drive data accuracy, transaction consolidation, and improved functionality. The main business system is SAP, but there are over 70 additional systems used throughout Manufacturing.

As a service group, the team also supports operational reporting, giving manufacturing the information they need to make timely decisions. Support for quality and process improvements is another key contribution. The group partners with the business for continuous improvements and efficiencies.

MANUFACTURING LEARNING CENTER

MLC is committed to continuous learning and employee development. The training opportunities offered to Manufacturing employees cover the following areas:

- Craft and Quality
- Process Improvement
- Business Acumen
- Business Systems
- Soft Skills
- Safety
- Leadership Development
- Lean

Paper Facts

If our annual use of roll stock paper was unrolled and placed end-to-end, it would reach to the moon and halfway back.

Warehouse holds 9,000 rolls of paper; 4-6 week supply.

Average daily use of paper is 95 rolls or 3.5 million pounds per month.

Paper is delivered by truck from Pennsylvania, Ohio, Wisconsin and Michigan.

Rail shipments come from both Vancouver and Madawaska, ME.



Empowering Behaviors

Every individual is involved in creating a safe work place

Leadership Commitment

Management champions a safe work place

Celebrating Success

Safe behaviors are recognized

SAFETY & ENGINEERING OVERVIEW

Safety & Engineering provides five essential services for manufacturing:

- Safety
- Production Maintenance
- Engineering
- Recycling
- Supply Services / Parts Inventory Management

Coverage is coordinated with all manufacturing departments and is normally provided on a 24/5 basis. Production Maintenance coverage has few breaks throughout the year because certain work is performed on running equipment and other work is performed on idle equipment. Recycling coverage primarily follows pressroom and bindery production. Engineering provides technical support for specific issues and is not organized to cover routine production.

Safety & Engineering includes employees who have a wide range of skills. Most positions are technical in nature and require knowledge of electrical and mechanical systems. An environment emphasizing training helps to advance employee skills and to keep pace with industry. High value is placed on safety and communication. The summary to the right shows the organization by position.

SAFETY TEAM MISSION:

Foster and support, individually and as a team, a 100% safe work environment through empowering behaviors, leadership, commitment and celebrating success.

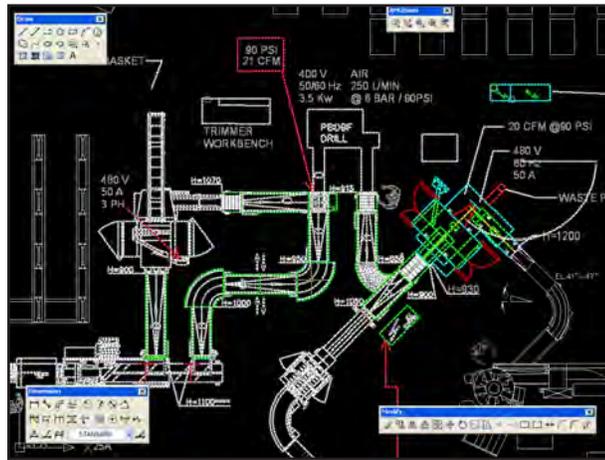
Staff by Positions

Safety Specialists
Associate Buyers
Engineers
Engineering Machinists
Maintenance Electricians
Maintenance Stores Attendants
Production Coordinator
Production Machinists
– Utility Personnel
– Recycling Operator
– Manager / Supervisor

PRODUCTION MAINTENANCE

Within Safety & Engineering, Production Maintenance supports all shifts in Prepress, Press, Bindery, Distribution, Subscription Services, Receiving and projects, to support our 24/5 production, across all three shifts.

Thomson Reuters book manufacturing uses typical prepress, press, bindery and packaging machinery. Over 400 active pieces of equipment is serviced and maintained by the S&E staff.



On the example shown, a customized conveyor system was developed to convert stand-alone bindery equipment to a continuous production line.

Work Orders

Equipment maintenance is authorized by a work order (WO) and is classified as either emergency, planned or preventative. The goal of both types of maintenance is to reduce equipment downtime, extend equipment life and maximize equipment efficiency. The two differences between emergency and preventative work orders are the method of initiation and the priority of the response. Emergency work orders are “called in” by machine operators while preventative work orders are scheduled by work planners. Emergency work orders receive a first-priority response, while preventative work orders are scheduled and receive second priority. Approximately 2,000 hours of production maintenance are performed each week. New emphasis has been placed on scheduling for predictive failures, anticipating when a part will fail.

Supply Services

Production Maintenance operates Supply Services, a 3,000-square-foot storeroom containing parts and supplies valued at \$1.8 MM. Supply Services is staffed with at least one attendant on each shift. Among the many important tasks attendants perform are issuing stock, receiving emergency calls, managing the tool crib, auditing inventory and coordinating efforts with Security and Facilities. Supply Services works closely with Engineering to ensure new equipment has an adequate supply of spare parts.

Maintenance Management

Production Maintenance uses a custom-developed SAP module for computerized maintenance management (CMM). In addition to equipment, work order and supply management, purchasing activities are performed with SAP.

Work is typically performed as individual projects that have specific scopes, start dates and end dates. Projects are “turned over” (delivered) to “the customer” (various production departments) upon completion and become part of the manufacturing process.

The source of project funding may be from either capital or expense budgets. Capitalized projects are typically larger than expensed projects and require multi-departmental involvement. Expensed projects typically affect a single department and are beyond the scope of routine maintenance. Both capitalized and expensed projects are implemented using the same project management principles.

Engineering projects frequently include the following tasks:

Equipment Layout Designs

Every equipment installation is unique and the first step is to prepare a layout drawing. A layout drawing indicates where equipment will be installed in the facility. Facility modifications and equipment relocations are determined. Plant utility requirements (compressed air, electricity, water, vacuum, etc.) are addressed.

ENGINEERING

Engineering has three positions that are specialized in the mechanical and electrical disciplines. Production Maintenance employees are occasionally reassigned to Engineering when workloads are high.

Equipment Installs

Most equipment in use at Thomson has been installed by Production Maintenance under the supervision of Engineering. Frequently, equipment manufacturers are involved in new equipment installations. Typical tasks associated with equipment installation include guarding, alignment, troubleshooting and training.

Equipment Specification Preparation

Engineering works with manufacturing technical supervisors, operators and purchasing to prepare equipment specifications and develop acceptance tests. Equipment specifications may be written to include a design approval process for custom equipment.

Production Equipment Modification

Equipment may need modification for many reasons – to prolong component life; to reduce make-ready time; to use standard spare parts; ergonomics; and safety. For example, limited access to a tear-out perforator on a web press made change-over difficult and contributed to high make-ready time.



Production Equipment Modification The picture shows two quick-change assemblies that were designed and fabricated in-house by Engineering to reduce make-ready time. The original holder was modified to accept these pre-set assemblies. Now operators can easily change assemblies by removing a quick-release pin.

Part Fabrication

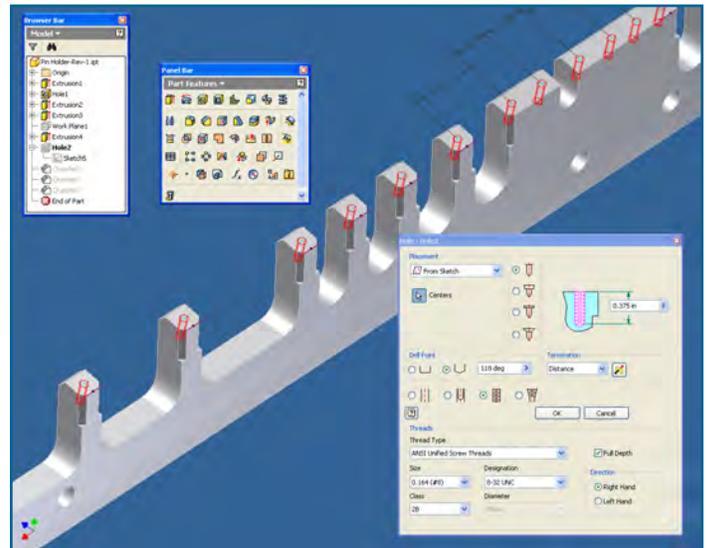
A wide variety of parts can be fabricated by Engineering. The first step of any fabrication is to determine economic feasibility. If a part can be purchased at a lower price and delivered when needed, there would be no advantage to making the part. In situations where equipment downtime is involved, the ability to fabricate parts is invaluable.



Part Fabrication The cam shown was fabricated in response to an unanticipated breakdown. The delivery quoted by the manufacturer was unacceptable; therefore, the decision was made to fabricate the cam in-house.

Mechanical Design

Engineering utilizes both 2D and 3D CAD for mechanical design. When designing parts and assemblies, it is not unusual to go through several iterations of design. This can be a costly and time-consuming process, especially if done by an outside supplier. Engineering has many advantages when designing in-house: immediate access to equipment and operators, a well-equipped machine shop, and knowledge of printing and bindery operations.



Mechanical Design Ink keys designed using 3D CAD. The virtual image compiles to a program that can be executed on a CNC mill or lathe.

Electrical Engineering

Engineering must ensure that electrical wiring is in compliance with the National Electric Code (NEC) and local building codes. Approximately 12 Programmable Logic Controls (PLC) and three Human Machine Interface (HMI) brands are supported. CAD software is used to create documentation for equipment modifications.

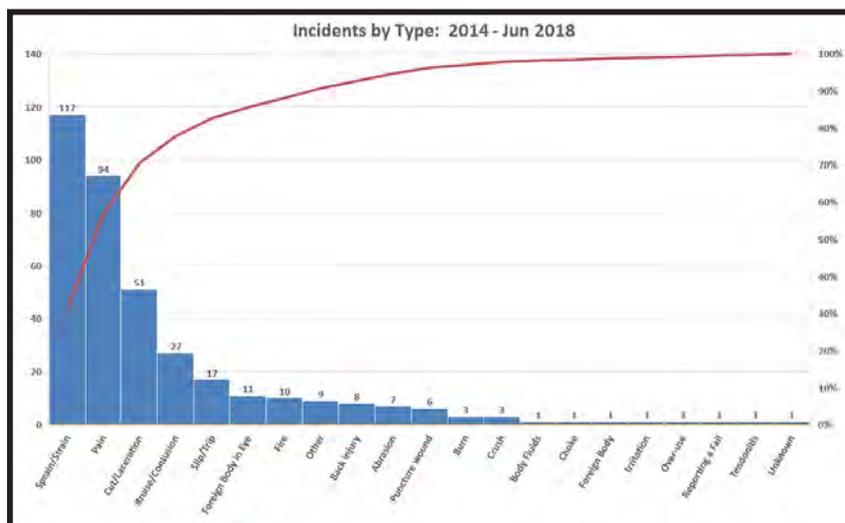
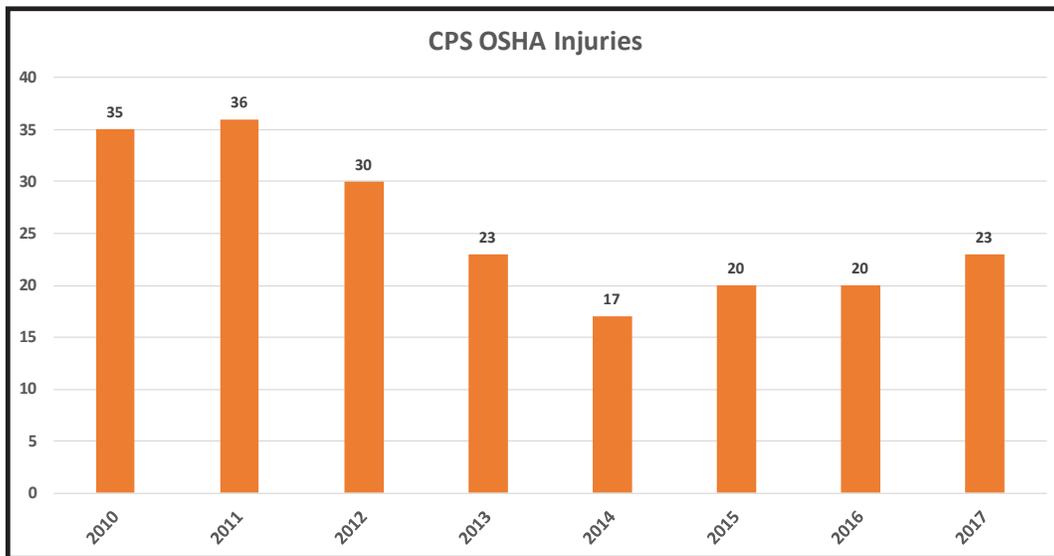
SAFETY

Thomson Reuters is a company dedicated to retaining, attracting and developing the best and brightest people, Thomson Reuters believes that we must operate our business in a manner that maintains and improves the health and safety of our employees. We believe that sound occupational health and safety performance contributes to our competitive strength and benefits our customers, shareholders and employees by improving the overall well-being of our employees, the community and the financial health of the company. Thomson Reuters is committed to achieving the highest performance in occupational health and safety with the aim of creating and maintaining a safe and healthy work environment enterprise-wide.

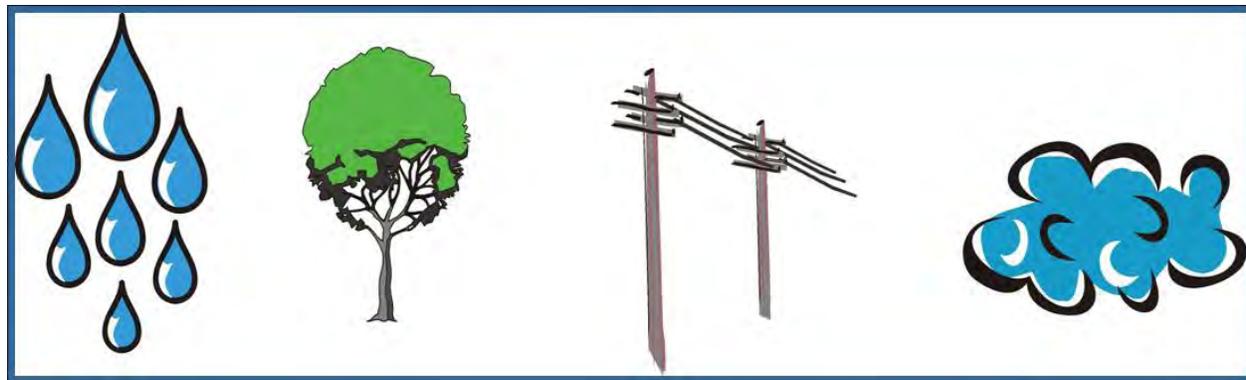
The Thomson Reuters organization has developed proactive regulatory, behavioral, safety and training programs to reduce the number of recordable injuries.

These achievements have been the result of Senior Management support and focus, management support, and employee-led safety and ergonomic teams.

Our goal is to achieve a 100% Safe work environment through continuous improvement.



RECYCLING



3,500
gallons
of water

9-15 trees

2,000 KWh of
electricity

30 pounds of
air pollutants

Thomson Reuters Manufacturing annual recycling saves:

21,626,500 gal.

92,685 trees

12,358,000 KWh

185,370 lbs.

Thomson Reuters recognizes that the protection of the environment is one of the most important issues facing businesses. We're committed to reducing energy consumption and promoting recycling throughout our business. Technology Services manages all aspects of the recycling of manufacturing materials. By weight, 56 percent of recycled materials originate from the pressroom and include signatures, cores, Hard White, and roll wrap. Another 35 percent is bindery trim collected by an extensive centralized trim removal system. The remaining 9 percent originates from throughout manufacturing and includes materials such as paper, old corrugated container, metals and plastic. It is estimated that 6,179 tons of paper, 14 tons of plastic and 62 tons of roll cores are recycled annually. Of all materials collected for recycling at Thomson Reuters manufacturing, paper is by far the biggest recycled item. Printing paper can be separated into two major groups, ledger and groundwood.

- **LEDGER** – paper made from a “kraft,” or a chemical process, that breaks down the wood fibers by removing lignin through the application of sulphates. Lignin is a bio-chemical in wood that binds the fibers together at the cellular level. Lignin gives wood its strength and is the primary source of heat during combustion.
- **GROUNDWOOD** – paper made from a mechanical process, where grinding separates the wood fibers. The lignin is left, more or less, in the pulp. Due to the presence of lignin, which is sensitive to pH, achieving brightness in the paper requires the pulp to be acidic.

With respect to recycling, ledger commands a higher price on the market than groundwood for two reasons. First, the grinding process used to make groundwood can damage some of the wood fibers, making them unrecoverable during repulping. Second, the presence of lignin in groundwood causes the paper to age (or darken) over time, makes the repulping process more pH-sensitive and prevents itself from being recycled into ledger (ledger, however, can be recycled into groundwood).

Thomson Reuters Core Publishing Solutions Fun Facts

- Thomson Reuters CPS uses 30 percent recycled paper and environmentally friendly soy-blend inks in the millions of books it prints each year.
- Our Eagan campus has installed new napkin dispensers to reduce waste by 20 to 40 percent. The napkins are made from recycled products using an environmentally-friendly process.
- Extensive recycling programs are in place for materials, including:
 1. Toner
 2. Scrap wood
 3. Computers/electronic equipment
 4. Paper
 5. Cell phones
 6. Batteries
 7. Carpet
 8. Aluminum
 9. Plastic
 10. Pop tops
- Over 1068 pounds of produce gardened by our Eagan Green Team.
- Thomson Reuters received the Gold-Level Bicycle Friendly Business because of our extensive participation in the Build-a-Bike Program, MS 150 Ride, and National Bike Challenge.

PREPRESS

OVERVIEW

Prepress is the first step in the print production process. To start the process, customers provide Prepress with their product files, which are eventually turned into a book. The individual pages are imposed or set up for the appropriate press or digital press. As simplistic as this sounds, many tasks and processes need to occur. Our team of professionals have created many quality procedures.

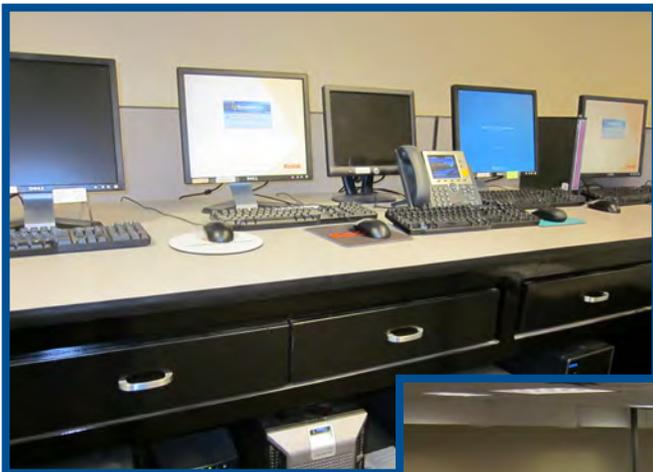
To ensure that a high-quality product is developed, several steps occur at the beginning of the process. For example, the files are checked by our Prepress Preflight area to make sure they are accurate and compatible with our various workflow systems. During this stage, the following issues are discovered and fixed before the production order continues:

- Images and fonts are not embedded.
- Fonts are not supplied.
- The type is not set to black.
- High-resolution images are not provided.
- Pages are not designed using cyan, magenta, yellow, black or Pantone.
- The overprints, trims, spines and bleeds are incorrect.

If an issue is found, the Manufacturing Client Services representative is contacted to make sure that the customers' needs are met.

Once the issues have been resolved, the following steps occur:

- Electronic files are imposed and proofs are sent out for approval.
- Imposed jobs are sent to the plating systems or to the digital print division.



Prepress Central

Thomson Reuters Prepress uses Kodak Prinergy systems to process incoming customer electronic files. Our team is centrally located to foster constant communication between our various setup areas.



Prepress, Preflight and Imposition Workstations

Thomson Reuters uses a variety of high-end Macintosh production computers to perform all preflighting and imposing work for clients. We use both Adobe Acrobat Professional enhanced with PitStop Professional.

This combination of software and server expertise feeds all of our CTP platesetters. We currently have five Prinergy Connect servers, which process thousands of final output images per day. Our imposition and graphic specialists are seasoned Kodak Prinergy Connect and InSite operators.

The Xerox Versant 80 with the latest Adobe Print Engine produces our textbook hardcopy proofs. Once proofs are printed, we offer softcover binding prior to delivery for client approval.

Our two Epson large-format printers provide contract proofing for all of our client covers and four-color work. They use the ORIS color calibration system to produce optimum results.

COMPUTER-TO-PLATE (CTP)

At Thomson Reuters, any job that is going to be printed on an offset press uses plates as the medium to transfer data to paper. After a file has been imposed for offset press and submitted into the Prinergy workflow system, the data will be imaged to plate via a computer-to-plate (CTP) device.

Our CTP operation uses thermal technology, where data is imaged onto an aluminum plate via a thermal imaging head inside the platesetter. Once imaged, the plate travels through a processor, which uses a chemical bath that processes the plate, preparing it for the offset printing process. Finally, the plates need to be punched and bent, creating a lip that will allow the plate to mount onto a cylinder of an offset press.



Kodak Magnus 800



Kodak Magnus VLF APL Platesetter with inline inspection table and bender, and automatic loading off a pallet.

The number of plates needed to create a full signature ranges from two to eight plates. In addition, if a job is printing in multiple colors, plates need to be created for each color (i.e., a four-color CMYK job will have a plate for each color).

Of our four CTP devices, three systems image VLF (very large format) plates, and each platesetter images at a resolution of 2,400 dpi. These systems produce plates for all offset presses. More than 3,000 plates can be produced in a 24-hour timeframe.

Type	Format	Average Plates per Hour (PPH)
2 - Magnus VLF	Large to Small	48
Magnus 800	Medium or Small	62
Magnus APL	Large to Small	48

- Plates-per-hour (PPH) averages depend on the mix/size of the plates being imaged on each particular imagesetter.

Thomson Reuters uses multiple plate sizes ranging from 20.75 X 31 inches up to 47 X 54.5 inches.



FONTS 101

Reduce common mistakes at the beginning of a new project by supplying the correct fonts. Below are steps to help customers *when application files are supplied*.

- Provide the name of the font manufacturer and the original version created.
- Include a copy of all the used fonts, including standard fonts like Times and Helvetica.
- Supply the bitmap screen and printer fonts for PostScript fonts that have both. OpenType, TrueType and Composite fonts are also acceptable.
- Each font should have its own suitcase, rather than collecting all of them in one.
- Supply fonts that are used in files that have been placed into documents, such as .eps files.
- Provide fonts, even if they have been previously submitted for other jobs.

ELECTRONIC FILE DELIVERY

From the very beginning, the book delivery process is designed to be as convenient as possible for customers. The options to deliver the product files are listed below.

Kodak's InSite File Delivery system

Any file, big or small can be uploaded to our new InSite Prepress Portal. It can also be used for on-line proof approvals of your products. Contact your account representative to set up a demonstration and/or user account to access system. Our 2016 upgrades have made the system 100% Java Free!

E-mail: Small files, such as logos and single pages, can be sent through e-mail to the account representative.

File transfer protocol (FTP):

Used for customers who don't have the ability to use an internet-based system like InSite, FTP provides you with the opportunity to transfer small and larger files through servers on the Internet. FTP is ideal for files larger than 5MB. You can contact your account representative to set up a secure folder on the FTP site for delivering files and picking up proofs.

Once an account is created, you can access the FTP site by entering the host name, your user name and your password. After logging in to the FTP site, you can create new folders for different jobs and/or transfer

your files into the folders. You will be provided with a second log-in through which outgoing soft proofs will be placed for your review.

Storage media: You can send your files on CD or DVD. These files need to be labeled with the company's name and title of the project. For special delivery needs, please contact your account representative.

File Naming Conventions

Clear file names are a quick and easy way to communicate key information for each project. A consistent file naming convention can help avoid any confusion about the files received.

Identify files with a unique name that differentiates each file. For example, when sending multiple files for each chapter of a book, clearly identify the chapters in numerical order. This will facilitate accurate positioning. See the sample convention listed below.

Author's name, title, volume and chapter number (text, cover, tabs)

File names should not exceed 23 characters, including any application extension. The file names include one period before the file extension and need to have the correct file extension name such as .doc, .jpg or .tif for a specific file type or application.

General Font Handling Suggestions

Avoid using a style attribute such as bold italic that might not be available as a printer font. Older printer drivers may create a pseudo version, which will reduce the font's quality. Many newer printer devices and raster image processors ignore pseudo commands and use the printer font, which affects the look of the text.

As a rule of thumb, use the actual stylized typeface needed and avoid "menu-styled" attributes, such as bold, italic, outline and shadow effects.

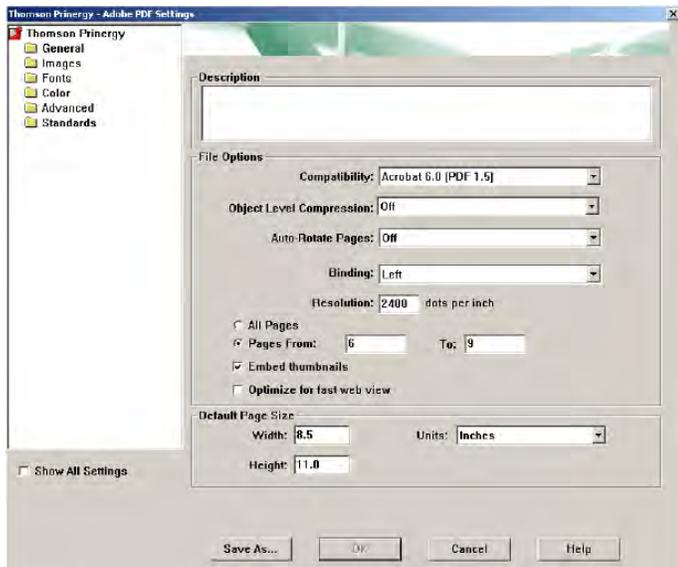
The ideal scenario is when the customer supplies a Print-Ready PDF file with all needed fonts embedded in the PDF. This minimizes document handling by CPS and any associated potential errors by doing so.

HOW TO CREATE PDF FILES FOR THOMSON REUTERS

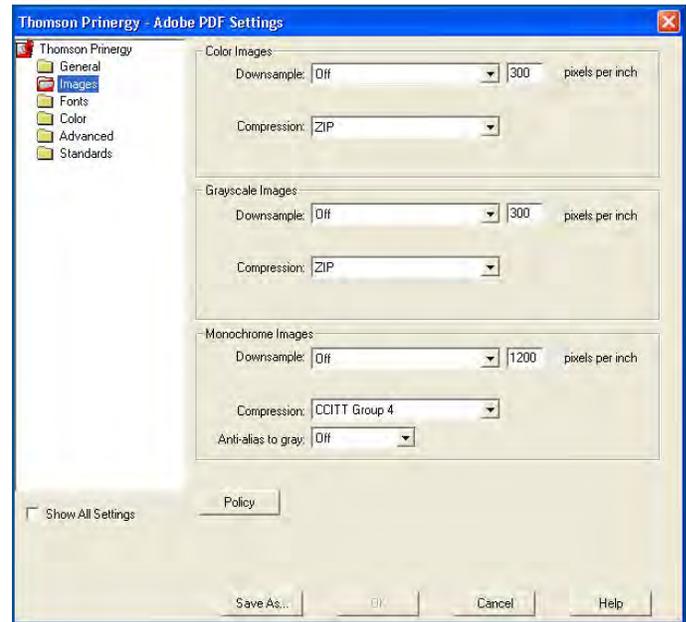
Contact your account representative to acquire a copy of the Thomson Prinerjy.joboptions file. Import this file into the Distiller application and then you will have the option to select Thomson Prinerjy in the Adobe PDF Settings. After this is installed, the settings will help you create PDF files with any Adobe application installed on your computer.

You also have the option to follow the steps included in the screens below, which are equivalent to the Prinerjy Thomson job options file settings. After selecting the options listed below, save the work to a file, which can be used to create PDF files that are compliant with Thomson Reuters' systems.

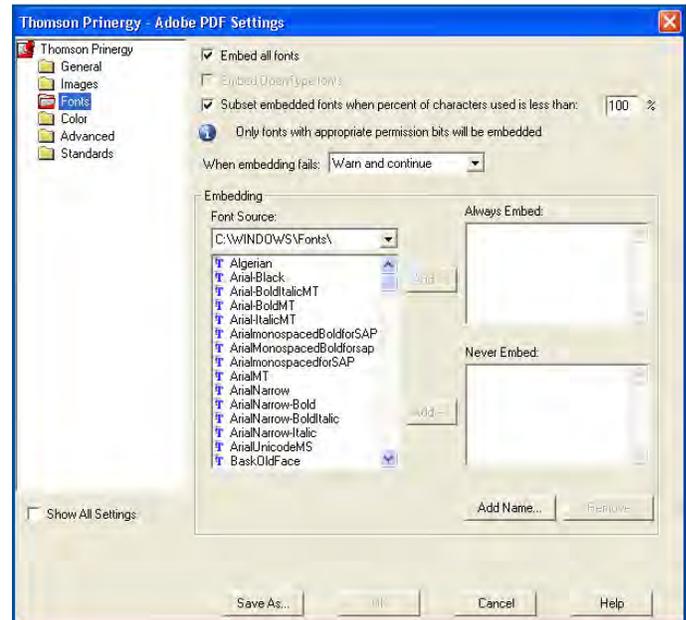
GENERAL OPTIONS



IMAGES OPTIONS



FONTS OPTIONS



Depending on your current system applications, you have the capability to generate a different version of PDF.

TRIVIA: When was Adobe Acrobat created?
June 15, 1993
IRS was the first to purchase the right to distribute

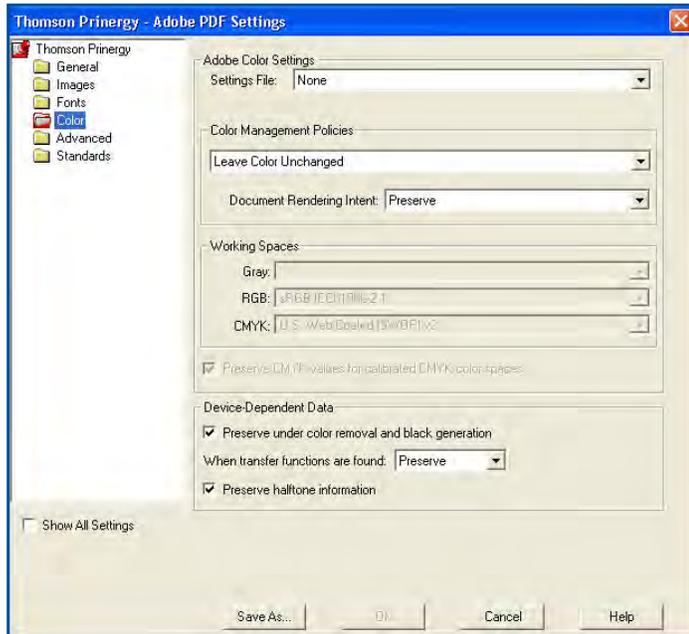
Thomson Reuters supports from PDF v1.2 going forward

1.2: Acrobat 3.0 (1996)	1.3: Acrobat 4.0 (1999)
1.4: Acrobat 5.0 (2001)	1.5: Acrobat 6.0 (2003)
1.6: Acrobat 7.0 (2005)	1.7: Acrobat 8.0 (2006)
Acrobat 9.0 (2008)	Acrobat X (2010)
Acrobat XI (2013)	Acrobat DC (2016)

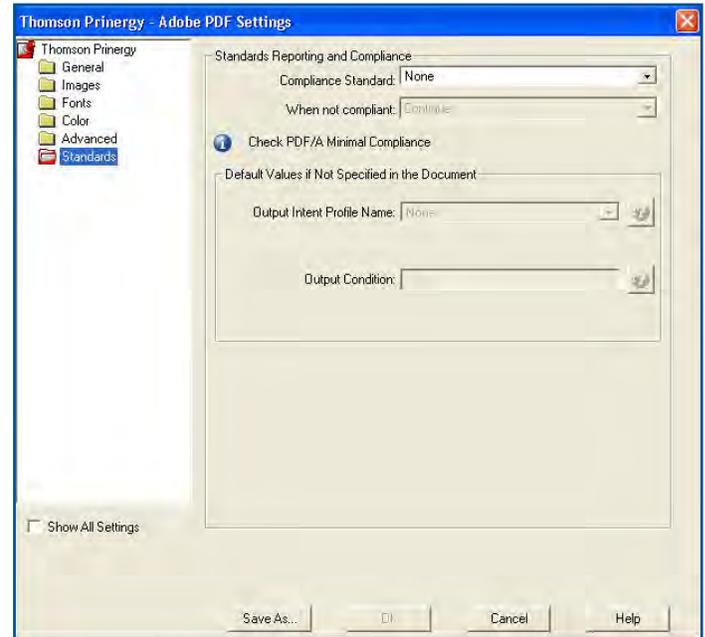
HOW TO CREATE PDF FILES FOR THOMSON REUTERS

(continued)

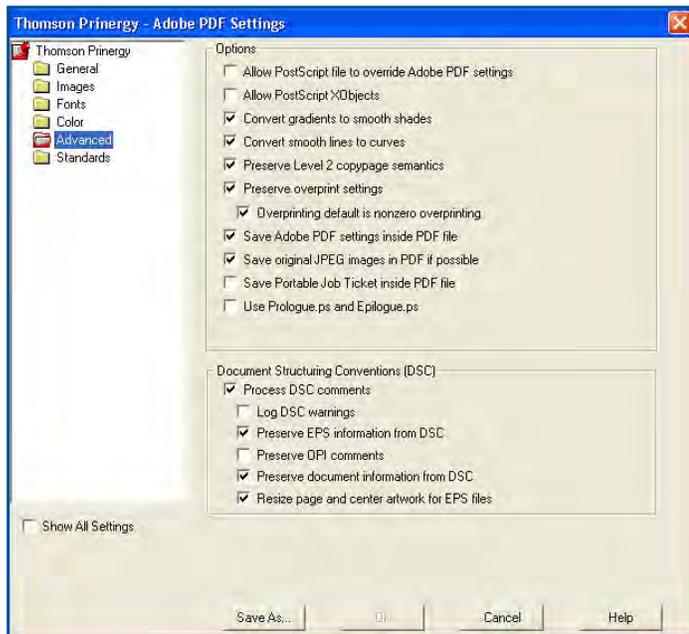
COLOR OPTIONS



STANDARDS OPTIONS



ADVANCED OPTIONS



HOW TO SEND PDF FILES

The best way to send PDF files to Thomson Reuters is by using the Thomson Prinergy Setup files to create them with **Adobe Acrobat Distiller** and **Adobe Acrobat Professional**. This can be supplied to any client. Using these setups, a client will create a PDF that will work smoothly through our workflow processes. This setup file can also be used for any version of **Adobe InDesign** or **Adobe Illustrator**.

The Thomson Reuters preferred method of file delivery is via PDF. Text files created in supported Macintosh-based programs can be supplied as application files, if necessary. Supply PC, proprietary-based or jobs in unsupported applications as properly created PDF or PostScript files.

Prinergy is a Kodak product that we use to create a PDF work environment. If you work with multiple Prinergy facilities, you will see that every vendor's settings may differ slightly. By using the Thomson Prinergy.joboptions file, you can be confident that files will flow through our systems fairly seamlessly.

Supported Macintosh Applications

QuarkXPress 2018 & lower
Illustrator CC 2018 & lower
Photoshop CC 2018 & lower
InDesign CC 2018 & lower

We encourage all customers to send test files in advance of a new job. This allows us to troubleshoot any problems before they might affect the project's schedule. There is no cost for this service. Contact your account representative with any questions.

ELECTRONIC MERGE AREA

The Electronic Merge area uses the functionality of Adobe Acrobat to update loose-leaf files submitted through a proprietary data repository called POWER, among other Base files held for our customers. The majority of files updated by Electronic Merge are sent to be imposed for both our digital and offset production areas. After files are imposed, they are electronically submitted into a queue for production on a continuous feed or cut-sheet press.

Some of the daily functions of the operators in our Electronic Merge area include:

- Performing electronic interfiling of updated content with the electronic base content to maintain uninterrupted production of loose-leaf print operations.
- Ensuring that they have completed updates, base and filing instructions according to customer production orders and filing instructions.
- Ensuring that the filing instructions and electronic updates/bases are complete and available to meet production requirements.
- Maintaining the master library to accurately reflect updated electronic files instructions.

Scanning Recommendations for Text

We recommend our customers scan text at 600 dpi.

FONT MANAGEMENT

Thomson Reuters now uses Suitcase Fusion from Extensis to centrally manage our font libraries. The entire Adobe Font Folio as well as the majority of the Bitstream family fonts is included in our Prepress library.

Suitcase Fusion assists us in creating a conflict-free environment with a single font data source. Font auto-activation with Adobe® and Quark® applications assists in loading only the fonts needed for each job.

Fonts that are supplied by the customer that are not part of our standard library are loaded only temporarily on the Macintosh workstation. We do this by putting them into the Macintosh User Library Font folder. They are deleted after the job is processed. This prevents unlicensed or rogue fonts from entering our permanent type library.

DEFINITIONS

Back margin is the measurement from the spine (side trim) of your book to the type.

Face trim is measured from the face of the book to the edge of the type.

Foot margin is determined by measuring the bottom of any page to the bottom of the last line of type or folio at the bottom of the page.

Head margin runs from the top of the page to the top of the first line of type on the pages. Prepress will align to the top of the running head unless otherwise notified.

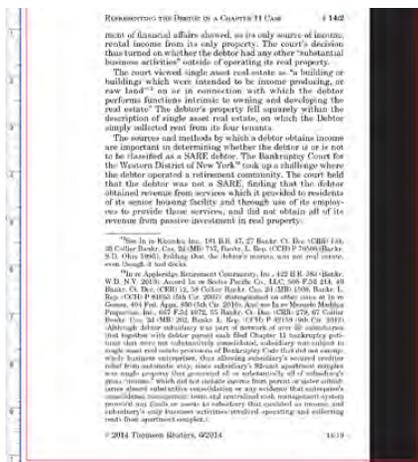
Customers can contact their account representatives with any questions. Please supply a hard copy of your preferences for the various margins if in doubt. This will eliminate any guesswork on our part.

PREPARING YOUR TEXTBOOK

Create the textbook to the exact trim size of the final product. Make sure all margins are correct so the book can be accurately positioned when printed. The example below shows a final product of 8.25" x 10" with a .125" bleed. The red box is showing the trim/media size and the blue box indicates the added .125" bleed. .125" is adequate bleed when all trim size and margins have been created accurately.

Once the book has been completed, the final PDF can be created either as a single PDF or separated as chapters. There is no need for physical trim/crop or bleed marks. The electronic trim/media and bleed boxes are all that are needed to position the file for the press.

If you are sending multiple files, make sure that all the files are setup to the same trim size and positioned identically in the application you are using to create them.



Bleeds

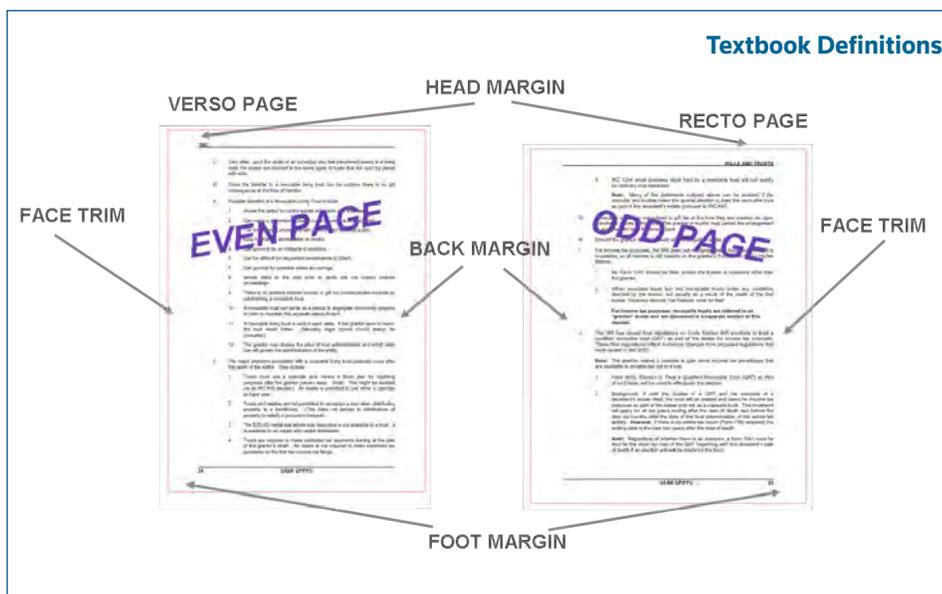
Please provide an adequate amount for your bleed margins, approximately .5 inch. This will allow us to adjust the heads and backs without the potential of losing any bleed. These are the specs for a NON-Power project.

Tabs

When creating a book with tabs, please call your account representative for specifications.

Images

Provide continuous tone images that are at a resolution to provide a good print quality, typically 300 dpi. When printing your book, Thomson Reuters uses a 133-line screen on offset Text, and 175-line screen for offset Covers. We realize that any screen captures that are done in a book will be of lower quality and will reproduce accordingly.



Thomson Reuters Quality

In efforts to produce a quality product for our textbook clients, we use various techniques to compensate for the folding and binding production processes. These techniques are called shingling and bottling. For further details on these processes, please see the Glossary.

Sending Textbook Page Revisions

Thomson Reuters realizes that many clients work with multiple sources to produce their books. Because of this and other factors, such as complexity and number of pages in a book, we may receive either a single PDF file for the entire book, or individual PDF files for each of the front matter and chapter pages in a book.

All textbook work including corrections or last-minute changes go through our Preflight department. This allows us to make sure we have all the revisions in place for current production and future archival.

How should revisions be sent? If the book has 10 single-page corrections or fewer, send us single-page PDF files. They will be merged into the book properly. If it has more than 10 single-page corrections, it is more efficient to send an entire new PDF file.

SOFTBOUND AND HARDBOUND COVER SPECIFICATIONS

More Cover Tips

Color Trapping:

Because of Thomson Reuters' Prinergy workflow and in-house trapping solutions, make sure the cover files have no color trapping when they are sent for production. If a special trapping situation is required, contact your account representative. For example, if you sent a two-color job in light blue and dark blue and want the dark blue to overprint the light blue, this needs to be discussed with your account representative.

Support Files:

Below are tips for support files. Supply all application files, fonts and other support files (.eps, .tif, .ps, etc.) in Macintosh-compatible format.

Make sure that all files are in the appropriate color space. An example of an incorrect color space includes using RGB or LAB instead of CMYK, or RGB, instead of grayscale.

Provide a PDF or printed sample of what the finished product should look like along with any other special directions or requests.

ISBN and bar codes are printed in one color to eliminate potential registration problems. Double-check that the tick and trim marks are colored registration and not black.

Make sure that type going down the spine of saddle-stitch covers is 3/16 inch away from that fold.

Supported Cover Applications:

QuarkXPress, Adobe Illustrator, Photoshop, and InDesign.

Softbound: A lot of production time is saved when cover files include the correct bleed. The standard bleed for a soft-printed cover is 3/16 inch. If there's too much bleed, it will run into or cover up the color bars on the templates. At the same time, the trimming process becomes more challenging if there's not enough bleed. Overall, it is better to have more bleed than too little.

The length of the tick marks should be 1/8 inch.



Hardbound: The standard bleed for a hardbound printed cover is 3/4 inch. Too much bleed will run into or cover up the color bars on the templates, but too little bleed will not wrap properly. Similar to soft covers, it is better to have a little too much bleed than too little bleed.

Hinges for hardbound covers should be 3/8 inch.



Contact your account representative for any special binding requests, such as spiral-bound books.

PROOFS

Content vs. Contract

What are the differences and how are they used?

Contract Proof

- A proof that is color-certified and can be used for color matching at the press. These proofs are to be used for color accuracy, image quality and content.
- This proof is approved by the customer and is used for matching color and content at the press.
- Only certified proofs printed from Thomson Reuters' Epson/Oris proofing systems are considered contract proofs.

Content Proof

- Simple layout proof that provides an idea of what the final product will look like.
- Proofs are used only to verify content, the position of elements on the page and the page order. Content proofs are not to be used for image quality or color.

Thomson's Proof Storage System

The Proof Storage Area was designed as an easy-to-use organized method for storing both proofs and printed samples. Each time a job is produced whether in our Sheetfed Press or Digital Print /iGen area, the operators save a printed sample along with the original proof. Both of these are used for any subsequent printings to ensure consistent color between printings and even between digital and conventional print.

Every file is stored using a color-coded "Terminal Digit" filing system, using the last 3 digits as the primary sort. This evenly divides the over 5,000 folders, and makes it very easy to find the correct folder. We are using a software called OpusLite to keep the files organized.



Epson Color Proofer using ORIS calibration software.

Proof Methods

What is appropriate for your job?

PDF (Soft) Proof

- Used typically as a content proof.
- This is a proof that is sent electronically to the customer after the file has been through the Prepress workflow system and is ready to be sent through the printing process. The electronic file is distilled into a PDF file, which can be viewed by anyone with the free Acrobat Reader.
- The quality of your monitor will influence the quality of your soft-proof, with high-resolution monitors better suited for soft-proofing. You will be able to preview soft-proofs on any type of monitor.



Proof Storage Library

Bound Text Proof

- Used typically as a content proof.
- A proof produced on the Xerox Versant 80 that shows imposed pages and indicates the final product trim marks, per a dotted line, around each page. The pages are then bound with a false cover, trimmed and then sent out to be approved.

Epson Color Proof

- Used as a contract proof for four-color products. Our proofs are certified using the Oris Certified Proof process to meet or exceed GRACoL Production Proof Tolerances.
- The proof process can be certified to match a four-color print product. However, it is an Inkjet process, not a screened process like the sheetfed presses, so it will not indicate dot patterns.
- Matching PMS colors using cyan, magenta, yellow and black inks are not exact and often not possible. Therefore, proofs that contain PMS colors are to be used for content only. The PMS formula guide swatch book will be used by the press operator for the final color match.

DIGITAL PRINT OVERVIEW



Thomson Reuters' Print-on-Demand operation allows its customers to produce short-run, high-quality print products in a cost-effective manner. To do this, we manage several areas with equipment that operates at different speeds and can support stocks similar to our offset operations. Using continuous feed (web-fed) equipment, one-color cut-sheet and four and five-color cut-sheet printers, and state-of-the-art imaging software and printing equipment, we can quickly transform a product from file to print.

The term *on-demand printing* evolved from high-speed *digital printing technology*, allowing customers to

print a quantity of one to several copies of a product, as they demanded, in a short turnaround time compared to the amount of time required to produce the same product via traditional offset printing.

Our digital print areas produce bound-volume products, loose-leaf binder products, saddle-stitch products, variable data research reports, covers, newsletters, circuit court slip opinions, shipment inserts and other miscellaneous products.

One of the *digital printing technologies* used at Thomson Reuters is known as an electro-photographic or electrostatic process, which uses toner rather than ink. This process involves applying an electrostatic charge to the surface of



a drum or belt. Once charged, digital data will allow a series of light-emitting diodes (known as an LED array) to pass to the areas on the drum or belt where data will not be



imaged, eliminating the charge. The toner used in these systems also carries a charge, and when applied to the drum or belt, attracts to the charged area. The toner is transferred onto paper and fused to it using heat and pressure. This entire process occurs at fast speeds on production printers.

Thomson Reuters Core Publishing Solutions Fun Facts

- Thomson Reuters Prepress produces an average of 1,061 plates per day.
- Prepress images more than 2.9 million square feet of aluminum each year. This is equivalent to producing nearly 25 million pop cans, which is enough for every Minnesotan to be given a six-pack of pop.
- Thomson Reuters is a 100% digital facility. If necessary, hard copy is scanned to create an electronic file.
- Digital areas produce approximately 10% of pages printed.

Thomson Reuters Core Publishing Solutions embraced InkJet technology in a big way in 2015, including both a continuous-feed and cut-sheet press. See specifications on page 2 of the Digital Print section.

How is InkJet different?

Please read excerpt taken from: "The Designer's Guide to InkJet" by Elizabeth Gooding & Mary Schilling, published by Canon Solutions America.

Inkjet is Different than Toner

If you are currently designing for color toner devices, you already have access to personalization and a fairly wide color gamut but not to the speed or capacity that inkjet printing can offer. Inkjet presses turn jobs around in a fraction of the time that toner machines do. Also, if you've ever had challenges with color drifting from one run to another in a toner environment, that problem will be virtually eliminated with inkjet. The inkjet process allows consistent run to run color because, unlike toner devices, there are no moving parts used to transfer an image onto paper and fewer parts that degrade print quality as they age.

NEW IN 2015 & 2017 -- INKJET PRINTING

HP T360 Specifications & Capabilities

SPEED

Up to 800 FPM

WEB WIDTH

Standardized at 28"

INK COLORS

Black

TRIM WIDTHS

Up to and including 6.625" wide
will be run as 8-page forms
Greater than 6.625" will be run as
6-page forms

CUT-OFF LENGTHS

9-3/4" Up to 9.000" Trim Length
10-3/4" Up to 10.00" Trim Length
11-3/4" Up to 11.00" Trim Length



PAPERS

- 45# & 50# Offset
- 40# & 45# Utopia
- 30# & 35# BorderBrite
- 27# & 33# Frabrite
- 22# 25# Lawbook

BINDING METHODS

- Hardbound
- Softbound
- Loose-leaf

WORKFLOW

Ultimate Impostrip /
HP Production

Goal: 1 Billion pages
Annually

2 - Canon Varioprint i300 Specifications & Capabilities



SPEED

294 A4 (Letter) pages / minute
Color Grip Ink Formula

PAPER SIZES

Minimum 8" x 8"
Maximum 12.6" x 19.2"

INK COLORS

CMYK Standard

PAPER TRAYS

8 Paper Trays, that can run any qualified
stock sizes

HIGH-CAPACITY STACKER

Can hold 2 Stacks of 3,000 sheets
(20 lb. Bond)

FINISHING EQUIPMENT

BLM 600 IN-LINE STITCHER
TECNAU DRILL for Loose Leaf Products

WORKFLOW

Prisma Sync Workflow
Custom XML

TYPES OF WORK RUN ON i300

- Custom Trademark Reports
- Print-On-Demand Products
- Loose-Leaf Work
- In-Line Conditioning Unit
upgrade for Coated Stocks

PAPERS MVP'd (Qualified)

- 60# Husky Domtar
- 50# Husky Domtar
- 31# & 35# Lawbook
- Gladfelter Pixelle
- Plus more Coated stocks

BLACK & WHITE CUT-SHEET DIGITAL PRINTING



VarioPrint 6320

Océ VarioPrint printers are used to produce almost two million newsletters annually.

The Digital toner printing areas at Thomson Reuters contain three Océ VarioPrint machines that run at blazing speeds to quickly turn around client projects. This group produces loose-leaves, inserts, tabs, newsletters, and more. The VarioPrint machines are centrally fed from a Prisma Workflow server. This allows the operators to perform additional functions prior to producing the final product. Some of these operations include changing files from simplex to duplex, adding slip sheets, changing a product from 1 up to 2 up, changing heads and backs, and making many types of file-positioning adjustments.

The VarioPrint machines can handle paper from 8 by 10 inches to 11 by 17 inches, with paper weights ranging from 31# Lawbook to 90 lb. Textbook. The VarioPrint machines can print up to 320 pages per minute. They have four paper input trays, and two of the printers have online folding and stitching capabilities utilizing new square back technology.

In 2013, we added an in-line GBC Power Punch on one of our production lines to accommodate a custom drill template. This eliminates a manual drill process in Bindery. In addition, we added a cutter to this area to finish these and other products prior to leaving the area. In addition we have 1 Océ/Canon CS10710 continuous feed presses which handle a combination of Loose-Leaf and Signature products. See specs below.

Folding Options:

- up to 11 x 17
- 9 x 11 or 9 x 12 1/2
- 8 1/2 x 11

Binding Options:

- Stitches: Dual, Signature and Portrait
- (200 pages max. depending on paper weight – consult your Thomson Reuters account representative for more information)
- Loose-leaf
- Saddle-stitch

WEB DIGITAL PRINTERS

Equipment Specifications

Océ/Canon CS10710 Press

Cut-sheet and signature folding

Produces line copy

Speed: 347 feet per minute

Stock: 27# Frabrite stock to 80-lb. text papers

IBIS SmartBinder

Loose-leaf products – one dedicated press

Paper roll widths:

14.50 inches – 2 up

18.25 inches – 2 up, 3 up or Head to Tail

Signature products

4-page signatures

Paper roll widths: 14.50 and 18.25 inches

Are interchangeable for Loose-leaf and Signature work



Océ/Canon CS10710 Press

COLOR DIGITAL PRINT

In 2006, we expanded our Digital Print operations with a color printing solution. In 2013 we installed our first new equipment since that time. The new systems give us some additional features, including 5th color printing and in-line stitching and punching.

KODAK NEXPRESS 2700SX

The NexPress SX platform is a fully modular design, which allows us to easily expand as our business needs change. This 5-color digital press includes a long-sheet pile feeder for additional paper feeds, and expands our sheet size capabilities to a maximum of 14 x 36 inches.

The system also includes the NexPress fifth imaging unit, which will allow us to print gold, dimensional raised print, more accurate spot colors, and high impact spot gloss.

NEW IN 2017: RGB Color Stations for additional Pantone Matching.



Kodak NexPress Specifications

Smallest sheet size:

7.9 x 11 inches
(smallest we run: 8.5 x 11)

Largest sheet size:

14 x 36 inches
(Standard sheet size 14 x 20)

Speeds:

91 impressions per minute
(8.5 x 11 inches)

FRONT-END TECHNOLOGY

All of the equipment that is upgraded has the latest Adobe Print Engine, to allow us to tackle even the most complex files with layers. We have also added other software tools to allow us to automate front-end impositions and file routing more seamlessly.

Color Correction Quick-Reference Guide for Our Cover Work Clients

If you are having difficulties producing the color you are looking for, here is some general color information to assist you.

IF YOUR PRINTED IMAGE IS:	AND THE IMAGE IS:	ADJUST THESE CMYs
Too Red	Dark	Reduce M & Y
Too Magenta	Dark	Reduce M
Too Blue	Dark	Reduce C & M
Too Cyan	Dark	Reduce C
Too Green	Dark	Reduce C & Y
Too Yellow	Dark	Reduce Y
Too Red	Light	Add C
Too Magenta	Light	Add C & Y
Too Blue	Light	Add Y
Too Cyan	Light	Add M & Y
Too Green	Light	Add M
Too Yellow	Light	Add C & M

PRESS

PRINTING BACKGROUND



The History

Alois Senefelder of Munich discovered the basic principle of lithography, “writing on stone,” in 1798. Working with a highly porous stone (limestone), Senefelder sketched his design with a greasy substance, which was absorbed by the stone. He then wetted the entire surface with a mixture of gum arabic and water. Only the stone areas absorbed the solution; the design area repelled it. By rolling on an ink made of soap, wax, oil and lampblack, he found that this greasy substance coated the design but did not spread over the moist blank area. A clean impression of the design was made when a sheet of paper was pressed against the surface of the stone.

The Principle

Lithography is a printing process that uses chemical processes to create an image. For instance, the positive part of an image would be a hydrophobic (oil-based) chemical, while the negative image would be water. When the plate is introduced to a compatible ink and water mixture, the ink will adhere to the positive image and the water will clean the negative image. This allows for a relatively flat print plate, which allows for much longer runs than the older physical methods of imaging (e.g., embossing or engraving).

The Modern Process

Modern lithography no longer relies on pressing paper to stone to transfer an image. Instead, the image is transferred from an inked plate to a rubber blanket, which comes into contact with the paper and transfers the image. This is called offset lithography. Offset lithography is the leading form of printing in the world today. The word *offset* has become almost synonymous with lithography.

Modern high-volume lithography is used to produce posters, maps, books, newspapers and packaging – just about any smooth, mass-produced item with print on it. In this form of lithography, which depends on photographic processes, flexible aluminum or plastic printing plates are used in place of stone tablets.

Many innovations and technical refinements have been made in printing processes and presses over the years, including the development of presses with multiple units (each containing one printing plate) that can print multi-color images in one pass on both sides of the sheet, and presses that accommodate continuous rolls (webs) of paper, known as web presses. Another innovation was the continuous dampening system. This increased control over the water flow to the plate and allowed for better ink and water balance.

The advent of desktop publishing made it possible for type and images to be manipulated easily on personal computers for eventual printing on desktop or commercial presses. The development of digital image setters enabled print shops to produce negatives for plate making directly from digital input, skipping the intermediate step of photographing an actual page layout. The development of the digital plate setters in the late 20th century eliminated film negatives altogether by exposing printing plates directly from digital input, a process known as computer-to-plate printing.

OFFSET PRESSES

The offset press is responsible for four important advantages of lithography:

- The rubber blanket surface conforms to irregular printing surfaces, resulting in the need for less pressure and make-ready, and improved print quality of text and half-tones on rough-surface papers.
- Paper does not contact the printing plate, increasing plate life and reducing abrasive wear.
- The plate image is right-reading rather than reverse-reading.
- Less ink is required for equal coverage, drying is speeded up, and smudging and off-set are reduced.

Presses are either sheet-fed or web-fed (roll). Presses can be single-color or multi-color. Each color on a multi-color press requires a complete printing unit of cylinders, rollers and ink. A two-color press has two printing units; a four-color press has four units, etc. Perfecting presses print both sides of the paper in one pass through the press.

SINGLE-COLOR WEB PRESS

Thomson Reuters has 9 web presses in its manufacturing plant. The web presses are configured as single-color, high-speed perfecting units. In other words, they print black ink on both sides of the paper in one pass through the press. These presses use very large rolls of paper, which continuously feed the press. They are capable of running 4,000 pages per minute, or 31 million pages per day. As the paper unrolls on the roll stand, it passes through a series of rollers that assist in smoothing out the paper and also acts as a storage of paper for roll splices (one roll of paper being spliced to another roll with two-way tape) during a press run. The web then passes through the infeed, to control web tension, and then on to the printing unit/units, where both sides of the paper are printed at once. The final step includes folding and cutting to produce signatures. The signatures are then bundled together and sent to the Bindery, where they are gathered into either a soft- or hardbound book.

Press

In the Pressroom, the plates get mounted on the web press and print onto large rolls of paper that is folded and cut and made into a signature. The largest press is 40 feet long and 20 feet tall, and each press is run by three operators who are experts in the chemistry of combining ink and water to create a quality print product. Overall, the presses have the capacity to run more than 31 million pages per day.

We have two types of web presses:

Heat-Set Web Press

With a heat-set press, the printed web proceeds through a natural-gas-supplied hot-air dryer (to evaporate the chemicals in the ink) and then goes over a set of chilled rollers that cool and set the ink on the web. The web then travels into the folder, where it is cut and folded into a signature (8-, 16-, 24-, 32-, 48- or 64-page book section). Heat-set presses are used to produce high-quality print on coated paper.

Cold-Set Web Press

With a cold-set press, the printed web travels directly to the folder, where it is cut and folded into a signature. Producing signatures on a cold-set press is more cost-efficient than printing on a heat-set press because of the higher cost of heat-set ink and the cost of operating the hot-air dryer and the chill rollers. Cold-set presses are more economical but do not perform as well on jobs containing half-tones, solids or heavy coverage.

WEB PRESS COMPONENTS

A web press consists of the following components:



1) Roll stand (splicer):

Holds the rolls of paper and allows the press to maintain running speed while changing from one roll to another.



2) In-feed/web guide:

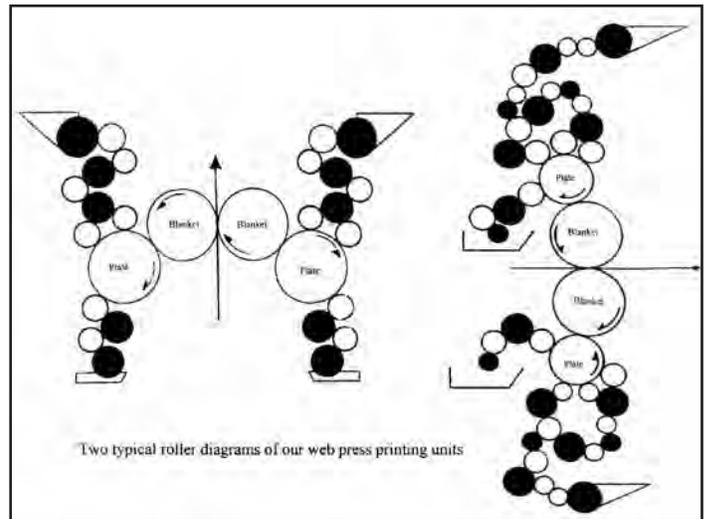
Used to control web tension and steer the web through the printing unit.



3) Printing unit, which consists of the following:

Plate cylinder: A cylinder that carries the printing plate.

Blanket cylinder: A cylinder that carries the offset blanket, a fabric-coated rubber blanket that transfers the image from the printing plate to the substrate or printed material.



Dampening system: A series of rollers that dampen the printing plate with a water-based dampening solution that contains additives, such as acid, gum arabic and other wetting agents.

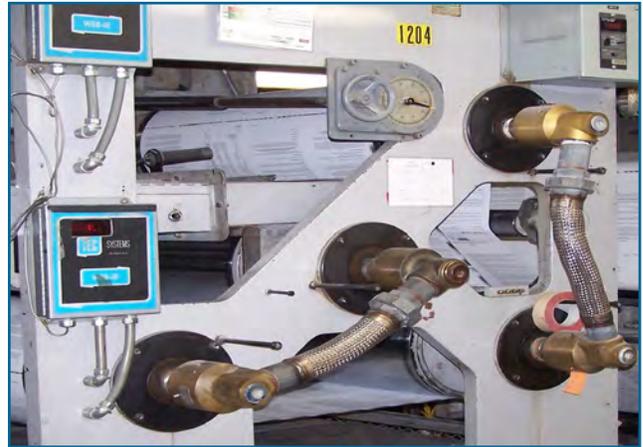
Inking system: A series of rollers that apply a metered film of ink to a printing plate.

In addition to one or more printing units, a press includes the following:



4) Dryer (if heat-set):

A natural-gas hot-air dryer (to evaporate the chemicals from the ink) as the web passes through.

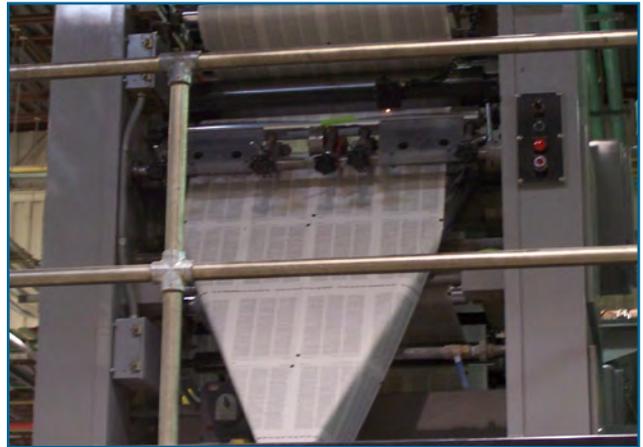


5) Chill stand (if heat-set):

Sets the ink to the paper.



6) Slitter / Former: Cuts or folds the web just prior to folding.



7) Folder:

Folds the cut or folded web into a signature format.



8) Delivery:

Delivers the folded signatures to the stacker.

9) Stacker:

Bundles the signatures to be transported to the Bindery.



Fully Automatic Vertical



Manual Horizontal



Mitsubishi Press

Capable of printing 8- to 64-page single-color jobs at speeds of up to 1,400 feet of paper per minute.

Timsons T48 ZMR

Installed in June 2007, the Timsons T48 ZMR (zero make-ready) press brings the newest downtime- and waste-reducing printing technology to Thomson Reuters. This press is capable of switching from one signature to the next signature without stopping and speeds up to 1,500 feet of paper per minute.

A second Timsons T48 ZMR was installed in Q1 of 2013, and a third heatset installation in process in 2018.



MULTI-COLOR SHEET-FED PRESSES

Multi-color sheet-fed presses print more than one color on one side of a sheet during a single pass through the press because there is more than one printing unit. Thomson Reuters has one multi-color sheet-fed press in its manufacturing plant. This press is used to print book covers as well as color book inserts, newsletters and marketing materials.

On Thomson Reuters' sheet-fed press, the multiple printing units are identical and arranged in tandem.

These are capable of printing a different color on each unit. A transfer cylinder is placed between units to transport the sheet from one printing unit to the next.

A multi-color press is capable of wet trapping, which is the ability of a wet, printed ink film to accept another wet ink film printed over it.

Thomson Reuters' Komori 6-color press is capable of printing one color in each printing unit.

SHEET-FED PRESS DESCRIPTION

A sheet-fed press consists of a feeder, one or more printing units, transfer devices to move the paper through the press, a delivery and various auxiliary devices (sprayers, consoles, etc.).



Delivery and Stacker



Feeder

In addition to one or more printing units, a sheet-fed press includes the following:

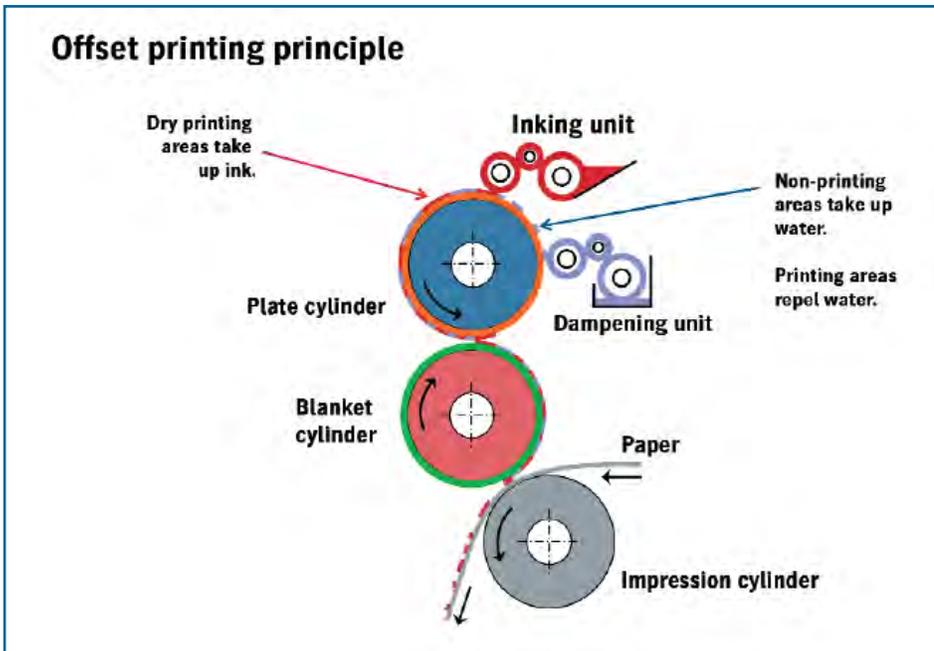
Feeder: Lifts and forwards each sheet of paper from a pile to the first printing unit.

Transfer devices: Often auxiliary cylinders with sheet grippers that facilitate sheet transport through the press.

Coater: Applies an aqueous coating to the sheet.

Delivery: The area of the press that receives and stacks the printed sheets.

SHEET-FED PRESS COMPONENTS



The printing unit of a sheet-fed offset lithographic press consists of three primary cylinders and a system for dampening and inking the printing plate:

Plate cylinder: A cylinder that carries the printing plate.

Blanket cylinder: A cylinder that carries the offset blanket, a fabric-coated rubber that transfers the image from the printing plate to the paper.

Impression cylinder: A cylinder running in contact with

the blanket cylinder that transports the paper or other substrate.

Dampening system: A series of rollers that dampen the printing plate with a water-based dampening solution that contains additives, such as acid, gum arabic and other wetting agents.

Inking system: A series of rollers that apply a metered film of ink to a printing plate.

Quality Printing

Quality checks are continuous and built into our printing processes. We use good technology and highly skilled employees to prevent the following list of printing problems from showing up in your products:

Density issues:	The degree of color or darkness of an image or photograph.
Gussets:	Sharp creases usually on the head or face of some pages due to the inability to release all air during the folding process.
Hickeys:	Recurring unplanned spots that appear in the printed image from dust, lint or dried ink.
Registration:	Pages not in register.
Perforation issues:	Pages falling out of books due to poor perforation
Rolled spines:	This occurs during the bundling of the signatures and prevents glue penetration on the spines.
Scumming:	Most often caused by a balance issue with water and ink; can also be a water form issue.
Scratches:	Unwanted lines on the printed material.
Turned corners:	Usually caused by web position in folder or improper folder adjustments.
Unwanted image:	Any unwanted printing appearing on the printed product. Examples would be pepper spots, fingerprints, scratches, erase marks showing up, process marks, etc.

COLOR PRINTING

In color printing, Thomson Reuters uses the GATF (Graphic Arts Technical Foundation) color control bar. This color bar lets press operators monitor ink densities, print contrast, ink trapping, slur and doubling. Here is a sample of this color bar.



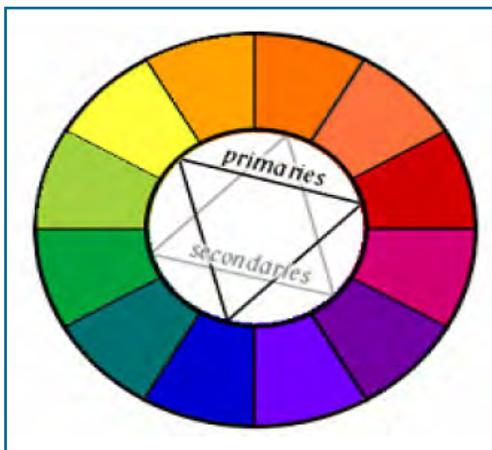
Color bars are also referred to as color control bars, color control strips or proofing bars. Color bars are rows of different-colored patches printed in the trim area of the press sheet. They are used by proofers and press operators to control the trapping, ink density, dot gain and print contrast of the proof or the printed sheet. They usually consist of solid and tint blocks of cyan, magenta, yellow and black; two- and three-color solids and tints; and additional elements and patterns such as resolution targets and dot gain scales.

There are several different types of color bars, and determining which one to use involves identifying the

type of printing being used. Prepress and print suppliers purchase original film or the rights to digital files of color bars and other test images. The film and files can then serve as constant reference points throughout the proofing, plate-making and print processes. They are available from GATF, DuPont, RIT (Rochester Institute of Technology) and others.

Color bars are an essential troubleshooting tool. They are easy to analyze, both visually and with densitometer, which is an instrument used for measuring the relative density of any part of an image.

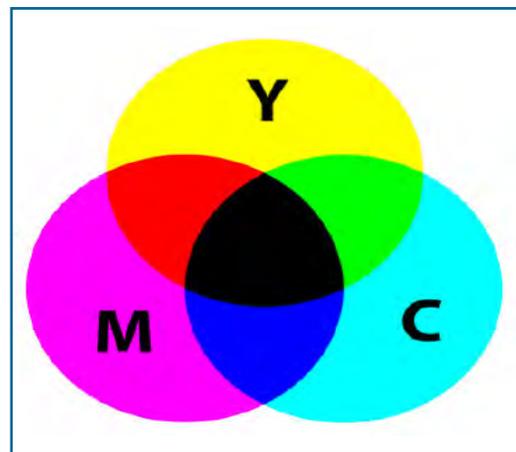
COLORED INK



For four-color work, printers use the primary colors: yellow, cyan (blue), magenta (red) and black. The sequence that these four colors are printed in may vary depending on the job. The most common four-color sequence is black, cyan (blue), magenta (red) and yellow.

Colored inks, regardless of their manufacturer, are based on the Pantone Matching System, or PMS. Ink companies manufacture their inks to match the established PMS colors. Customers often ask printers to match a specific PMS number or will give them a sample to match. For the best color match, we request that customers provide the specific PMS color from the most current PMS swatch book, along with a printed sample.

A common problem with multi-color printing, whether it is four-color process, two-color or three-color printing, is "trapping." Trapping refers to how well a subsequent color, such as black type, will print on top of previous printed wet ink. This is called wet trapping. In order for this to be successful, the first printed color must have



more tack than the second color. When printing a four-color process with one pass through a four-unit press, the first ink color must have the highest tack and each successive color a slightly lower tack. This allows the wet ink on the paper to pull the next color off the blanket, rather than the other way around. If the ink on the blanket has a higher tack than the ink on the paper, it will stick to the blanket and not transfer to the paper.

Metallic inks use metallic powders, such as aluminum and bronze, mixed with the proper varnish base. The powders are actually flakes that deposit in reflective layers to produce a pleasing metallic luster. The varnish dries rapidly and has sufficient binding qualities to hold the powder to the paper surface. Metallic inks should not be used on uncoated paper stock unless a base ink is printed first and allowed to dry. Wet trapping with metallic inks is almost impossible, and dry trapping is not the best. Whenever possible, it is better to reverse out type rather than trying to overprint. The reverse must not be too tight, as it will tend to fill in when being printed.

CONSIDERATIONS (SHEET-FED VS. WEB)



Komori 6-Color Press



90-3 Press

Many factors influence the type of technology a printer might purchase, including the following:

Run speed: A sheet-fed press will usually run consistently at 5,500 to 10,500 impressions per hour. A web press can run at 10,000 to 60,000 impressions per hour.

Run length: Web presses are usually designed to run jobs from 1,500 impressions and up. A sheet-fed press is much more economical on the shorter-run length.

Thomson Reuters has become very efficient at running web presses with run lengths in the 300 to 2,000-run-length range.

Make-ready: At Thomson Reuters, new-job make-ready time on a web press can be from 10 minutes to two hours in length (depending on the type of job being printed). The Timsons ZMR press has a stacked printing unit that allows plates to be changed while the previous form is running, which greatly reduces downtime and make-ready times.

Paper waste: As a result of high run speed on a web, paper waste could be very high on a short-run-length job. The initial make-ready might waste 1,000 to 2,000 signatures or more. The signature-to-signature plate change can waste from 50 to 300 signatures. By contrast, a sheet-fed press can be set up using waste paper. Anywhere from 20 to 50 sheets can be lost on an initial make-ready, and 15 to 25 sheets can be lost on plate change or press stops. Obviously, on short-run-length jobs, the amount of paper wasted would have an impact on the cost of a job. At Thomson Reuters, waste per form in the web operation is averaging 270 signatures.

Quality: The quality of both types of presses is very good. Top-quality-type half-tones should be run on a heat-set web press or on a sheet-fed press. The impression cylinder on a sheet-fed press is made of metal, allowing the printer to print a very precise half-tone dot. On a web press, the impression cylinder is the blanket cylinder (rubber) that is used to print the backup side of the sheet.

Flexibility: A few issues that should be considered:

First of all, a web press can go from a roll of paper to a printed, folded signature in a matter of seconds. A sheet-fed press must have the paper piled, printed and then sent to the Bindery to be folded.

Sheet-fed presses can run many different trim sizes by printing on different-sized sheets of paper. A web press can change the roll width of a roll between its minimum and maximum widths, but the "cutoff" (length of product) is a fixed measurement.

Depending on the product being run, a sheet-fed press can also run the paper grain either "long grain" or "short grain," whereas a web press can only run the paper grain parallel to the web.

On Thomson Reuters's sheet-fed press, the paper must be piled at the feeder end before it goes to press. We do not have the capability of running roll stock on our sheet-fed presses. These sheets are then fed individually into and through the press by a series of grippers. Some sheet-fed presses print only one side of the sheet in one pass; others can print both sides at once. We print one side only. Folding is not done on the press but on folding equipment in the Bindery.

THOMSON REUTERS CORE PUBLISHING SOLUTIONS WEB PRESS SPECIFICATIONS

PRESS	CUTOFF	WIDTH	UNTRIMMED SIG LENGTH	PRODUCT	TOP SPEED	# PAGES IN SIG	HEATSET	COLOR
20-07 Timsons T48 ZMR	41.25" (41-1/4")	54" (ribbons)	10.312" (10-5/16")	Max 9.8125" (9- 13/16")	1500 FPM	20, 24, 32, 48, 48, 64	NO	1 (Two units ZMR)
20-13 Timsons T48 ZMR	41.25" (41-1/4")	54" (ribbons)	10.312" (10-5/16")	Max 9.8125" (9- 13/16")	1500 FPM	20, 24, 32, 48, 48, 64	NO	1 (Two units ZMR)
NEW: 20-18 Timsons T48 ZMR	46"	54" (ribbons)	11.5" (11-1/2")	Max 9.8125" (9- 13/16")	1500 FPM	20, 24, 32, 48, 48, 64	YES	2 (Two units ZMR)
80-2 Harris M1000	19.375" (19-3/8")	36" (former)	9.8125" (9-13/16")	Max 6 x 9.25"	860 FPM	16, 32	YES	1
90-3 Mitsubishi	22.75" (22-3/4")	38" (former)	11.5" (11-1/2")	Max 8.5 x 11	1100 FPM	8, 16, 32	YES	2
95-3 Mitsubishi	21.5" (21-1/2")	36" (former)	10.8125" (10-13/16")	Max 8.5 x 10	1200- 1400 FPM	16, 32	YES	1
95-5 / 95-6 Mitsubishi	21.5" (21-1/2")	55" (ribbons)	10.8125" (10-13/16")	Max 8.5 x 10	1400- 1800 FPM	48, 64	YES	1

Impressions Per Hour converted to Feet per Minute

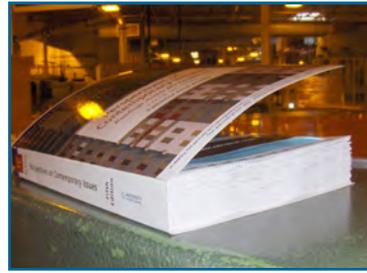
IPH speed x cutoff = inches / 12 to get feet / 60 to get FPH (feet per minute)

Feet per Minute converted to Impressions Per Hour

FPM x 12 = inches / cutoff = IPM x 60 = IPH

BINDERY

OVERVIEW



The Bindery department is responsible for creating a finished print product. To create this look, the Bindery uses more than 100 processes or machines each day to fold, perforate, stitch, cut, drill, case-in and bind the pages. The department also uses a variety of binding methods including loose-leaf, saddle-stitch, side-stitch, softbound pamphlet and hardbound binding.

The Bindery department is composed of three areas:

- Softbound
- Hardbound
- Product Finishing

Application processes and machines in Bindery consist of:

- Case making
- Cover decorating
- Pocket lining
- Endsheets making
- Folding
- Perforating
- Collating
- Stitching
- Cutting
- Binding
- Sewing
- Tipping
- Tech boxing
- Drilling

SOFTBOUND

Softbound books are books or pamphlets with soft covers, typically paper (plain, varnished, UV Coated or laminated), or cover stock that is hot-foil stamped or screen printed. Some books are bound without a cover.

Common examples of softbound books are paperback novels, technical manuals, pocket parts, telephone books and brochures.

The Bindery has five ways to make a softbound book:

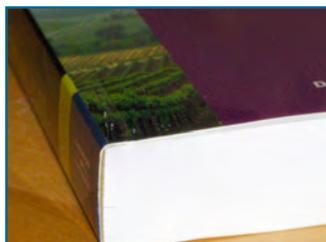
- Perfect binding
- Burst pamphlet
- Burst loose
- Saddle stitching
- Side stitching

Perfect Binding

Perfect binding is an economical and functional binding style. To perfect-bind a book, the printed and folded signatures are first gathered together (stacked on top of each other).

The cover is scored to the thickness of the spine, creating a channel or groove for the gathered signatures.

Often, an additional score is placed on the front or back cover, or both, to act as a hinge to help prevent stress at the binding when the cover is opened.



The gathered signatures are clamped together and the spine is sawed to expose the paper's fibers. Hot glue is applied to the roughened edge, and then the covers are applied to the text. The bound books are then trimmed on three sides in a three-knife trimmer. A perfect-bound book has a clean, finished and professional look. This process can also be achieved using digitally-printed text. In this case, the text is delivered as a pre-collated unit. This eliminates the need to gather the signatures. All other steps are the same.

Burst Pamphlet

Burst-binding a softbound pamphlet is similar to the perfect-binding process, except the Bindery saws only enough paper from the spine fold to remove the bumps created by the burst perforation on the fold. No spine trim is allotted in Prepress for a burst pamphlet. Burst pamphlets should be produced only when the roll stock used on press allows the minimum 1/8-inch face trim. This bind style is also used when product is overrun with adhesive case bound books.

Burst Loose

Burst-binding a loose-leaf product is similar to the burst pamphlet process, where only the perforations are smoothed out on the spine before applying a false cover to the signatures. The signatures are collated and bound together using hot melt only to allow for consistent drilling and trimming. After the bound signatures are drilled, 3/16-inch is trimmed from the spine to create a loose-leaf product.

SOFTBOUND

The four machines listed below perform perfect binding, burst pamphlet and burst loose.

- NEW: Muller Martini Alegro Hybrid Binder
- Muller Martini Norm Binder
- Kolbus
- Horizon BQ470

NEW IN 2017: Muller Martini Alegro Hybrid Binder

The Muller Martini Hybrid Binder can bind both hardbound web and digital, as well as softbound web and digital signatures. The machine produces hardbound and softbound products up to 2.5" in thickness. The gather section has 27 pockets with bundle loaders, and signature recognition on each feeder. It also has three book block feeders that can be utilized in combination with the feeders to combine book blocks and signatures together in a single run.



The Alegro binder applies hot melt to the spine and side joints prior to cover application. For hardbound book blocks, cold glue is applied and dried prior to application of hot melt. "Crash" is applied instead of a cover to the hardbound book block to prepare it for the hardbound bind-in process. Crash is crepe paper that has strength and elongation. This feature helps create a beautiful well-rounded back, helps eliminate splitting and reinforces the spine from head to tail. This creates a strong bond to the book block with cold glue or hot-melt adhesive.

A three-knife trimmer finishes the product and the books are stacked, boxed and palletized through automation on the back end.

Muller Martini Norm Binder

The Muller Martini binder does softbound and hardbound binding. The machine produces pamphlets using high-quality text and cover stock. The gatherer has 40 pockets with bundle loaders, and collates up to 40 signatures, endsheets or inserts.

The binder has 67 clamps and a two-shot gluing system. For perfect bound, hot melt is applied to the spine and side joints prior to cover application. For hardbound book blocks, cold glue is applied and dried prior to application of the hot melt. "Crash" is applied instead of the softbound cover. Crash is crepe paper that has strength and elongation. This feature helps create a beautiful well-rounded back, helps eliminate splitting and reinforces the spine from head to tail. It creates a strong bond to the book block with cold glue or hot-melt adhesive. The three-knife trimmer finishes the product. The product is then palletized or boxed in-line.

Kolbus Binder

The Kolbus binder produces pamphlets with extreme thickness requirements from 1/8 to 2 5/8 inches. The gatherer has 40 pockets with signature recognition and 30 hopper loaders.

For books containing more than 40 signatures, the Kolbus will perform a double gather. A double gather consists of collating some of the signatures and creating a book block without a cover. This book block is then dropped on at the start of the gatherer and all remaining signatures are gathered on top to make the complete book.

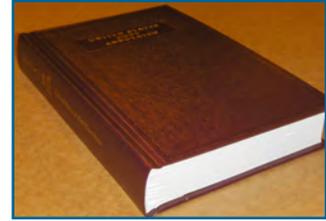
The binder has 25 clamps and a one-shot hot melt and side joint glue application. The finishing trim is done on the high-quality three-knife trimmer. The product is then palletized or boxed in-line.

Horizon BQ470 Perfect Binder

The Horizon BQ470 is a 4-clamp perfect binder designed for use with digitally printed text. The binder operator hand feeds gathered text into the clamp infeed. As with all other perfect binders, the BQ470 has a saw to prepare the spine for optimal glue application using a combination of milling and notching. Both spine and side-joint hot melt glues are applied and the cover is affixed to the book. After nipping the cover to the signatures, the book is carried to the binder delivery belt where it can be stacked or delivered into a 3-knife trimmer.

Saddle Stitching

Saddle stitching is a method that gets its name from the "saddle" that the folded booklet is placed on during the stitching process. The booklet is produced by opening the signature at the middle fold and placing it over the spine fold of the next signature. After all signatures are collated, a stitching head containing wire stitches (or staples) the booklet directly in the crease of the fold, tightly binding the signatures together. The stitched booklet is then trimmed on three sides: top, outside and bottom. In saddle-stitched work, the printed sections are inserted one inside the other. This method is used for softbound books only and is limited to 1/4-inch or less.



Muller Saddle Stitcher

The Muller Saddle Stitcher opens and gathers up to eight folded signatures on the conveyor, and can apply a cover.

The cover feeder scores and folds the flat cover sheet (laminated, varnished or with no finish).



Two staples are stitched through the spine of collated signatures and the cover. Pamphlets are trimmed one at a time on the in-line three-knife trimmer.

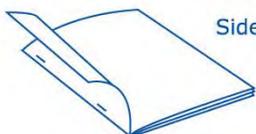
Product requiring drilling is drilled in-line at the Saddle, eliminating additional cycle time and material handling.

Side Stitching

Side stitching is done by gathering and securing signatures with stitches through the top side of the first to the last. On pocket parts, the signature has a piece of manila at the end, used to secure the pocket part in the back cover of a hardbound book.

We have three machines that do side stitching:

- Muller Martini Side Stitcher
- XG-3 (Harris) Side Stitcher
- LG (Harris) Side Stitcher



Side-Wire Stitched

Muller Martini Side Stitcher

Gathers up to 13 signatures (usually 4–13) on top of one another and a manila card on the back. Two-wire staples are placed through the book approximately 3/16-inch from the spine. Pocket parts are trimmed one at a time on the in-line three-knife trimmer.

XG-3 (Harris) Side Stitcher

Gathers up to 10 signatures (usually three to six) on top of one another, and a manila card on the back. Pocket parts are trimmed one at a time on the in-line three-knife trimmer.

Drilled Binder pamphlets are also produced here. These would look similar to a Pocket Part, except they do not have the manila card and are drilled in-line.

LG (Harris) Side Stitcher

Gathers up to five signatures (usually one to three) on top of one another, and a manila card on the back. Pocket parts are trimmed one at a time on the in-line three-knife trimmer.

Hardbound

Hardbound books are books with rigid protective covers. The covers are typically made with dense cardboard covered with cloth, heavy paper, laminated paper or sometimes leather. Hardbound books may have flexible sewn spines, which allow the book to lie flat on a surface when opened. Most modern commercial hardcover books are adhesive bound, burst-bound, which uses a two-shot application of cold and hot glues to secure the gathered signatures, or using hot melt only, similar to the Perfect Bound method.

To make a hardbound book, the cover is made separately from the text and then is brought together in the casing-in process.

Three independent processes are needed for making a hardbound book:

- Cover making process
- Text binding process
- Casing-in process

Application processes in hardbound consist of the following:

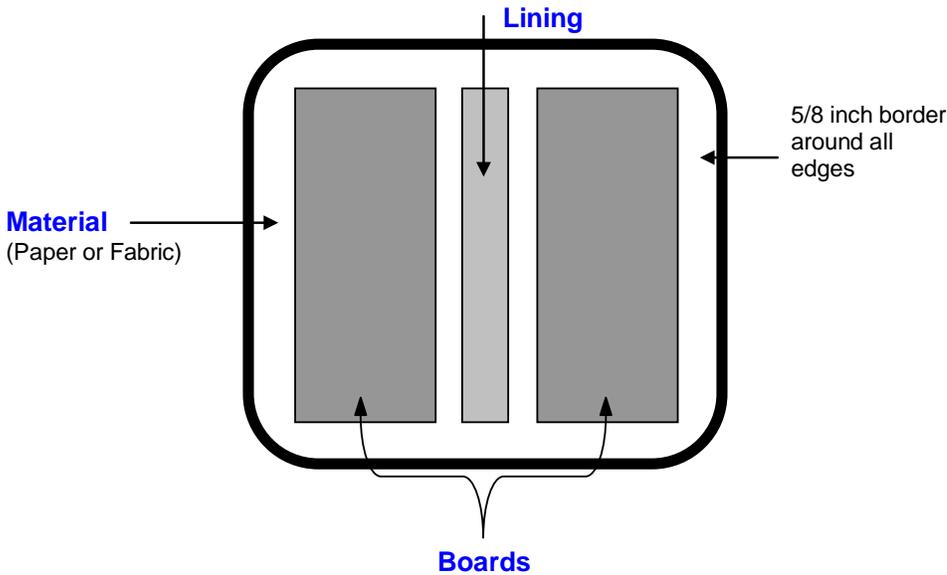
- Cutting materials
- Case making
- Stamping
- Gathering
- Sewing
- Casing-in
- Pocket Application
- Dust jacketing
- Tech boxing

Burst Binding

Burst binding is a process where a book block is created for final processing with a hard cover using cold glue and hot-melt glue to hold the pages/signatures together. The signatures are collated, along with the needed endsheets to bind to the cover, and cold glue is applied to the spine folds. The cold glue is forced into the burst perforation, binding the pages to each other as well as binding the signatures. After the cold glue is dried, hot-melt adhesive is applied to the spine with a paper cap, or crash, in place of a cover.

HARDBOUND

Cover Process



All hardbound books need a protective cover for the book block. Covers for hardbound books can be stamped with a decorative design. Covers that are a part of a series have specific guidelines that are followed so a book that may have been produced 80 years ago has the same unified look today. Covers can also be produced using printed sheets.

Case Makers

The case makers adhere binder boards and lining to cover materials. The cover materials can consist of cloth, paper, leather or printed laminate sheets.

Kolbus

We have two Kolbus case makers. One runs about 20 covers per minute and the new Kolbus case maker installed in 2008 runs about 60 covers per minute.

Stamping

The decoration of a cover starts with a metal die and hot-stamping foil. The stamping machine uses heat, pressure and time to transfer an image to a hard cover. The metal die may be used alone for embossing or blank stamping.

Three Deflores automatic stamping machines apply four to six impressions (hits) per cover. Heated dies on each head apply embossing patterns, foil panels or foil lettering to cover materials. Foil may be a solid pigmented color or may be a reflective metallic color.

Kluge Stampers

Two Kluge presses are used to process sheet stock and covers. Both presses are capable of:

- Foil stamping
- Embossing
- Die cutting
- Kiss cutting



Pocket Application

Many legal hard cover books must contain a pocket envelope inside the back cover to hold the Pocket Part. This is achieved in-line on the Case In-Line. After casing in, the back cover is opened, glue is applied and an open side envelope is affixed.



Deflores Stamping Machine

Burst Binding

We have two machines that do burst binding:

- Muller Martini Norm Binder
- NEW: Muller Martini Alegro Hybrid Binder

Muller Martini Binder

A description of the Muller Martini binder can be found in the Softbound portion of this book.

NEW: Muller Martini Alegro Hybrid Binder

A description of the Muller Martini binder can be found in the Softbound portion of this book.

Sewing

Another way of binding is using sewing machines and sewing through the spine of individual signatures, which have been gathered with endsheets on the UB binder. This process is referred to as Smythe sewing. Glue is applied to the last signature and endsheet to add strength. Two Astronic sewing machines deliver completed books.

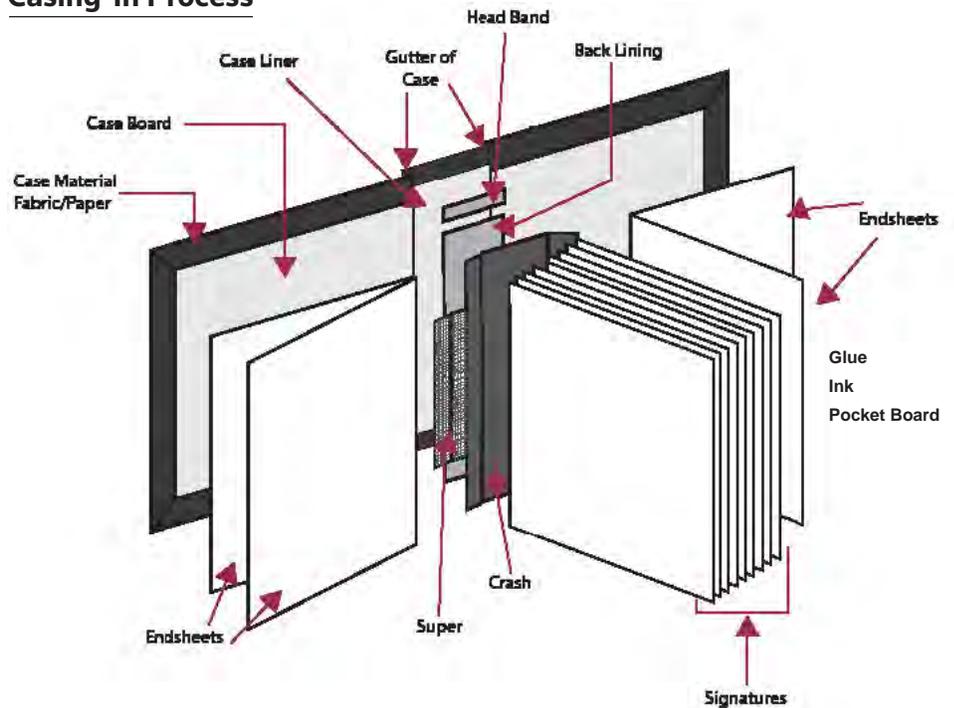
NEW IN 2018: We added an Aster Pro sewing machine to our fleet.



Casing-In Process

The casing-in process combines the burst or sewn book blocks with the hard cover. This process can also be used to produce flexible cover books. This is a hybrid with a thick soft cover used to case-in the book instead of a hard cover. Bibles are a common example.

Casing-In Process



Head Bands

Head and tail bands are available in a variety of color combinations and provide a nice finishing touch.

The Bindery has two machines that do casing-in:

- Muller Martini Diamant
- Kolbus Compact Line



Muller Martini Diamant

The Diamant line was installed in 2008 and cases-in up to 60 books per minute. The Diamant line is capable of running pocketed work, as it has a "pocket applicator" to automatically finish the product in-line. Multiple-copy packing can be done on the tech boxer.



Diamant 60 Case-in Line

OTHER OPERATIONS THAT SUPPORT HARDBOUND AND SOFTBOUND

Longford (Gathering Machine)

The Longford has 30 feeder boxes and gathers pocket parts into complete sets and odd titles. It can bundle up to a maximum 7 1/4-inch height. At the Longford, bundles are strapped or shrink wrapped and sent to the next operation for shipping.

Laminators

Laminators apply lie-flat poly or nylon film to printed sheets, which are used as the cover for softbound or hardbound books. The pattern roller determines the type of finish on the poly film, which is either embossed or smooth.



Film is available in satin, matte and gloss finishes. Gloss lamination greatly increases luster and shine; matte and satin finishes are softer and less obvious to the eye, as well as less reflective. Laminating creates a very durable book cover.

UV Coating

UV coating is an alternative process to lamination with similar visual properties. UV coating uses an ultra-violet light to cross link the photo-reactive polymers of a liquid material into a thin plastic layer. UV coating is available in gloss, satin and matte finishes and is suitable for softcover or marketing materials.

Bracket Strippers

Bracket strippers are used to create four- or six-page reinforced endsheets (four pages is standard). Endsheets are attached to the front and back of the book block during the binding process. Endsheets are critical to the strength, durability and overall longevity of a hardcover case-bound book.

Tipping

Tipping is used to combine two signatures or a signature and an endsheet. A 1/8-inch bead of glue is applied to secure two forms together. Tipping is used for jobs consisting of more signatures than the binders have feeders, therefore requiring that two signatures be tipped together and doubling capacity.

Tech Boxing

The tech boxer is located on all finishing binders and casing-in lines to give flexibility of boxing in-line. The tech boxer eliminates the need to send a product to another resource for boxing. After books are boxed, they are stored in the warehouse or shipped to customers' warehouses.

Dust Jacket

The dust jacketer applies printed laminated covers over finished hardbound books.



UV Coater



Three-Knife Trimmers

Three-knife trimmers, which are incorporated into the softbound binding and casing-in lines, trim the head, tail and face of products.



Bracket Stripper



Boxing Machine



Sample Dust Jacket

Product Finishing

Product Finishing

The Product Finishing area does all the custom finishing work to products before they are shipped or sent to storage. Processes include the following:

- Loose-leaf binder assembly
- Hand assembly
- CD insertion
- Drilling
- Shrink wrapping
- Cutting
- Collating
- Tabbing
- Stitching
- Folding

Binder Assembly

In the loose-leaf area, employees assemble binders and content. Responsibilities include:

- Customer orders for shipment of loose-leaf products
- Updating inventory



Hand Assembly

The hand assembly area includes processes done by hand, including the following:

- Binder assembling
- Applying stickers
- Tip-ins
- CD insertion

Drilling

- Drilling is a process where holes are drilled using a hollow point drill according to a pattern or template to fit into binders.

- Saddle-stitched pamphlets and loose pages are done on five manually operate Lawson machines.
- Perfect bound pamphlets and burst loose) are drilled on an automatic Dexter Lawson drill.
- After drilling, loose-leaf products are final trimmed (at spine).



Drill

Shrink Wrapper

The shrink wrapper is used to collate and wrap products with poly film. The following products are shrink-wrapped:

- Loose-leaf updates or binder supplement sets for subscription mailing and for stock
- Book sets for customers
- Kits for customers



Shrink Wrapper

Flatbed (Polar) Cutters

The flatbed cutters are used to trim covers for case making or perfect binding. They are also used to cut materials for endsheets, tip-ins, pocket lining or reference materials.

Collating

Collating is an automated process to gather single sheets of paper in sequential order.

Tabbing

Tabbing is a process that converts sheet stock by cutting away extra material, leaving a protruded tab that is used to identify a section in a binder or in documents.



Flatbed (Polar) Cutters

Folding

Folding

Folders bend and crease a sheet of stock to form a printed product. A sheet is carried through conveyor belts from the feeder. The sheet enters the folding plate, which adjusts the length of the fold. The sheet hits a stop, buckles and is carried between two rollers to fold the sheet. There can be up to 64 pages to a folded signature.

We have three types of folds:

- Buckle (pictured right)
- Gate
- Accordion

Buckle

The buckle fold uses two roller pushing the sheet between two metal plates, stopping it and causing it to buckle at the entrance to the folder. A third roller working with one of the original rollers uses the buckle to fold the paper.

Gate

The gate fold creates a flap from the front edge, with a fold running parallel to the spine of the book. The finished page is marginally smaller than the normal trimmed page. A card or heavy board is double-folded from the two outside edges of a folder. The two folded pages meet in the center of the page, edge to edge, like a double gate.

Accordion

The accordion fold is commonly used for brochures. One advantage to this type of folder is that every panel is exactly the same size, simplifying mechanical production by eliminating allowances for “creep” from panel to panel. In addition, all folds are in the same direction (parallel), avoiding folding specific panels against the “grain” – often troubling when printing on coated papers because of the potential for cracking of surface coatings.

Perforation

Perforations are used to allow glue to penetrate to the center of the form when binding. Different perforations are needed depending on binding styles. Perfect-bound books have a small perforation on the spine, whereas burst-bound books have an open perforation on the spine. For sewn, cover or saddle-stitched products, there is no perforation on the spine.

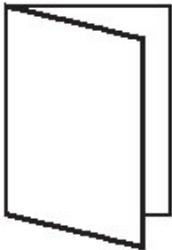
Perforation Needed per Binding Style

- Perfect-bound – Small perforation on the spine
- Burst-bound – Open perforation on the spine
- Sewn, cover or saddle-stitched – No perforation on the spine

FOLDING DIAGRAMS

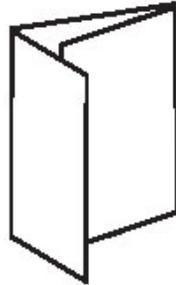
The Basic Four-Page Fold

The simple and most economical method of presenting a piece of literature – aside from the basic single-panel sheet, e.g., a flier or catalog/product sheet – is to fold the piece in some fashion, without any form of mechanical binding.

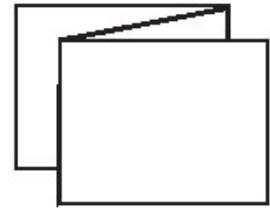


The Basic Six-Page Fold

A three-panel folder becomes six pages; a four-panel folder becomes eight pages, and so on. A variety of printed pieces can be folded and trimmed to finished size, all without the use of mechanical binding. There are many configurations possible, but there are also mechanical limitations to consider.

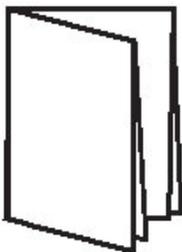


Variation Six-Page Accordion Fold

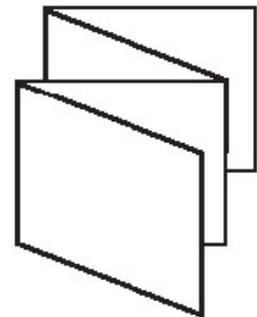
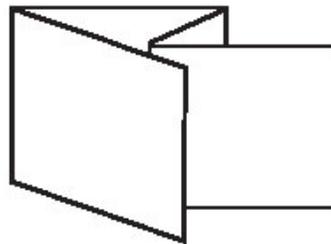


Eight-Page Right-Angle Fold

In the illustration of the eight-page right-angle fold, the product as shown (without trimming) could be considered a “broad-side” or fold-out brochure. If each panel were 8.5 x 11 inches, this piece would contain eight pages, or four panels, and the flat size would be 17 x 22 inches.

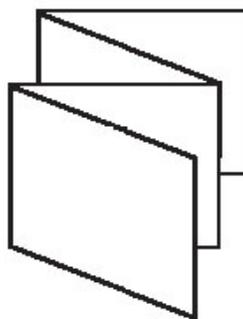


Variation to Eight-Page Fold



The Basic Accordion Fold

The eight-page accordion folder is another folding configuration that is commonly used for brochures. One advantage to this type of folder is that every panel is exactly the same size, simplifying mechanical production by eliminating allowances for “creep” from panel to panel. In addition, all folds are in the same direction (parallel), avoiding folding specific panels against the “grain” – often troubling when printing on coated papers due to the potential for cracking of surface coatings.



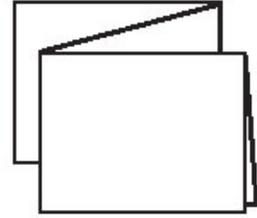
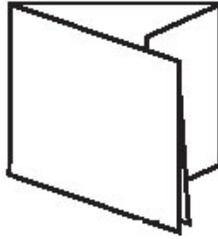
Thomson Reuters Fun Fact

Throughout the plant, our run lengths vary from as many as 50,000 books to a couple dozen. Using more than 100 different processes, the Bindery works to make sure customers' needs are met in a timely fashion.

FOLDING DIAGRAMS cont'd

12-Page Fold Shown in Two Variations

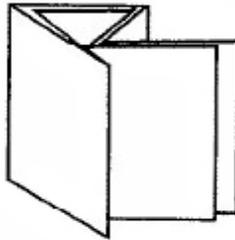
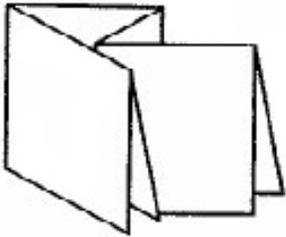
Both with one parallel fold and two right-angle folds.



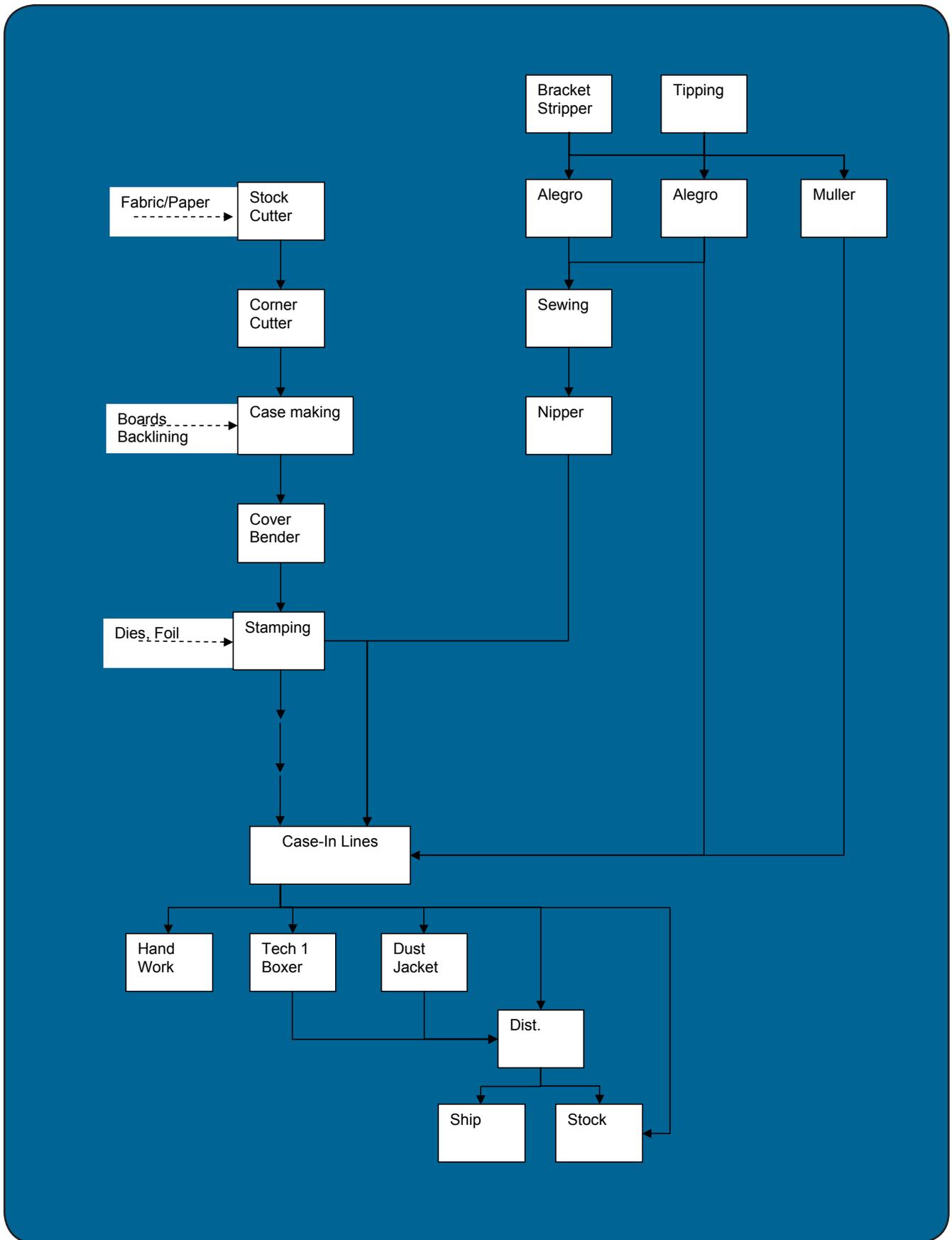
16-Page Fold Shown in Two Variations

One parallel and two right-angle folds.

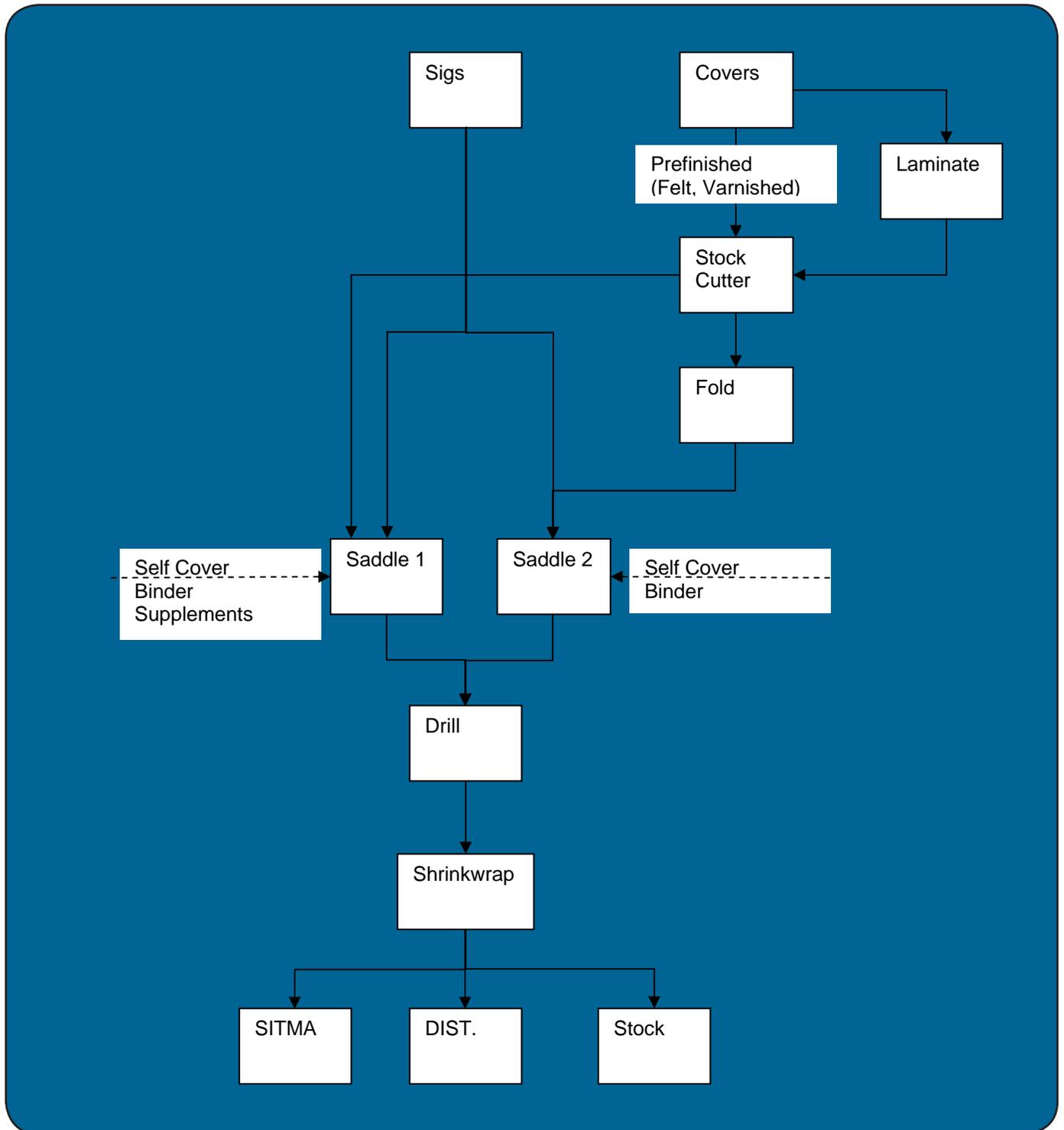
Three parallel folds.



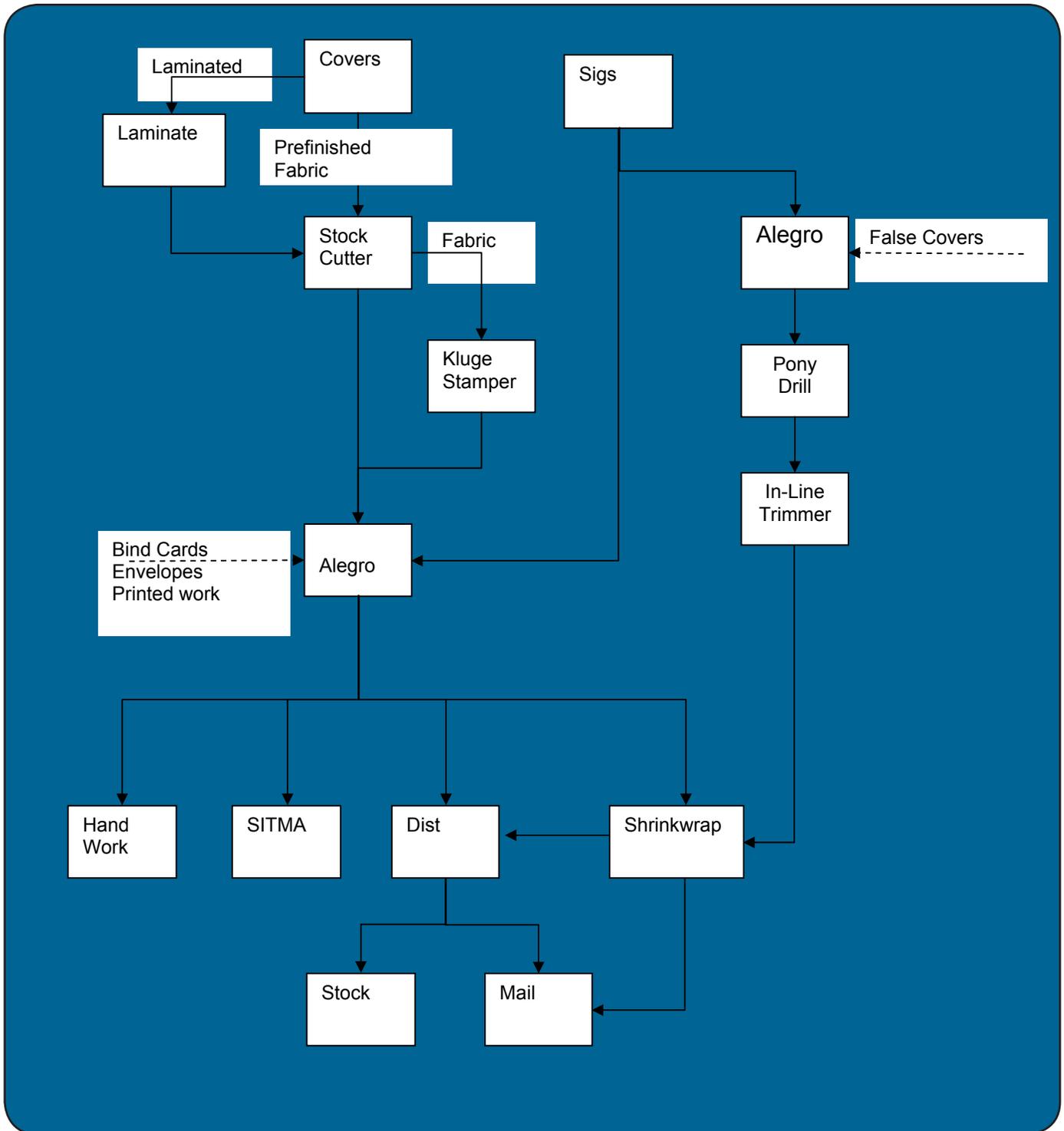
HARDBOUND PROCESS FLOW



PAMPHLET PROCESS FLOW

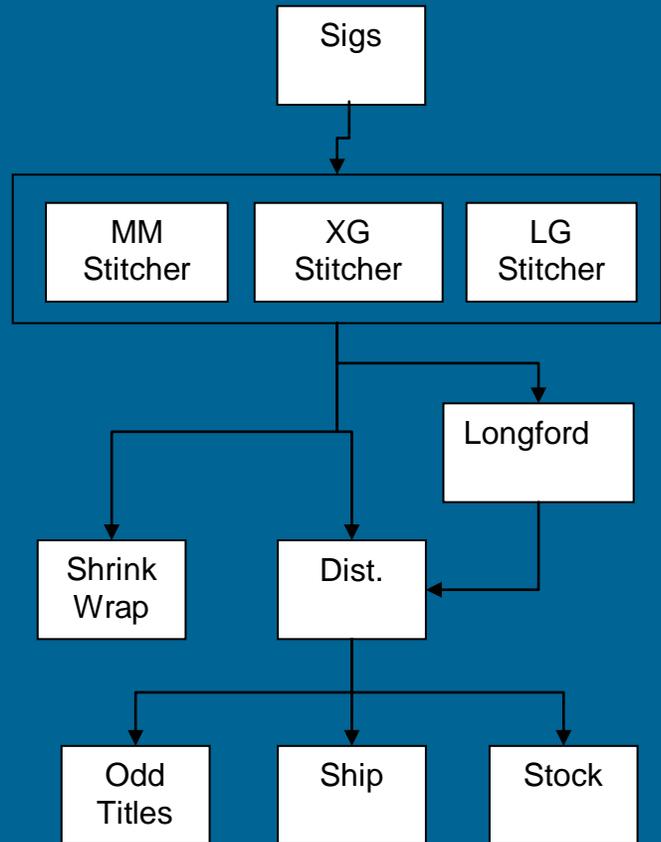


PERFECT BOUND PROCESS FLOW

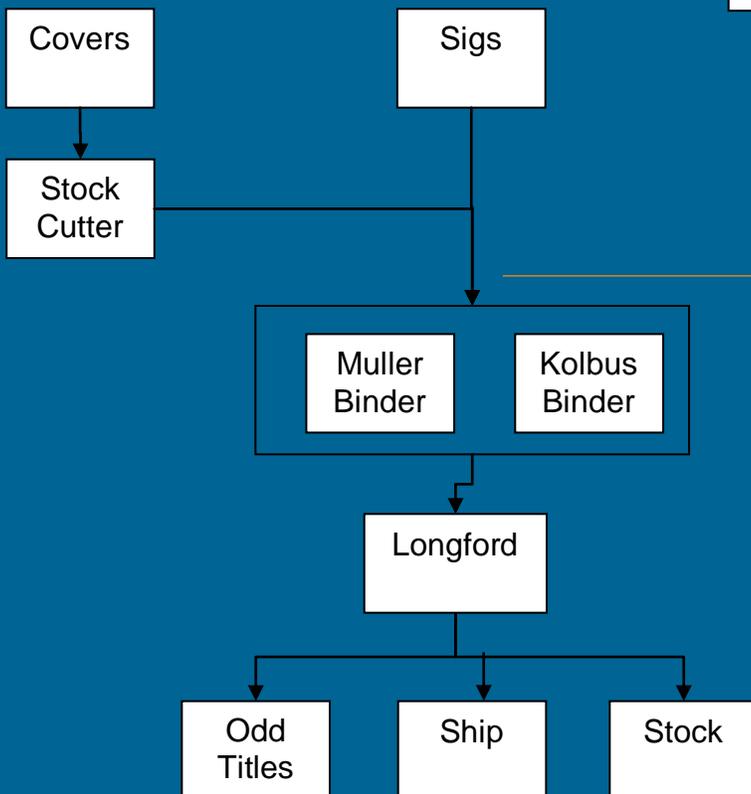


POCKET PART AND SUPPLEMENTAL PAMPHLET PROCESS FLOWS

Pocket Part Process Flow



Supplemental Pamphlets Process Flow



SUBSCRIPTION SERVICES

DEPARTMENT OVERVIEW



Subscription Services has three main areas:

- Mailing Area
- Packaging Lines
- Packing Bench / Special Handling

Products are shipped in the following types of packages:

- Cartons
- Shrink-wrap
- Poly bags

Subscription Services packs and ships products to subscription customers, as well as bulk product orders for other Thomson Reuters businesses. Flex packaging ensures customers requesting multiple copies receive the fewest number of packages possible. By analyzing each subscription list we determine how to most efficiently package the multiple shipments using our automated equipment and minimize postage and freight costs by shipping fewer packages.

In 2017, Subscription Services shipped more than 3.6 million packages. These shipments include:

- Hardbound books
- Softbound books
- Pamphlets
- Loose-leaf materials
- Newsletters
- CDs
- Advance sheets
- Legislative Service Pamphlets
- Pocket parts
- Customer invoices
- Thomson Reuters first-class mail



MAILING AREAS

Mailing Area

The Mailing Area folds and inserts documents into envelopes and prints postal rates on the envelopes. Pieces are then placed in a tray or sack and loaded onto a USPS trailer that is picked up once or twice per day, depending on volume.

Company bills, accounting documents, etc., generated by SAP processes are printed in the Computer Operations Print Center and delivered to Subscription Services for postage mailing.

The Facilities department delivers mail from the campus center mail room to Subscription Services for mailing.

The Mailing Area consists of:

- Inserting lines
- Inkjet machine
- Hand mail
- Meters



Inserting Lines

Inserting lines are used primarily for first-class and standard mail (1/4-inch thick maximum), which includes:

- Billing documents
- CDs
- Newsletters
- Marketing materials

The inserting line contains two Pitney Bowes postage meters. The three inserters are:

- Bell & Howell (BH) BH2000: Inserts invoice into envelope that will go onto package. Goes to packing line
- BH400: Invoices directly to customers
- Flowmaster: Subscription newsletters and CDs inserted into mailing envelopes that are shipped directly to customers.

Flowmaster

The Flowmaster inserts products into 6 x 9 and 9 x 12 envelopes for mailing or storage in the warehouse. It is a six-station inserting machine for marketing mailings, newsletters and CD-ROM/DVD discs. Addresses are inkjet-printed directly on the envelope.

Inkjet

The Inkjet machine prints customer information on envelopes, which is then used on other machines.

Hand Mail

The Hand Mail area is used for anything that is not able to be mailed from an automatic line.

Meters

Meters process pieces that weigh over 2 oz. and get diverted from the automatic lines, and are manually metered.



SORTING/PACKING LINES

Packaging Lines

The packaging lines automatically place products in cartons or wrap and affix subscription notices (with addresses) to the packages. Packages are stretch-wrapped on the pallet and then shipped.

The four packaging lines are:

- Levimatic: 1- or 2-book carton machine
- Red/Blue: multiple-book carton packing line
- Sitma: individual product poly-wrap machine
- Shrink wrapper: multiple product poly-wrap machine

Levimatic

The Levimatic machine inserts up to two books in a carton automatically. Products are auto-fed into the machine. A die-cut box forms around the material and is glued. It can process 11 different package sizes. The Levimatic glues subscription notices in envelopes to the outside of the box.



Red/Blue Line

The red/blue line packs multiple sets of books in cartons. The books are fed by hand into preformed boxes. These lines process 38 different package sizes and have a maximum of 12 feeding stations. Subscription notices in envelopes are glued to the outside of the box. Most pocket part sets and ship groups are shipped from these lines.



NEW IN 2017: Red Line Robot

Sitma

Sitma wraps individual pamphlets with poly wrap for shipment and inkjets customer addresses directly on the front cover of the publication.

- Primarily periodicals, single packages
- Individual poly bag for shipping protection
- Sorted, bundled, strapped and sacked for routing efficiency and lower transportation rates
- Applies Post-Net bar code to obtain postal automation discounts



Shrink Wrapper

The subscription shrink wrapper wraps products in poly film for shipment.

- Loose-leaf is the common product
- Manual feed process
- USPS sorts, and discounts are applied to these packages
- Gathers materials for publication updates that are sent directly to customer
- Subscription notices



Packing Bench – Special Handling

At the packing bench, all products are packed by hand in cartons or envelopes. All special handling is done at the packing bench and is packed by hand.



At the packing bench, personnel use the “range process” to generate labels. The range process consists of bar code sheets that tell the handler how many books the customer is asking for.

The types of products processed at the packing bench include:

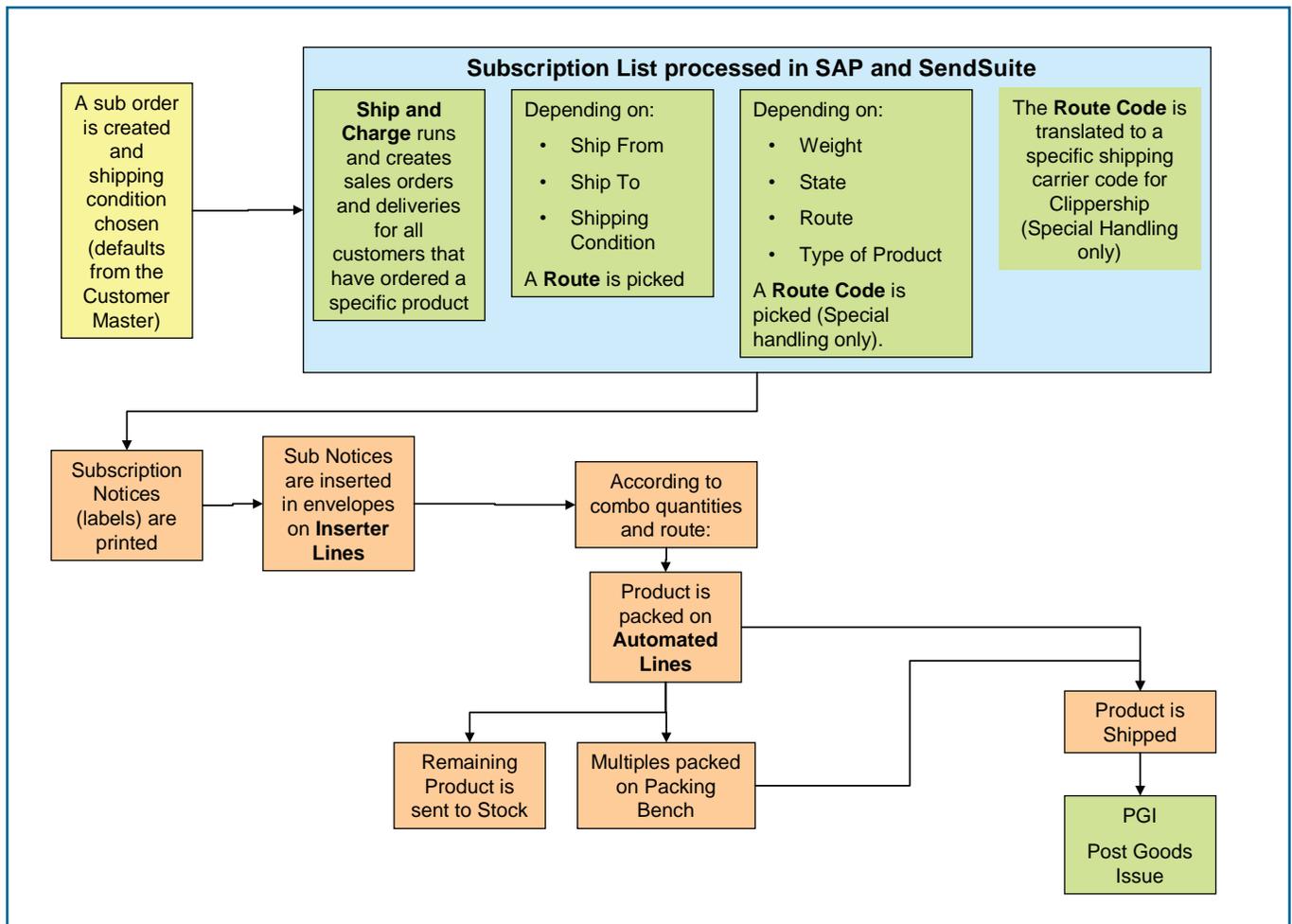
- Primarily parcels, small carriers and less-than-truckload (LTL)
- Multiple copies of books to a single address
- Special handling
 - International
 - Priority shipments
- Packages going through Online Shipping Invoices (OSIs)
 - Machine parts
 - Product samples for machine testing by various machine vendors
- Marketing materials and trade show supplies
- Expedited shipments
- Special orders

Once the order is packed, the operator utilizes SendSuite to “rate shop” for the best shipping method.

Why do we want to rate shop?

- To pick the least expensive carrier that will deliver in the requested timeline.
 - Select Ground Services that can deliver in 1 or 2 days instead of Air Services.
 - Looks at all possible carriers instead of using predetermined rules.
- Uses actual weight from the scale to select the carrier instead of an estimated weight.
- Allows a shipping operator to ship small parcel, LTL, TL, international and multi-pack shipments all from one, easy to understand, intuitive interface.
- Operators can print appropriate shipping labels and necessary documents from WMS, ERP and IM systems, simplifying and automating the process resulting in increased productivity.
- With visibility of the entire shipping process, and instant access to shipment history, customer service is easily improved by the ability to respond quickly to delivery status questions.
- Reduce human error by generating shipping documents such as Bill of Lading, Air Bills, COD Tags and Return Labels automatically.

SUBSCRIPTION FULFILLMENT PROCESS FLOW



Subscription Fulfillment

- Ship and Charge (a software program Subscription Services at Thomson Reuters uses) creates a list of customers subscribing to a product four days before the scheduled ship date.
- Text files are created and loaded into a Presort Lists folder for BCC Presort.
- BCC Presort software is used to create USPS-approved sortation by ZIP code.
 - BCC Presort software is frequently updated.
- By sorting to high-volume ZIP codes, discounts are generated by creating direct entry into the nearest BMC.
 - Non-presort-eligible pieces, such as multiples, foreign addresses, house copies and express shipping, are downloaded to a database accessed by other shipping systems such as ClipperShip.
- The presort process provides address output files and all USPS-required documentation, such as pallet placards, sack tags, postage statements and zone reports.
- Labels and/or subscription notices are created, printed, stuffed and then delivered to the machines to put on the packages.

Subscription Services is one of the largest mailers in Minnesota and we take pride in consistently shipping products to customers on time. In this department, subscriptions are delivered to customers one to two days faster than shipping regular mail. Altogether, we ship about 8.5 million products annually.



DISTRIBUTION

WAREHOUSING & FULFILLMENT SERVICES

The Distribution Center

The Distribution Center picks, packs and ships single orders to thousands of customers worldwide. On average, the department ships approximately 4,000 units a day.

Specifically, Distribution order fulfillment targets a 24-hour turn-around after receiving an order and turns priority orders around within the same day. Customer returns are processed within five business days.

Distribution's quality service also includes:

- Sarbanes-Oxley-compliant inventory accuracy program.
- 99.94 percent unit inventory accuracy.
- "Cycle counting" of all products to ensure ongoing accuracy.

The Storage area contains multiple choices of racked and floor inventory sectors, including full-pallet, half-pallet, tray and tote box. These choices allow Distribution to balance storage costs with processing efficiency for numerous types of media.

Types of Media

- Hardbound Books
- Softbound Books
- Binders
- Newsletters
- CDs
- Folders
- Envelopes
- Bound-Volume Sets
- Slip Cases
- Loose-Leaf Products
- Information Packets
- DVDs
- Pamphlets

PICKING AREAS

Picking Areas

Within the Storage area are five distinct fixed-bin picking areas. These areas enable Distribution to manage a variety of requirements.

The five picking areas are:

- Flow Rack
- Very Narrow Aisle
- Bulk Picking Locations
- Express Bins
- Wide Aisle

Flow Rack

The Flow Rack (pictured below) contains high-order-volume products, which are picked to tote boxes and routed via conveyor directly to the packing benches.



Very Narrow Aisle

The Very Narrow Aisle is for bound-volume product sets. These bound volumes are assigned locations laterally through the aisle. The aisles are wide enough to accommodate wire-guided battery-powered lift trucks. The operator needs only to adjust speed and elevation to pick a product.

Bulk Picking Locations

The Bulk Picking locations are primarily for educational products requiring large quantities of one product for a small number of customers.

Express Bins

The Express Bins are used for products requiring large quantities of one or two products for a large number of customers.

Wide Aisle

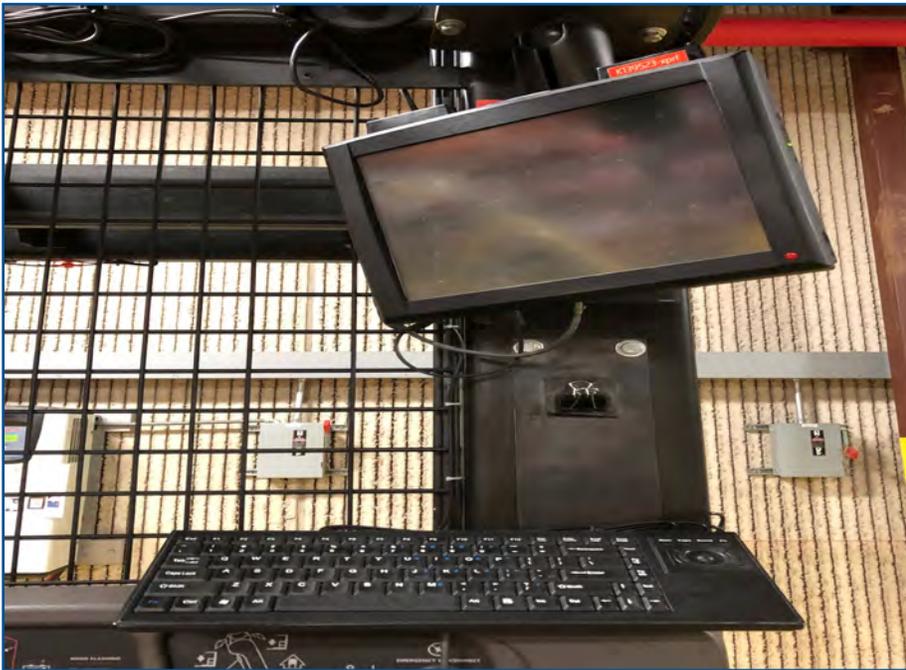
The Wide Aisle (pictured below) is the largest fixed-bin picking area and houses the remainder of our products, including customer and contract products. Like brand products are assigned locations near each other for efficiency in order picking.



Long-Term Storage

These products are stretch-wrapped, enabling them to be warehoused for longer periods of time without worry of blemish or damage.

NEW ORDER PROCESSING



Picking

All of these areas have unique location assignments for specific product placement. With the help of the SAP business system, Distribution knows where every product resides for quick and immediate retrieval. SAP also organizes requirements per storage area and location for efficient, timely order picking. Also, each forklift has a "radio frequency" PC (picture above) to help them quickly locate items in the warehouse. The flow rack pickers use handheld RFs (pictured right).



Packing

The Packing area contains 14 packing benches, with a PLC-controlled conveyor feed from the flow rack to each bench. There is also a large-order packing area and a large-order packing bench.

Packing Benches

The packing benches (picture top right) process most of the requirements allowing for a large variety of packaging options, from cold-seal "jiffy pack" envelopes to various-sized box containers.



Large-Order Area

The large-order area processes palletized or "skidded" requirements. These do not require picking, as the products generally come directly from the factory without going through any storage or warehouse area.

Large-Order Bench

The large-order bench processes customer orders having the same product or set of products. The packaging requirement is usually identical from order to order. The large-order bench accommodates multiple packages to be processed at once.

Thomson Reuters Core Publishing Solutions Fun Facts

- A tour through the manufacturing facility is 1.5 miles in length and takes 1-1.5 hours.
- The building on this campus could cover 57.6 football fields, and usable space is 2.6 million square feet.
- The distribution warehouse is as large as 10 football fields.
- On average, 4,000 books are distributed to customers daily.

SHIPPING - OUTBOUND FULFILLMENT

Distribution's Shipping - Outbound Fulfillment group is responsible for:

- Package quality, package quantity verification and proper packaging.
- Generating customer address labels.
- Assigning a carrier, creating shipping documents and loading carrier vehicles.
- Posting shipment system tracking updates.

The most recurrent types of shipments are:

- Parcel shipment.
- Less-than-truckload (LTL) freight orders.
- Truckload (TL) freight orders.
- International (including ocean freight).

After the shipment has passed through the traffic management system (SendSuite), an e-mail message is sent to the customer, providing shipping details and tracking data.

Returns

Distribution's returns (reverse logistics) function is responsible for:

- Receiving customer returns.
- Applying credit to automated returns in SAP.
- Restocking product to inventory, or recycling as appropriate.
- Working with Accounts Receivable to ensure correct processing of more complex returns.

Inventory Control

To ensure the accuracy of inventory and to support efficiency of the overall manufacturing operation, Distribution also has a separate inventory control function.

This group's responsibilities include:

- Assignment of picking locations to support efficient picking and cost-effective storage.
- Execution of the Cycle Counting program to validate and correct inventory accuracy.

- Control of product reorder points to minimize potential stockouts.
- Ensuring overall inventory integrity.

Third-Party Logistics

Distribution offers unique third-party logistics (3PL) services to our customers. Customer order entry via Web Services is not SAP-specific and can be used to communicate with most any other business system. Distribution processes can accommodate nearly any business with only minor modifications.

Special shipping requirements can be accommodated and tracked through our traffic management system, SendSuite. This information flows through the Web Service as well as all standard shipping tracking records.

The Distribution Center has an account representative who acts as a personal liaison between 3PL customers and the Distribution Center.

In addition, the reverse logistics activity is processed through SAP and can be transmitted to our contract customers via this same Web Service.

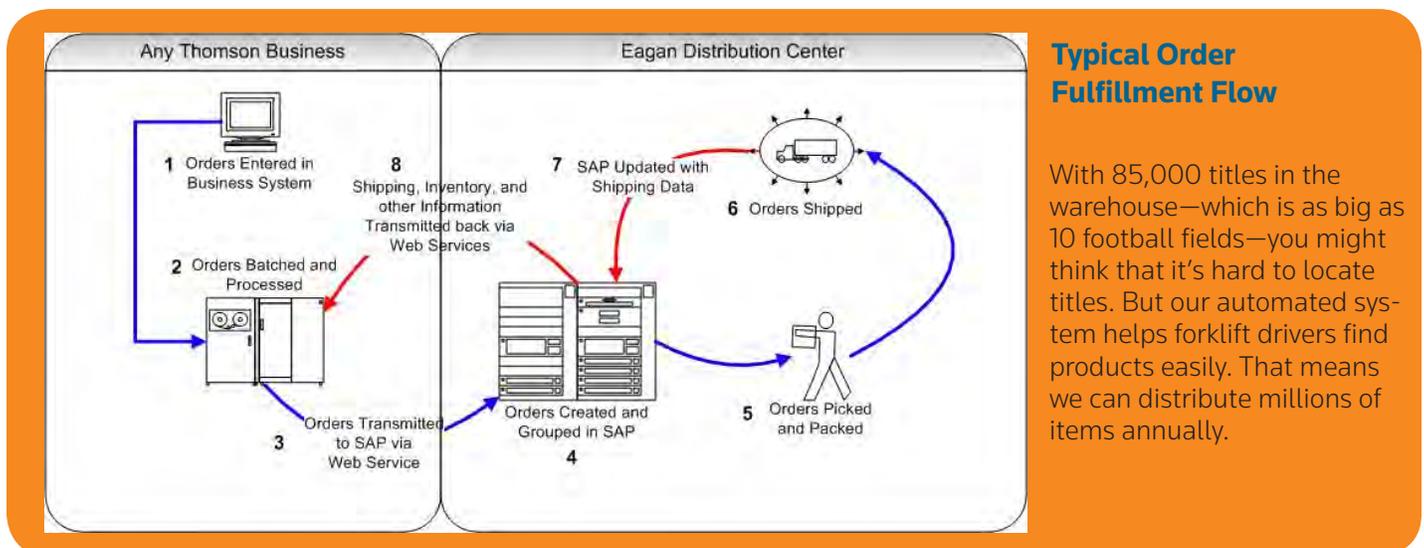
Distribution has a talented pool of analysts who can provide process and business analytics, as well as routine performance and status reports.

EDI – Electronic Data Interchange

An EDI document is an electronic version of a paper document such as a purchase order or invoice. EDI allows companies to exchange transactional data electronically. Standards govern how EDI documents are structured (fields included) and their use. Companies may have unique EDI Compliance Rules involving the data exchange, physical packaging, and labeling.

EDI Documents TR currently supports:

- Inbound Purchase Order
- Inbound Purchase Order Acknowledgement
- Outbound Advance Shipping Notification
- Inventory



Typical Order Fulfillment Flow

With 85,000 titles in the warehouse—which is as big as 10 football fields—you might think that it's hard to locate titles. But our automated system helps forklift drivers find products easily. That means we can distribute millions of items annually.

History

West, a Thomson Reuters business, has a global reputation for developing innovative products that meet law professionals' needs. This dedication began more than 130 years ago, when two brothers opened John B. West, a storefront book publisher and bookstore. The business owners soon realized that their customers did not have an effective way to get current opinions from Minnesota courts. West responded in 1876 by publishing *The Syllabi*, a weekly publication that provided attorneys with court opinions at an unprecedented rate.

A year later, West revolutionized the legal market by developing the National Reporter System—the only collection of American case law to be editorially enhanced by experienced attorney editors. The National Reporter System is the foundation for products such as Westlaw and KeyCite, which have transformed how legal professionals use information. For over a century, the bench and bar have relied on West's Key Number System to make legal research faster and easier. The comprehensive indexing tool divides the body of American law into more than 400 legal topics such as people, property, contracts and crimes. Each area is assigned a specific key number that quickly

directs lawyers to specific points of the law. This landmark tool set the standard for the organization, presentation and delivery of legal information.

While the country was celebrating its bicentennial, another innovation was taking place at West. Researchers were getting their first online glimpse into a trusted body of legal information known as Westlaw. The online tool has become one of the primary legal research services for lawyers and legal professionals. With more than 23,000 databases of case law and statutes, Westlaw is the premier online research tool accessed by millions of users around the world.

With an eye focused on its customers, West developed print-on-demand publishing to quickly provide customers with short-run, high-quality print products. In 2006, West introduced the first-ever short-run binding machine. Custom-made in Germany, the machine binds hard and softbound books simultaneously and turns products around in record time. Since 1872, West has been a leader in innovation. With its headquarters in Eagan, Minn., West has earned a reputation for providing high-quality legal, regulatory and business information to legal professionals worldwide.



Historic Highlights

Beginnings
1872 - 1900



1872
West Publishing Company is founded by John B. West in St. Paul, Minn.



1876
West publishes *The Syllabi*, an unprecedented weekly publication reporting on the opinions of courts used by attorneys.

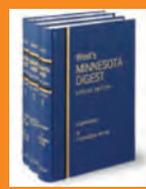


1877
West develops the National Reporter System.



1908
West introduces the Key Number System, the only index for classifying American law.

Rapid Growth
1900 - 1990s



1926
West Publishing Company establishes the United States Code in response to the need for a single codification of U.S. law.



1975
West launches its first online services.



The Merger
1996 - Present

1996
Thomson merges with West Publishing Company and later becomes Thomson West.

2007
Thomson West celebrates the 10-year anniversary of KeyCite, West's first full-service national citation system.

2008
Thomson West acquires Reuters.



Thomson Reuters

Core Publishing Solutions/Industry-Wide

Book Manufacturing Terminology

A	Adhesive	A hot-melt or cold-set glue used in book binding.
	Adhesive Binding	Generic term for book binding, which uses adhesives along the backbone edges of assembled printed sheets. The book or magazine cover is applied directly on top of the tacky adhesive. Examples are perfect-bound and burst-bound.
	Adobe Acrobat	A program or suite of programs from Adobe Systems, Inc. which creates, edits, and manipulates PDF files that can be viewed on any computer system that has PDF-reading software (such as the Adobe Acrobat Reader). PDF documents are often referred to as Adobe Acrobat files, even if a different program was used to generate the file.
	Against the Grain	Folding or feeding paper at right angles to the grain of the paper; also called cross grain.
	Anti-Aliasing	Smoothing or blending the transition of pixels in an image. Anti-aliasing the edges on a graphic image makes the edges appear smooth, not “jagged” or bit-mapped.
	Anti-offset Powder	Finely powdered starch sprayed on the printed surface of coated paper as sheets exit the sheet-fed press. This prevents wet ink transfer from the top of one sheet to the bottom of the next sheet.
	Aqueous Coating	Water-based coating applied like ink by a printing press to protect and enhance the printed surface.
	Archive	A place or collection containing records, documents or other materials of historical interest.
	Artwork Mock-up	A comprehensive design produced primarily to give the client an approximate idea of what the printed piece will look like.
	Attribute (Font)	A font characteristic (such as bold or italic,) created by highlighting a font and clicking on a button. Font characteristics created in this way may not print properly (e.g., a bold version of the font might not exist, but it will look bold on your computer screen). Instead, you choose the bold version of the font from the Font menu in the application you are working in.
	Automatic Picture Replacement (APR)	Scheme where low resolution images are swapped with their high-resolution counterparts.
	Automatic Plate Changing	Capability of a press to automatically change plates.
B	Back	The inner margin of page.
	Backbone	The back of a bound book connecting the two covers; also called a spine.

Backing	Shaping the spine of a book block to form a shoulder on its front and back; one of the case binding operations, (see <i>also</i> rounding).
Back Lining	Reinforcing material, paper or fabric, that is glued to the book block backbone or spine in a case-bound book after rounding and backing.
Back Up	In printing: to print the second side of a sheet already printed on one side. In computers: to make a copy of your work on a separate disk in case something happens to the original.
Banding	In digital printing, this term refers to patterns on a print caused by insufficient color or gray-scale ranges within the output device's image processor, or insufficient information contained within the original scan. Banding is most noticeable in printed areas that fade from light to dark.
Bar Code	A binary coding system using a numerical series and bars of varying thicknesses or positions that can be read by optical character recognition (OCR) equipment. Bar codes are used in printing as tracking devices for jobs and sections of jobs in production.
Basis Weight	Weight in pounds of a ream (500 sheets) of paper cut to a given standard size for that grade; example: 500 sheets of 17-by-22inch 20 lb. bond paper weighs 20 pounds. In countries using ISO paper sizes the weight, in grams, of one square meter of paper.
Bearers	The flat surfaces or rings at the ends of press cylinders that come in contact with each other during printing and serve as a basis for determining packing thickness.
Bill of Material (BOM)	A list of parts or components by Original Equipment Manufacturer (OEM) part number, or by other description.
Binders Board	Paper board used in making the front and back covers of a case-bound book.
Binding	Joining the assembled (collated) pages of a printed piece together. Binding takes many forms, including saddle-stitching, adhesive binding, mechanical binding and loose-leaf binding. Binding is also used as a general term to describe all finishing operations.
Bitmap Font	A font used to display text on a computer screen. The letters in a bitmap font are broken up into pixels. When the font is sent to a printer, or enlarged to large point sizes on the screen, the letters will look "jagged" or bit-mapped.
Blanket In	In offset printing, a rubber-surfaced fabric that is clamped around a cylinder. The image is transferred from the plate to the blanket, and from which it is transferred to the paper.
Blanket Cylinder	The cylinder that carries the offset rubber blanket.
Bleed	When any image or element on a page touches the edge of the page, extending beyond the trim edge, leaving no margin, it is said to bleed. It may bleed or extend off one or more sides.

Bleed Tab	A bleeding ink square at the edge of a page that functions as a guide for locating specific material.
Blind Stamp or Emboss	A design, that is stamped or embossed without metallic ink or foil. Giving a bas-relief effect.
Blueline	Prepress photographic proof made from stripped negatives where all colors show as shades of a single color on white paper. Also called brownline, silver-print, Dylux®.
Body	The printed text of a book not including end papers or covers.
Bond Paper	A grade of writing or printing paper where strength, durability and performance are essential requirements; used for letterheads, business forms, etc. The basic size is 17-by-22 inches.
Book Block	The gathered signatures of a publication before the cover is added.
Book Paper	General term used to define a class or group of papers having common physical characteristics that, in general, are most suitable for book production. The basic size is 25-by-38 inches.
Bottling	If a page skews because of the number of pages, the thickness of the paper or the folding equipment, bottling is a method to adjust/compensate for the page skewing in folded signatures.
Brightness	In paper, the reflectance or brilliance of the paper.
Buckle Folder	A bindery machine in which two rollers push the sheet between two metal plates, stopping it and causing it to buckle at the entrance to the folder. A third roller working with one of the original rollers uses the buckle to fold the paper.
Building-In	A forming and pressing machine that holds cased-in books tightly under heat and pressure while the adhesive is drying.
Burst Binding	A form of binding similar to, but more durable than, perfect binding, where the spine of each section is slotted or perforated during the folding operation. Glue is pushed up between the perforations during binding and the cover is then drawn on. Its advantages are that it allows the text pages to remain held together as a folded sheet and the adhesive has a larger area to grip by penetrating the slots and the backs of the signatures.
Burst Bound	The book block created for final processing with a hard cover using cold glue and hot-melt glue to hold the pages/signatures together. The signatures are collated, along with the needed end sheets to bind to the cover, and cold glue is applied to the spine folds. The cold glue is forced into the burst perforation, binding the pages to each other as well as binding the signatures. After the cold glue is dried, hot-melt adhesive is applied to the spine with a paper cap or "crash" in place of a cover. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.



Burst Loose	Similar to burst pamphlet process where only the perforations are smoothed out on the spine before applying a false cover to the signatures. The signatures are collated and bound together using hot melt only to allow for consistent drilling and trimming. After the bound signatures are drilled, 3/16" is trimmed from the spine to create a loose-leaf product. Layout Standard Trim: Spine – 3/16"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
Burst Pamphlet	Similar to perfect bound process, except that the bindery trims only enough paper from the spine fold to remove the bumps created by the burst perforation on the fold. No spine trim is allotted in Prepress for a burst pamphlet. Burst pamphlets should only be produced when the roll stock used on press only provides enough trim to take the minimum 1/8" face trim. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
Calender	To make the surface of paper smooth by pressing it between rollers during manufacturing.
Calibrate	To adjust the scale on a measurement instrument, such as a densitometer, to a standard for specific conditions.
Calibration	A process by which a scanner, monitor or output device is adjusted to provide a more accurate display and reproduction of images.
Caliper	The thickness of paper, usually expressed in thousandths of an inch (mils). In board, however, it is expressed as "points". Also a device on a sheet-fed press that detects double sheets or on a binding machine that detects missing signatures or inserts.
Carrier	The base solution of an ink used to distribute dye or pigment color. Water is the carrier for aqueous inkjet ink.
Cartons	Corrugated boxes used to pack a finished product.
Case	The covers of a Hardback (case bound) book; made with cloth or similar material and boards.
Case-Bound	A book bound with a stiff, hard cover which is covered by fabric or other material.
Case Maker	A machine that produces hard covers for case-bound books.
Casing-In	Insertion of text contents of a book block into the case when binding.
Cast-Coated Paper	Paper dried under pressure against a heated, polished cylinder to produce a high-gloss enamel finish.
Chalking	Refers to improper drying of ink. Pigments dust off because ink has been absorbed too rapidly into the paper.
Chill Rolls	On a web offset press, the section located after the drying oven where heat-set inks are cooled below their setting temperature.
Choke	To slightly overlap touching colors in order to compensate for minor misalignments on the printing press. Choke is one process where a lighter color surrounds and overlaps a darker color.

Chopper Fold	Conveying a signature from the first parallel fold in a horizontal plane, spine forward, until it passes under a reciprocating blade that forces it down between folding rollers to complete the fold.
CIE LAB	The CEILab color space was defined by the Commission Internationale de l'Eclairage (CIE) in 1976 and represents a three-dimensional, rectangular coordinate system. The vertical coordinate, L, specifies the lightness of a color; the 2 horizontal coordinates a and b represent the hue and the saturation on red/green and blue/yellow axes respectively. The CIELab color space is also ideal for representing color differences, since geometric distances in the color space more or less approximate the intuitive color differences.
CIP3	International Cooperation for Integration in Prepress, Press and Postpress is a Manufacturers' Association established in 1995 to promote the non-proprietary digital integration of the printing process, from Prepress to Postpress. Its most important achievement has been the definition of the Print Production Format, a data format for recording all information relevant for the print process. In 1999, CIP3 was incorporated into CIP4, which deals with a broader range of subjects.
CIP4	Created in 2000 from the Manufacturers' Association CIP3 (see above), seeks to provide the basis for the computer-based integration of the entire process involved in the production of print products, from preliminary costing and quotations to delivery and billing. One of the first results has been the establishment of the Job Definition Format (JDF) as a common standard.
Coated Paper	Paper with a coating of clay or other substances that improves reflectivity and ink holdout.
Collate	A finishing term for gathering paper in a precise order.
Colophon	Publisher's imprint or trademark. Generally used on the title page, jacket and binding.
Color Balance	Maintaining the ratio of cyan, magenta and yellow ink to produce a picture with the desired color and without an unwanted color cast or color bias.
Color Bar	A series of colored shapes printed outside of the finished area. These bars are used to verify the accuracy of the printing job and allows the press operator to calibrate the print job and adjust the press if necessary.
Color Electronic Prepress System (CEPS)	A computer-based system for the Graphics Art Industry that electronically simulates the traditionally labor intensive or cumbersome tasks associated with page makeup and color image manipulation.
Color Model	Also referred to as color space. A color model is a geometric or mathematical representation of visible colors. Well-known color models include, CMYK, RGB and HLS (hue, lightness, saturation).
Color Separation	The process whereby the four process printing colors (CMYK) are separated into their primary colors to allow for professional printing.

Colorant	Colored particles or dyes added to inks giving them vibrancy and hue value.
Comb, Plastic Binding	A curved or rake-shaped plastic strip inserted through slots punched along the binding edge of the sheet. It is used to hold the product together mechanically.
Compact Disc, Read Only Memory (CD-ROM)	An adaptation of the CD that is designed to store computer data in the form of text and graphics, as well as hi-fi stereo sound.
Compensator	A device used on the web press to assist with keeping registration by means of electronic eyes and a compensator bar on a plate.
Composite	Color separation file which contains all color information in one file which can be printed as a composite or separated into the individual color plates for printing.
Computer Aided Design (CAD)	The use of computer programs to design detailed two- or three-dimensional models of physical objects, such as mechanical parts.
Computer Aided	The process of using computers to control tools and machinery in Manufacturing (CAM) manufacturing.
Computer to Plate (CTP)	The production of printing plates directly from the computer without requiring film as an intermediate step. Also called "direct-to-plate." The plates are typically made of aluminum, but polyester, polymer and silicon plates are also used.
Continuous Tone	Also known as Contone; an image which contains gradient tones from black to white.
Contrast	The tonal change in color from light to dark.
Copy	Original job material (paste-ups, film, photos, and other graphics) furnished for the print job.
Coverage	The amount of ink on a page or sheet, usually given in percentages.
Cover Paper	Papers used for the outside covers of catalogues, brochures and booklets.
Crash	A flexible paper material used to cover hot-melt adhesive on the spine of a book block.
Creep	Sometimes called "push out," it is the distance margins shift when paper is folded and/or inserted during finishing. The amount of creep will vary depending on both the number and thickness of the sheets and must be compensated for during layout and imposition.
CREO	A company purchased by Kodak that was one of the original creators of direct-to-plate devices that Thomson Reuters utilizes.
Crop Marks	Crossed lines placed at the corners of an image or a page to indicate where to trim printed material. Crop marks may be drawn on manually or automatically applied with some desktop publishing software programs.

Cross Direction	In paper, the direction across the grain. Paper is weaker and more sensitive to humidity in its cross direction.
Crossover	Sometimes called “hook-up”. Printing across the gutter or from one page to the facing page of a publication.
Curl	In paper, distortion of the unrestrained sheet due to differences in structure or coatings from one side to the other or to absorption of moisture on an offset press. The curl side is the concave side of the sheet.
Cutoff	Circumference of the impression cylinder of a web press, therefore the length of the printed sheet on roll to sheet presses or the length of the repeat pattern on roll to roll presses.
Cyan	One of the three subtractive primary colors used in process printing; commonly known as “process blue.”
Cyan, Magenta, Yellow, Black (CMYK)	A color model based on four process colors. The colors are mixed to create a full-color image on a printer.
Cylinder	Part of a system of large rollers on an offset lithography press. The plate cylinder transfers an image onto the blanket cylinder, which is then offset onto a press sheet passing between the blanket and impression cylinders.
D Deboss	A plate-sunk image. To press an image into paper so it lies below the surface.
Densitometer	An instrument that measures transmitted or reflected light by indicating the percentage of a given area that is covered by halftone dots. This instrument is used to ensure consistency between films, proofs and printed pieces.
Density	The degree of color or darkness of an image or photograph.
Desktop Color	An enhanced EPS file format. Not used as much as it was in the past, Separation (DCS) the DCS format is still necessary for some types of graphics work. DCS separates a CMYK graphic into five files: one gray scale image for each of the four CMYK process colors and an FPO file with preview which goes into the page layout document.
Device Driver	A program that controls a particular type of device which is attached to a computer. There are device drivers for printers, displays, CD-ROM readers, diskette drives to name a few.
Die	Device for cutting, scoring, stamping, embossing or debossing.
Die Cutting	Using sharp steel rules to cut special shapes from printed sheets. Die cutting can be done on either flatbed or rotary presses.
Die Stamping	Printing from lettering or other designs engraved into copper, brass, or magnesium.
Digital Press	A printing device that produces high-quality output directly from digital files without the creation of printing plates.

Digital Video Disc (DVD)	A type of optical disk similar to the CD-ROM but with much greater storage capacity. A DVD holds a minimum of 4.7GB of data, enough for a full-length movie. DVD drives are backward-compatible with CD-ROMs, thus enabling them to play old CD-ROMs, CD-I disks, and video CDs.
Dot	An individual element in a halftone reproduction. Using a loupe you will see that printed pictures are made of many dots.
Dot (Gain)	An increase in size of each dot of ink when printed due to temperature, ink and paper type. A press operator tries to minimize dot gain, which can muddy the printed image.
DTP	An acronym for either "Desktop Publishing System" or "Direct-to-Plate."
Dummy	A sample of the proposed work made to establish the exact dimensions of the bound book, e.g., size, shape, form and general appearance.
Duotone	A term for a two-color halftone reproduction from a one-color photograph.
Dust Jacket	Printed wrapper around a case-bound book to protect the binding.
E EDI	Electronic Data Interchange. EDI allows companies to exchange transactional data electronically.
Electronic Layout Sheet (ELS)	Used for checking signature page order.
Embossing	Relief image to achieve a raised printed surface (blind embossing gives an unlinked impression on blank paper). To press an image into paper so it lies above the surface.
Encapsulated Script (EPS)	Encapsulated PostScript. A file format used to transfer PostScript image Post-information from one program to another. The preferred file format for saving images, as it is resolution independent, as opposed to TIFF.
End Matter	Printed matter (usually explanatory) following the text of a book, e.g. appendices, bibliography, index etc.
End Papers/Sheets	Also called End Sheets; Folded pair of papers attached to the first and last signatures of a book and pasted to the inside covers. Sheet that attaches the inside pages of a case bound book to its cover. End Papers add to binding strength. Self-end Papers are a type of end paper which uses the text pages.
Errata Slips	Correction slips. Tipped in or inserted as separate sheets, after printing.
Ethernet	A very common method of networking computers in a Local Area Network (LAN). There is more than one type of Ethernet. By 2001, the standard type was "100-BaseT" which can handle up to about 100,000,000 bits-per-second and can be used with almost any kind of computer.
Even Pages	Left-hand pages bearing even numbers.
F Fab	Cloth-like cover material used to make cases.

Face	Edge of signature that is handled when turning pages.
Filler Pads	Corrugated cardboard squares to fill space in cartons.
Filter	Also called a Plug-In for various programs, e.g., Adobe Photoshop or Illustrator, allowing the program to produce different effects. E.g., sharpening, blurring, and a multitude of special effects.
Final Size	The size of the printed piece after folding and any finished work.
Finished Goods	A complete and billable product.
Finishing	All post press operations, including folding, trimming, assembling sections and specialized tasks such as die cutting and foil stamping.
Flat	Another name for an imposition, ready for plating.
Flush Cover	Cover trimmed to the same size as the text pages, e.g., paperback books.
Fly Leaf	Blank leaf at the beginning or end of a book.
Foil	Metallic material used for printing (blocking) the wording on the binding case.
Foil Stamp	To press a heated die onto a sheet of foil, release the foil from its backing and adhere it to a substrate.
Fold	Bending and creasing a sheet of paper as required forming a printed product.
Folding	There are two kinds of folds: parallel and right angle. In parallel folding, each fold is parallel to the other. An example is a letter that requires a two parallel fold for mailing. Right angle folds are folds that are made at right angles to each other.
Fold Marks	Guides on the original copy and printed sheet that indicate where a printed piece will be creased.
Folio	The page number.
Font (Font Family)	A font is a complete set of characters in a particular size and style of type. This includes the letter set, the number set, and all of the special character and diacritical marks you get by pressing the shift, option, or command/control keys.
Foot	Bottom or tail edge of the signature or page in a book.
Fore Edge	The outer margin of a page opposite side to spine.
Foreword	Prelude to the true text, usually written by someone other than the author.
French Fold	Two folds at right angles to each other.
Frontispiece	Left hand page illustration facing the title page.
 Gang	Print two or more finished products on the same sheet during one press run.

Gatefold	Flap from the fore edge, with a fold running parallel to the spine of the book. The finished page is marginally smaller than the normal trimmed page. The two folded pages meet in the centre of the page, edge to edge, rather like a double gate.
Gathering	Lacing the sections of a book in correct order before binding.
Gradient	The blending from one color to another color.
Grain Direction	In paper making, the direction in which most fibers lie depending on the direction that the paper travels during the paper making process.
Graphics Interchange	One of the two most common image file formats on the Internet today, Format (GIF) especially for animated banners. A GIF image can consist of a maximum of 256 colors.
Gripper Edge	The leading edge of paper as it passes through a printing press.
Gripper Margin	Unprinted blank edge of paper on which grippers bear, usually half an inch or less.
Grippers	The metal fingers on a printing press which holds the paper as it passes through the press.
Gutter	The inside margin between facing pages, or the margin at the binding edge.
H Halftone	A process in which a black-and-white photograph is re-photographed through a screen so that the gradations of light and dark in the original photograph are reproduced as a series of tiny dots that print as a continuous tone. The fineness of the screen is measured in lines per inch, as in a "150-line screen," and is a factor in determining the quality of a printed photo.
Hardcover	A book with a separate case bound cover.
Head	The top of the page of a book or the top of a signature.
Head (Margin)	Margin from the of the type area to the top of the page.
Headbands	Strips of material (often decorative) placed at the head and sometimes also at the foot of the spine of a case bound book block.
Head-to-Head Imposition	Arranging pages on a form during planning so that the top of one page butts up against the top of the opposite page.
Heat-to-Tail Imposition	Arranging pages on a form during planning so that the top of one page butts against the bottom of the opposite page.
Hickey	Reoccurring, unplanned spots that appear in the printed image from dust, lint, or dried ink.
Hot Melt	Type of adhesive used on unsown binding.

I	Image	A digitized representation of a photograph with the ability to be displayed on a computer monitor and output to paper or plate.
	Image Area	Portion of paper on which ink can appear.
	Imposition	Print operators will print books using large sheets of paper which will be folded later. This allows for faster printing, simplified binding and lower production costs. Imposition is the process of arranging pages correctly prior to printing so that they fold in the correct order.
	Impression	Putting an image on paper.
	InDesign	The latest, state-of-the-art software from Adobe for publication design and layout.
	Index	Alphabetical listing of topics or subjects in a book showing the page numbers on which they appear.
	Indicia	Postal information place on a printed product.
	Ink Fountain	The reservoir on a printing press that holds the ink.
	Inkjet Printer	Printer used on mailing and boxing lines to print subscribers' names or product information on labels.
	Insert	Specially printed piece for insertion in a publication.
	InSite	Kodak's internet / intranet File Delivery and proof approval system.
	Interleaf	Leaves inserted between the pages of a book.
	ISBN	International Standard Book Numbering System
	ISO	International Standards Organization
J	Job Definition Format File (JDF)	A non-proprietary information carrier that can link and refer to multiple production devices; based on XML. This allows creators and print service providers to describe the intent of a printed piece, as well as each of the process steps that are required to achieve the intent. Also considered an electronic job ticket.
	Joint	Groove going along the spine on case binding.
	Joint Photographic Group (JPEG)	An image compression format used to transfer color photographs and Experts images over computer networks. Along with GIF, it is the most common way photos are moved over the Web.
K	Kerning	In typesetting, the process of subtracting space between specific pairs of characters so that the overall letter spacing appears to be even.
	Kiss Die Cut	Cutting the top layer of a pressure-sensitive sheet and not the backing.
	Knock Out	To clear an area of absolutely every printing dot, or to outline an image and drop out all dots surrounding it. E.g., when white type appears on a color field (hence "knocking out" of the color).

L	LAB (Color Model)	A color model that describes color in terms of its luminosity or brightness (L). It then describes color on an axis from green to magenta (A) and then from blue to yellow (B). LAB contains every color in both the RGB and CMYK gamut.
	Laminate	Bonding clear plastic film by heat and pressure to a sheet of paper to protect the print and improve its appearance.
	Landscape	Page or illustration wider than it is deep.
	Layout 1/8-inch	Used for the perfect bound binding method. Layout Standard Trim: Spine Trim– 1/8"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
	Layout 3/16-inch	Used for the Burst Loose binding method. Layout Standard Trim: Spine Trim 3/16"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
	Layout No Spine Trim	Used for the following binding methods: Burst Pamphlet, Saddle Stitched, Side Stitched, Burst Bound, Side Sewn, and Smythe Sewn. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
	Leading	The space between lines of type, often measured from the baseline of one line to the baseline of the next.
	Leaf	Two pages of a book. The front and back of a single piece of paper.
	Line Gauge	A printer's ruler, usually marked off in points, picas, agates, and inches, and sometimes also in centimeters. A 12"-inch, two-sided gauge has inches in 16ths and agate lines on the front. The back has 6 and 12 point (Picas) and point scales.
	Line Screen	Refers to the organization of elements of a printing screen; used to define the density of the screen, e.g., a 133-line screen refers to a pattern with halftone dots per inch. The higher the number, the higher the quality of detail reproduction.
	Lining Material	Stock used in the center between boards when making cases. Also used at the case in line to attach headbands.
	Lip	The extended edge of one side of a signature that is gripped to open the signature to the centre spread to facilitate the opening of the section. Also known as lap or pick-up.
	Loose-leaf	Finished product that is provided as loose sheets, often drilled for insertion into binders.
	Loose-Leaf Binding	A process in which individual sheets can be inserted and removed at will from a section of a larger document often held in a three-ring binder.
	LZW Compression	A type of compression that can be used automatically when saving TIFF files. Using LZW compression will not result in a loss in quality, but the compression rate decreases as the amount of information (number of bits) increases.

M	Magnus	A high-speed plating device used developed by Thomson Reuters and developed by Kodak.
	Make-Ready	Machine preparation for each operation in the production process. A significant percentage of the cost of production, particularly for short runs.
	Margins	Space surrounding printed area of a page.
	Mark	A set of horizontal and vertical lines which indicate where a page should be positioned or trimmed. It could also be a mark on a plate that specifies a fold, a bleed, etc.
	Match print	Trade name for 3M integral color proof.
	Mechanical Binding	A generic term to describe book binding by mechanical means, such as ring, post, comb, spiral, wire and wiro, and by holding pages and cover together by staples such as saddle-wired (stitched) and side-wired (stitched).
	Micrometer	Instrument used to measure the thickness of different papers.
	Midtone	The middle range of tones in an image.
	Moiré	The noticeable, unwanted pattern generated by scanning or rescreening a piece of art that already contains a dot pattern. This effect can also be caused by the misalignment of screen angles in color work.
O	OEM	Original Equipment Manufacturer
	Offset Printing	Offset printing is a technique where the inked image is transferred (or "offset") from a plate to a rubber blanket, then to the printing surface.
	OK Book	A set of signatures gathered from the Press to use as a sample in the Bindery.
	Opacity	Property which minimizes "show through" of printing from the reverse side of a sheet of paper. The more opacity or the thicker the paper, the less show-through.
	Open Prepress Interface (OPI)	Also known as image-swapping technology, this is the process that allows low-resolution images inserted into a page layout program to be swapped with the high-resolution version for plate setting.
	OS	A commonly used acronym referring to an operating system.
	OS 10 / X	The latest version of the Mac OS, the operating system software for Macintosh computers.
	Outline Font	This is the correct name for what many people call a printer font. An outline font is the part of a PostScript Type 1 font that is installed on the computer hard disk and that gets downloaded to the output device when printing. It contains the PostScript instructions necessary to correctly describe the font shape.
	Overhang Cover	Cover larger in size than the pages it encloses.
	Overprint	To print one ink directly on top of another ink.

Overs	Copies produced in excess of the quantity ordered.
Page Count	Total number of pages in a book, including blanks.
PageMaker	A page layout program produced by Adobe Systems for both Windows and Macintosh users.

P Pallet	A portable platform used to enable drivers to move finished goods from one area to another. Also used to store product in the warehouse.
Pantone Matching System (PMS)	An ink color system containing about 500 color swatches, each of which is identified by a color number and a formula for the ink.
Perfect Binding	An adhesive-binding method. Signatures are collated on top of each other, the spine of the book block is sawed off to create loose-leaf pages and roughened before adhesive is applied and the cover is drawn on. Note that 3mm of the back of the book is trimmed off during binding.
Perfecting	Printing both sides of the paper (or other material) on the same pass through the printing press.
Perfecting Press	A sheet-fed printing press that prints both sides of a sheet in one pass.
Pica	A typographic measurement. There are 12 points to a pica and approximately 6 picas to an inch.
Pico liter	The unit of measure for the volume of ink contained in a drop of ink. A pico liter = one trillionth of a liter.
Pigment	Water-based ink which contains solid, opaque pigment particles suspended in ink to provide color. Both the HP360 and Canon i300 ink uses pigment.
Pinholes	Tiny areas that are not covered by foil in stamping.
Pixel	Pixel is an abbreviation for picture element. It is the smallest individual dot that can be displayed on a computer screen.
Plate	Short for printing plate, this is generally a thin sheet of metal that carries the printing image. The plate surface is treated or configured so that only the printing image is ink-receptive.
Plug-In	A self-contained software component that adds or changes functions in a particular software system. When a user adds a plug-in to a software system, the foundation of the original software system remains intact.
Pocket	Slit in the cover board in the back of a hard bound book to store pocket part.
Pocket Part	A side-stitched supplement for a legal bound volume. This is usually published yearly.

Point	A printer's measure for type specifications. There are 12 points in a pica and 72 points in an inch.
Portable Document	A file format developed Adobe Systems. PDF captures formatting information from a variety of desktop publishing applications, making it possible to send formatted documents and have them appear on the recipient's monitor or printer as they were intended. To view a file in PDF format, you need Adobe Acrobat Reader, a free application distributed by Adobe Systems.
Portrait	A type of page orientation or illustration deeper than it is wide.
Postscript (PS)	A page description language developed by Adobe Systems, Inc. to describe an image for printing. It handles both text and graphics. A PostScript file is a purely text-based description of a page. The computer language most recognized by printing devices.
PostScript Printer	A file that contains information on screen angle, resolution, page size Description (PPD) and device-specific information for a file to be printed on a PostScript device.
Preflight	The test used to evaluate or analyze every component needed to produce a printing job. Preflight confirms the type of disk being submitted, the color gamut, color breaks, any art required (illustrations, transparencies, reflective photos, etc.), layout files, screen fonts, printer fonts, EPS or TIFF files, laser proofs, page sizes, print driver, crop marks, etc.
Preps	An imposition software that electronically places all of the client pages properly for plating. They are then sent to Prinergy (see below) for refining and trapping prior to plating.
Prinergy	A software/hardware system used by Thomson Reuters developed by Kodak. The system processes client electronic files by "refining" and trapping the electronic information prior to plating for the printing press.
Printer Driver	A program that controls printing and sets options such as print quality and paper size for a particular printer.
Printers Spreads	Pages of a document that are arranged in the order that they will be printed on a press. Thomson Reuters preference: Readers Spreads (see below).
Process Color	Also called full color. Refers to the four-color process reproduction of the full range of colors by the use of four separate printing plates, one for each of the primary colors - magenta (process red), yellow, cyan (process blue), and black.
Production Order	A precise description of a print order which contains all specifications and comments required for a job.
Profile	A file which describes how colors look on a specific output device. These profiles are used by Color Management Systems to automatically adjust colors as it passes from one device to another, making sure that the image looks the same on all devices.
Proof	The first copy of the actual book, used to find errors and make necessary corrections.

Q	Quadtone	A gray scale image reproduced using four spot or process colors to add depth and color.
	QuarkXpress	A desktop publishing (page layout) application for Mac OS and Windows, produced by Quark, Inc.
R	Raster Graphics	A type of graphics file which stores the images as a collection of pixels. They are also called bit-mapped images.
	Raster Image	A component used in a printing system which produces a bit map. The Processor (RIP) bit map is then sent to a printing device for output. The input may be a page description in a high-level page-description language such as Post Script, Portable Document Format or another bit map of higher or lower resolution than the output device.
	Readers Spreads	Pages in a document arranged in the same order that they would be if a reader were reading the finished product. Publications are not printed this way on the press. Software rearranges or imposes the pages on a layout for plating that allows for folding and cutting into the final product.
	Ream	Five hundred sheet of paper.
	Recto	The right-hand page of a book.
	Red, Green Blue (RGB)	The color space commonly used for computer monitors that divides color into the three primary colors of light: red, green and blue. They are not used in the printing process.
	Register	To position print in the proper position in relation to the edge of the sheet and to other printing on the same sheet.
	Register Marks	Cross-hair lines or some other marks on film, plates, and paper that guide production personnel in processing a print order from start to finish.
	Resolution	Generally used as an expression of image output quality; usually expressed as either dots per inch (DPI), which refers to the number of pixels per inch, or lines per inch (LPI), which is the number of rows of dots per inch in a printed halftone image. The number of pixels in an image. The more pixels, the higher the resolution. The higher the resolution, the better the picture.
	Rich Black	A black color that is made by printing with cyan and black ink units. This produces a much darker, deeper black on press than can be achieved by using the black ink unit alone.
	Right-Angle Fold	A term used for two or more folds that are 90-degree angles to each other.
	Rounding	Creating a round spine of a book block during the hardcover binding process.
	Run	Number of copies to be produced. This is also called print run.
	Running Head	Title repeated at the top of each page of a book.

S	Saddle Collation	Pages are ordered consecutively for the first half of the signature; the Format second half of the signature contains the last pages of the job in consecutive order. The next signature in the layout will contain the pages that follow the first half of the previous signature and which precede the second half of the previous signature. (E.g., In two 32-page signatures, signature 1 would contain pages 1-16 and 49-64. Signature 2 would contain pages 17-48).
	Saddle Glued	A binding method where a line of glue is applied along the spine folds to hold leaves and the cover together.
	Saddle Stitched	Pamphlet produced by opening the signature at the middle fold and Pamphlet placing it over the spine fold of the next signature. After all signatures are collated in this fashion, wire is "stitched" or stapled through the spine fold to hold the product together (usually two stitch positions). The product may be produced with a cover or may be a self-cover pamphlet. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
	Scanner	A digitizing device used to translate a picture or typed text into a pattern of dots which can be understood and stored by a computer.
	Scoring	A crease put on paper to help it fold better, particularly helpful with heavier paper stocks, so that it will fold without cracking.
	Screen	A piece of fine mesh, usually made of wire, that is used to create color tint in printing. Piece of film with dots of uniform density, used to make plates that will print screen tints.
	Screen Ruling	The number of lines or dots per inch used in both directions on a contact screen to make halftones or separations. Screen rulings are available from 65 lines per inch to 200 lines per inch. For color separations, however, it is better to use 150 line screens for best press control and visual resolution.
	Self Cover	Cover printed on the same stock as a book.
	Self-Ends	A type of end paper. If the extent of the book is such that blanks are left at front and back, the blanks can be used as end papers and are known as self-ends.
	Server	A host computer that holds and delivers information and software to other computers linked by a network.
	Sewn Binding	A book binding method using threads to hold signatures together, e.g., thread-sewn, section-sewn with either cover drawn on or case bound.
	Sheet-Fed Press	Press that uses pre-cut sheets of paper, rather than rolls.
	Sheets	Plain or printed paper in the large flat form before folding.
	Sheetwise	To print one side of the paper, then turn the sheet over to print the other side of the paper, using the same gripper and opposite side guide.
	Shingling	A technique used to compensate for creep. The gutter margin on a page is gradually narrowed from the outside pages to the middle pages of the signature.

Short-Grain Paper	Direction of paper in which the machine is parallel to its shortest dimension.
Side Guide	The mechanical register unit on a printing press that positions a sheet from the side.
Side-Sewn	After initial burst binding, the book block has heavy-gauge thread "sewn" through the side of the entire book block near the spine. This method is used only for Elementary/High School textbooks and is similar to burst bound except no hot melt or crash is used. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
Side-Stitched	Type of stitching produced by collating the signatures and "stitching" or stapling wire through the side of the collated signatures in 2 stitch positions. This is also known as a Pocket Part. Layout Standard Trim: Spine – 0"; Head – 3/16" ; Face – 1/8" Min.; Tail – 1/8" Min.
Signature	A printed flat sheet that is to be later folded into a multi-page document.
Signature Mark	Used in book work as a guide to gathering. The signature mark is usually a small capital letter but may also be a figure or bar printed at the bottom of the first page of each section (signature) of the book. The sequence of signatures is progressive throughout the book.
Slitting	Cutting printed sheets into two or more sections by means of cutting wheels on the folding machine
Small Computer Interface (SCSI)	A high-speed interface for hard drives, CD-ROM drives, scanners and System other devices.
Smythe Sewn	Signatures are collated in order with end sheets. After collating, the signatures are fed into a sewing machine that sews thread through the spine fold of one signature at a time in consecutive order. After sewing, the book block must be "nipped" to tighten the spine by squeezing the book together and applying a thin layer of cold glue to the spine to keep the spine tight. Layout Standard Trim: Spine – 0"; Head – 3/16"; Face – 1/8" Min.; Tail – 1/8" Min.
Specifications for Web Offset Publications (SWOP)	A standard set of specifications for color separations, proofs, and printing to encourage uniform standards in the industry.
Spine	Part of a book's cover or jacket, visible when the book is on a shelf, or the binding edge of a book or publication.
Spine Perforation	Cuts on the spine of a signature. Styles vary depending on binding requirements. Examples are Burst, Mini Burst, Saddle, and Sewn.
Spiral Binding	Binding with wires in spiral form inserted through holes punched along the binding side.
Spoilage	Planned paper waste for all printing operations.
Spot Color	A specific color in a design, usually designated to be printed with a specific matching ink, rather than through process CMYK printing.

Spot Varnish	Varnish used to highlight a specific part of the printed sheet.
Spread	When a publication is printed with several interacting spot colors, gaps or color shifts may appear between objects. A spread closes the gap by overlapping a light foreground object to a dark background.
Squares	Projection of the boards beyond the head, fore edge, and tail of a book
Stamping	Using a die and often colored foil or gold leaf to press a design into a book cover, a sheet of paper or other substrate. The die may be used alone (in blank stamping) if no color or other ornamentation is necessary. Special presses fitted with heating devices can stamp designs into book covers.
Standard Collation	Pages run in consecutive order within the signature for collating one Format signature on top of the next. (If 2 32-page signatures, Signature 1 would contain pages 1-32, Signature 2 would contain pages 33-64.)
Stay Drill	Cloth reinforcement used when making six-page or pocket end sheets.
Step and Repeat	Pre-press technique of exposing an image in a precise, multiple pattern to create a flat or plate. Images are said to be stepped across the film or plate.
Stock	Paper or other material to be printed and bound.
Stuffit	A Stuffit file is a common means of compressing and distributing data on the Macintosh platform. Through the use of a program created by Aladdin Systems, one can make a given file or folder much smaller for backup or distribution. The Windows counterpart of the Stuffit process would be to create and distribute "zip" files.
Substrate	Any surface on which printing or stamping is done.
Super	A gauze-like material added to the book block when casing in the add strength to the hard bound book
T Table of Contents	A list of chapter titles, main headings or other divisions of a book inserted in the preliminary pages before the main text.
Tagged Image File	An industry-standard file format developed for the purpose of storing Format (TIFF) high-resolution, bit-mapped, gray-scale, and color images.
Tail	Foot or bottom of a signature.
Tail Margin	Margin from the bottom of the type area to the bottom of the page.
Tear-Out Perf	A perforation made in the folder of a web press to allow the end user to easily tear out a page of the book.
Text	Body matter of a page or book, as distinguished from headings.
Thermoplastic Binding	A form of binding in which the pages are attached to a cover by means of a heat set plastic adhesive.

Throw-Out	Folded map or plan printed and bound in a book to fold out to a size larger than the page size.
Thumb Index or	Alphabetical or subject index cut into the fore-edge of a book (Thumb Cut) to facilitate quick reference. Dictionaries are sometimes thumb cut.
TIFF Downloader	A Kodak product that sends final output TIFFs to CREO plate setters for plating.
Tipped-In	An illustration or printed matter separate from the main work and pasted in correct position at its inner edge to the page following/preceding it.
Title Page	The right-hand page at the front of a book following the half-title page. The title page shows the title of the book, the author's name, the publisher's name and the year of publication.
Tracking	The process of uniformly increasing or decreasing the space between all glyphs (letters) in a block of text. Tracking is sometimes called character spacing or letter spacing.
Transparency	A selected color or area on an element in a page design that allows another page element behind it to become visible.
Trapping	A technique in which abutting colors are slightly overlapped to minimize the effects of mis-registration of the printing plates.
Trim	The cutting of the finished product to the correct size. Marks are incorporated on the printed sheet to show where the trimming is to be made.
Trim Marks	Crop marks placed on copy to indicate the edge of the page for trimming.
Trim Size	The final size of one printed image after the last trim is made.
TrueType	An outline font standard originally developed by Apple Computer in the late 1980s as a competitor to Adobe's Type 1 Font used in PostScript.
Typeface	The design name of the characters within a type family or font, for example, Times New Roman.
U Unders	Numbers of copies short of the quantity ordered.
Up	In printing, two-up, three-up, etc. This refers to the impositions of material to be printed on a larger size sheet, to take advantage of full press and binder capacity.
V Varnish	A clear liquid applied to printed surfaces for looks and protection.
Vector Graphic	A graphics format that uses shapes and lines, called paths. Vector graphics are resolution-independent graphics that appear smooth and crisp regardless of how magnified the image is on screen. They also can be enlarged as big as you want them without having jagged edges. This format is best for line art and logos that don't require complicated coloring or textures.

Veranda	Projection of the boards beyond the head, fore edge and tail of a book, known as squares.
Verso	The left-hand page of a book.
Vignette	A photo or illustration, etc., in which the tones fade gradually away until they blend with the surface they are printed on or into another color.
Vignette Halftone	A halftone whose background gradually fades to white.
Virtual Proof	Looking at a visual representation of a project on a computer screen versus looking at a physical hard-copy proof. Typically delivered to a client as a PDF file.
W Wash-up	Removing printing ink from a press and washing the rollers and blanket. Certain ink colors require multiple wash-ups to avoid ink and chemical contamination.
Waste	A term for planned spoilage.
Web	Roll of paper used in a web press and most often folded, pasted and converted in one continuous form. Also a ribbon of paper as it unwinds from a roll and threads through the press.
Web Guide	A device on a web press that by use of electronic eyes, keeps the paper web straight as it runs through the different sections of the press.
Web Press	A high-run, fast-speed printing press that uses rolls of paper rather than individual sheets.
Wire-O Binding	Continuous double series of wire loops run through punched slots along the binding side of a booklet.
With the Grain	Folding paper parallel to the grain of the paper.
Work and Tumble	To print one side of a sheet of paper, then turn the sheet over from gripper to back using the same side guide and plate to print the second side.
Work and Turn	To print one side of a sheet of paper, then turn the sheet over from left to right and print the second side. The same gripper and plate are used for printing both sides.
Write Once, Read	It is sometimes used when discussing computer storage media that can Many (WORM) be written to once, but read from multiple times. Examples of such storage media are CD-R and DVD-R.

X
Z

Xtension	A plug-in for the page layout program QuarkXPress.
ZIP	The filename extension used by files compressed into the ZIP format common on PCs.
Zoom	Enlarges the view of an object enabling you to see more details.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic or mechanical, including photocopying, recording, or otherwise, without the prior written permission of the publisher.

Printed in the United States of America.

© 2018 Thomson Reuters. All rights reserved. July edition.

The trademarks used herein are the trademarks of their respective owners.



THOMSON REUTERS