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Modern Printing Technology



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Printing is one of those inventions that have revolutionized our world and is the most important fundamental practices in our society. Nothing is more essential to civilization intellectually or commercially, than printing. Printing is widely used in our society to pass on information and to decorate objects. Printing is a process for reproducing text and images, typically with ink on paper using a printing press. It is often carried out as a large scale industrial process, and is an essential part of publishing and transaction printing. There are various types of printing methods such as screen printing, offset printing, rotogravure printing etc. Offset printing is a widely used printing technique where the inked image is transferred (or offset) from a plate to a rubber blanket, then to the printing surface. There is an enormous growth being witnessed in the printing industry. The emergence of the retail revolution and growing education across the country is acting as a fuel to the growth of the printing industry. The Indian Printing Industry is well established and presently growing at 12% per annum.

This book provides you details about the various methods and techniques involves in modern printing technology. Some of the fundamentals of the book are multi colours, paper publishing unit, screen printing, offset printing press, rotogravure printing, desk top publishing, computer forms and security printing press, printing inks, ink for hot stamping foil, aluminium printing plate for offset printing machine, screen printing on cotton, polyester and acrylics. The book also covers process, project profiles of different types of printings and printing inks manufacturing along with sources of machinery and raw materials.

The book provides you with comprehensive information on modern printing technology. Basic information in entering a market and the opportunities and requirements of the potential sector has been the best way to penetrate in a market. How and what if properly answered can take you to a long way. The first hand information on different types of modern printing technology has been properly dealt in the book and can be very resourceful for those looking for entrepreneurship opportunity in this sector.

## Tags

Aluminium Offset Printing Plate, Aluminum Printing Plate, Application of Screen Printing, cheap ways to do screen printing, Computer Forms & Security Printing Press, desktop publishing tutorial, Digital Printing Inks, flexographic printing business plan, Flexographic Printing Inks, Flexographic Printing: Technical Process, Flexography Printing Process, Gravure Printing industry, gravure printing process, gravure printing technology pdf, Great Opportunity for Startup, How to Make a Screen Print, how to make offset printing plate full processes, how to set up a printing press business, How to Start a Printing Press Business - Startup Business, How to Start a Successful Printing Press Business, How to Start My Own Small Printing Business, How to Start Printing Industry in India, How to Start Up a Printing Business, Modern Printing Process, Modern Printing Technology book, Modern Printing Technology, Modern Technology of Printing & Writing Inks, Most Profitable Printing Business Ideas, Offset printing plates, offset printing press business plan, Offset printing technology, Offset Printing: Start Your Business, Opening a Printing Press Business, Pad Printing Inks, Printing and paper Technology, Printing Based Small Scale Industries, printing business ideas in India, Printing Business, Printing Industry in India, printing inks types, printing press business ideas, printing press business plan, Printing processes: Offset, Flexo, Gravure, Printing Technologies –Flexo Printing –Gravure Printing, Process technology books, Profitable Small Scale Printing Business, project for startups, Rotogravure printing - Rotogravure printing process, Scrap Offset Printing Aluminium PS Plate, Screen Printing Inks, screen printing process, Screen Printing Techniques, screen printing tutorial, Security Printing and Integrated Forms, Security Printing, Setting up and opening your Printing Business, Small Start-up Business Project, Start a Security Printing Business, Start up India, Stand up India, Starting a Printing Business, Starting an Offset Printing Press, Start-up Business Plan for Printing

Process, startup ideas, Startup Project for Printing Business, startup project plan, Web Offset Machines, What Equipment Do I Need to Start a Printing Business?, What is Desktop Publishing?

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**Sample Chapter:**

# MULTI COLOURS 8 PAGE PAPER PUBLISHING

## UNIT

### INTRODUCTION

It is perhaps Edam realized that the twentieth century is not so much the atomic age as the age of mass communication better, faster, more efficient international communication: an age of which the atomic race is only aspect. Visual communication a term coined only recently the graphic and typographic arts output and standard of printing have grown to crude process used only for short runs is giving way to an appreciation of the special characteristics effects and advantages of offset printing.

#### **Printing Cycle for Direct and Indirect or Offset Printing**

At the preparatory or preparing stage the operation involved converting the original to be reproduced into a printing plate or image carrier. The starting point in all printing processes is the original or copy. In all other cases the original is converted to the form for printing by photo mechanical means.

#### **Letterpress**

Letterpress is a "relief" process that is, the printing surface holding the image to be printed is raised above the non-printing background.

In traditional letterpress, all the text is printed from metal type and pictures from letterpress blocks. These elements are assembled together (imposed) to create a "frame" inside a rigid frame (chase), which is placed in the press. A development of letterpress uses "stereo" or "electro" plates for each page or for the whole "forme".

These are four main types of letterpress printing machine, all combine the following elements, inking, printing, feeding and delivering.

The image areas of the letterpress block are raised while the non-image areas are recessed so that they do not pick up ink. The plate is inked by a roller. Paper is placed over the inked image and pressed on to image in the press by an impression cylinder resulting in the image being printed on the paper.

#### **Offset Press Operation**

Offset presses are rotary in nature and use the principle that grease and water do not mix to deliver the desired impressions on paper.

The printing section of the press includes a plate cylinder, an impression cylinder a blanket cylinder, linking rollers, a moisture system and a plate adjustment (Registration) device.

That all material to be printed is on one thin, flat, and pliable plate is one of the various uses of the offset process.

Once the plate is on the press the operation must apply, the moisture (water plus an additive) to the surface of the plate. When ink greases is applied, it adheres only to the image area and is repelled by the water wet portions. Because of the water grease action and its photographic nature, offset printing is considered a chemical process.

### Bureau of Indian Standards Specifications

The following Indian Standards Specification are available for reference

I.S. 11610-1986

Rubber rollers for offset printing size A4

I.S. 6830-1973.

### Uses and Application

The offset press is characterized by the following important advantages over other printing methods;

1. The rubber printing surface conforms to irregularities in the paper surface. Less printing pressure is needed and print quality is improved. Half tones of high quality can be printed on rough papers.
2. Paper does not come into contact with the metal printing plate. Therefore the plate is less subject to abrasive wear and can run much longer editions.
3. Speed of printing is increased. The effect of press improvements on printing speed.
4. The image on an offset printing plate reads right instead of in reverse or wrong reading. This facilitates both hand and photomechanical preparation.
5. Less
6. Ink is required for equal coverage. This reduces trapping problems and decreases to tendency of the printed sheets to smudge/and set off i.e. produce a mirror image on the back in the delivery pile. Also drying is quicker.

### **Photo Offset Printing**

Photo-offset printing of increasing interest to everyone in the field of communications differs from letter press because it is:

1. Photographic
2. Plan Plano graphic (printing is done for a flat surface)
3. Chemical is natural rather than mechanical
4. Usually indirect rather than direct, each of the above can have an effect on editorial as well as a mechanical procedures.

## **MARKET SURVEY**

India is one of the big country having about 900 million population. The estimation is made that about 37% people are educated now. The growth in the percentage of educated people is taking place day by day with establishment of new school, colleges, education institutions and other. Similarly demand of books, publications etc. is also increasing. This needs establishment of new printing process, viz. Offset, Treadle Letter, Flexographic, Rotogravure, screen Printing etc.

For publication or printing of books, advertisement materials, packaging materials and others.

Presently the South Zone had the highest number of commercial printing presses in India. That is 30 percent followed by the North Zone is in the leading position with South zone a close second.

### **Type of presses :**

Out of the total of 72,137 presses, all except about 1,000 fall in the category of General commercial Presses.

### **Ownership :**

About 90 percent of the printing presses in India are either proprietary or partnership concerns.

### **Category of work :**

Jobbing work accounts for over 60 percent of the income of the printing presses in India. Next importance is book printing, packaging and publicity material.

Another significant change that has take place is the increase in the share of publicity material from four percent to nearly seven percent. This is mainly due to the increase in the production of consequent increase in advertisement.

It will be observed that of the 44 percent of the presses located in large cities, the vast majority (over 70% are in the metropolitan towns) and the remaining 56% a relatively small percentage, (below 30% is in semi-urban areas). There are hardly any printing presses in rural area.

## **ROTOGRAVURE PRINTING**

# INTRODUCTION

Printing as an art of graphic communication is so ancient that it is not certain when it was invented. It is reported to have originated in China. Printing from stone inscriptions and from wooden blocks, i.e. engraving in relief text and pictures on stone or blocks of wood and printing the relief impression with ink on paper was practiced in China as early as sixth century A.D. The oldest book in existence is known to have been printed from blocks in A.D. 868 in Japan.

The turn of the nineteenth century, there has been a phenomenal advancement in science and technology, which radically changed the mechanism involved in composing and printing techniques. Development such as application of power to printing press and later adoption of photographic techniques to printing processes, have enabled incredibly fast rate of reproduction in highly mechanized presses, quick and precise preparation of printing surfaces and tremendous improvement in quality of the printed material. The four process families are Plano graphic printing, intaglio printing screen printing, gravure printing.

The modern commercial derivations of the intaglio process are based on photography and photo mechanics. These are rotogravure and sheet-fed gravure. Of these the largest and the most important commercially is rotogravure, which is used in news papers roto sections for some of the big edition magazines and for big commercial works.

Rotogravure employs an exquisitely polished copper cylinder as the printing surface and makes use of a screen to break-up the light and dark areas into small unshaded dots.

The etched cylinder is designed for running on a web-fed rotogravure machine. The cylinder revolves in a through of a ink, the ink floods over the surface of the cylinder and is at once scraped clear by a thin blade called "doctor". This blade of cylinder length keeps the surface free of ink, but leaves the cells full.

## Methods of Plate Making

Printing image carriers of plates or cylinders can be produced in any or a combination of six different ways:

### 1. Manually: -

By the use of hand tools, engravers, knives etc. to produce image-carriers for the relief and intaglio.

### 2. Mechanically :-

With the help of engraving and geometrical ruling machines, pantographs etc. for the relief and intaglio processes but hand transferring and Benday machines can be used for lithographic plates.

### 3. Electromechanically

### 4. Electronically

### 5. Electrostatically

### 6. Photo mechanically

## Gravure Plate Making and Cylinder Making

The adoption of the cross line screen for photogravure printing initiated the modern commercial process.

Modifications for multicolours printing have been made.

## Printing Surface

Modern gravure printing is done principally from images etched in cylinder on web processes and is generally referred to as rotogravure. On sheet-fed presses the printing element is a thin copper plate, which is wrapped around the cylinder. Preparation of the printing surface is essentially the same for cylinders and for plates.

For monochrome printing by conventional gravure, bichromate sensitized carbon tissue or transfer film is contact-printed through a continuous tone positive and then exposed a second time while in contact with a screen consisting of transparent lines and opaque square dots. Warm water is applied and the paper for the carbon tissue or backing of the film is peeled off. The gelatin thus transferred to the copper surface is further developed with warm water to produce a gelatin relief resist. The areas corresponding to screen

lines remain unetched and provide lands. Which support the doctor blade in printing. For long runs and to minimize wear, the etched cylinder or plate is chromium plated.

For multicolours printing the principal process involves a combination of halftone and continuous-tone positives for each colour. The halftone positive has a lateral dot formation, which is similar to conventional gravure in the shadows but with varying dot sizes in the middle tone and highlights. In the direct transfer process, only the special halftone positive is made. This is contact-printed directly onto the copper cylinder, which has been sensitized with a photopolymer of the cinnamic ester type. For long runs the cylinders are chromium plated.

After the gelatin layer has been transferred face down to the copper surface, treatment with warm water dissolves the under-hand parts, leaving a gelatin relief resist. The thinnest areas are penetrated first by ferric chloride solution are etched deepest, the print the shadow tones of the picture. The areas where the resist is thickest are penetrated last by the etchant, are etched the least and print the lightest tones.

### **Limitations**

The serious problem with gravure cylinder making has been the difficulty of reproducing identical cylinders from the same films due to difference in materials, etching solution, impurities in copper, environmental conditions and other factors. As a result, repress proofing has not been successful and corrections must be made on the cylinder, which is expensive.

### **Gravure**

Gravure printing is from sheet-fed presses, which involves plates. By far the greatest amount of gravure printing is from cylinders on rolls of paper or film. This is desirable in packaging but not as necessary in magazine printing. The gravure printing unit consists of a printing cylinder and an impression cylinder, and an inking system. Ink is applied to the printing cylinder by an ink roll or spray and the excess is removed by a doctor blade and returned to the ink function. The impression cylinder is covered with a resilient rubber composition, which presses the paper into contact with ink in the tiny cells of the printing surface.

Gravure ink consists of pigment, a resin binder and a volatile solvent. It is quite fluid and dried by evaporation. For high speed printing, the solvents are quite volatile and the linking system must be enclosed. In multicolours printing, where two or more gravure units operate in tandem, each colour dried before the next printed. The web therefore is passed through a heated dryer after each impression. Single-colour rotogravure printing yields excellent pictorial reproduction on a wide range of papers. Its reproduction type matter and line drawings leaves something to be desired.

## **Uses and Applications**

Gravure or intaglio printing finds applications in the production of newspaper, supplements, book review sections, feature magazine, catalogues, illustrated magazines, advertising literatures, calendars, greeting cards, wall papers, patterns in textiles, linoleum and oil cloth, labels and wrappers on aluminium foil, gasoline, cellophane, vinyl polymers, LDPE, HDPE, PP and similar other materials, security papers, paper money and stamps etc.

### **Printing Industry in India**

Printing was introduced in India in 1556 by the Portuguese when they established a press in Goa. The first book "Doctrina Christas"™ printed in India, in foreign language, as is said to have come out of this press in 1957.

# **DESK TOP PUBLISHING**

## **INTRODUCTION**

Evolution of cheap and powerful microcomputers, development of comprehensive word processing and page planning software and availability of near letter quality laser printer with ability to mix various front



styles and graphics, have made concept of Desk Top Publishing a reality.

Over the last few years, computers have penetrated every respect of industry, business and education.

They have totally changed the way in which information is processed. Now with the advantage of desktop publishing (DTP), the method of presenting information has also changed.

Today man has a tool, which allows him to design, layout and produce printed matter right at his desk. One can create newsletters, reports, data sheets, and brochures in a matter of minutes on a computer screen, and print it out on a laser printer in seconds.

The revolution in desktop printing started in 1985. Though the technology is just Eleven years old, already plenty of hardware and software options are available.

Like any other computer system the three main components of DTP are hardware, software and printer.

The system is equally comfortable with text or graphics. The both can be mixed at the same time.

For IBM PC, an additional RAM, a floppy disc and a colour graphics adapter (CGA), or enhanced graphics adapter (EGA), or Hercules monochrome graphics adapter are required.

Graphic tools (for making lines, boxes and moving text etc.) are manipulated by an input device such as a mouse or graphic tablet. Although one of these is recommended, in most cases they are not absolutely necessary.

## MARKET SURVEY

In the Indian Market DTP System manifests itself in three distinct forms, and an end user who accepts the quality of a laser printer has to select from the option available.

In the IBM and its compatibles environment a PC/AT or a PC/XT can successfully, support the various publishing software packages released. The user has to select a compatible combination of a word processor, graphics and front generator, page makeup and type setting programme and PDL as an integrated package.

The resolution of the monitor is improved by addition of a Hercules or EGA Card. The software packages selected have to be mastered through manually.

Abacus Computers Ltd. has released "Linos"™ desk top publishing package. It comprises a 20 MB hard disk, accessed by a PC/XT supporting a mouse, a monochrome monitor, Hercules upgrade and Laser writer as the output device.

Linos can typeset text in 34 different fonts supported by the laser writer plus, and the text can vary in size from 4 to 127 points in steps of 0.5 points.

Graphics files from Lotus 1,2, 3 and PC-Paintbrush can be incorporated anywhere in the running text. Linos can also recognize files from word star 2000 and Microsoft Word through suitable translations available.

Linos power and shortcomings can be best appreciated by typesetting operation.

Apples Machintosh DTP system is distributed in India by Raba Contel. The generation of icons and windows, the ease of their manipulation with a mouse, the versatility of the graphic packages.

The mouse may at time feel clumsy and the cursor movement is not as efficient as in the PC environment.

Competent technical and training support with regard to the system software is difficult to get.

Another alternative is to look for a compatible phototypesetter. Linos can produce a comugraphic compatible disc and Ginasho Overseas at Delhi is a commercial center, which helps in switching from the PC-environment to commercial typesetting. Set and send, a software package from Bree Communications inc. converts a Macintosh diskette to an MCS compatible version.

To sum up, desk top publishing has come to stay. But its full potential and applications by only be realized by those conversant with the various packages available.

### Laser Printers and Digitizers

Desktop publishing involves many components, but without good output devices, all the effort that goes into

designing and laying out pages is wasted. Currently, the primary high-resolution output device in a desk top publishing operation is the Laser printer. Most good looking documents that result from desktop publishing are nicely formatted type.

Laser Printers and digitizers as much as computers and software-makes desktop publishing a personal rather than a strictly corporate or industrial endeavour.

### **Laser Printers**

A laser printer is a photocopier. In fact, many such printers use the same technology that photocopiers do, a photosensitive drum temporarily holds an electric charge in the shape of an image transferred to it by a computer-driven laser beam. The charges and the image carried within it are transferred to a sheet of paper as it rolls across the drum. The paper then attracts the toner (plastic ground into a fine powder) and heat bonds the toner of the paper.

### **Digitizer; Producing Graphic Images**

A digitizer transforms an image into digital information you can store in a computers memory or on a mass storage device. You can then transfers that information to a bit-mapped screen, whereas you can edit it repeatedly, or to a high resolution output device such as a laser printer. Digitizers are of two sorts: Video and Optical.

Video digitizer use the standard video signal produced by, typically, a video camera, but also by a VCR or even a television set that can emit a video signal. A video signal digitizer scans an image and turns each element of the image into a binary number.

An optical digitizer scans flat art of with a tiny beam and converts the amount of reflectance into digital information similar to that produced by a video digitizer. The number translation process for displaying the image on a big-mapped screen and printing on a printer are the same for optical digitizer as for video digitizers. Thunder Scan is optical digitizers.

### **Software**

Two main types of DTP software are: the Page Make-up program and the Type setting program. Such programmes combine the conventional roles of the typesetters and the paste up artist. Text can be typed, arranged in columns and blocks on a page. It is also possible to break up to text, add headlines, captions and subheads.

The graphics may be as simple as a box or a line, or as complex as a line drawing, or digitized photograph. Macintosh page make-up programs are: Ready Setgo, Page Maker and Mac Publisher. The allow mixing of text and graphics freely and are compatible with together Mac programmes such as Mac Write, Mac Word, Mac Draw and Mac Point.

Typesetting software is for creating galleys, which are cut to proper lengths to be pasted manually on a page.

Typesetting programs offer more features and flexibility then page make-up software. Two most desirable features are kerning and letter space justification.

### **Page Make-U Programs**

**Page Maker:** Aldus Corpâ€™s Page Maker for Mac got DTP off the ground. It has simple menu commands, WYSIWYG (what you see is what you get) displays, the ability to incorporate text and graphics from other programs and to output to high resolution printers and typesetters.

Pager Maker permits working on a WYSIWYG view of a page in three different sizes â€“ normal reduced and enlarged. Each view gives accurate presentation of what will appear at the laser printer.

Commands which, are displayed on the top of the screen are : file, edict, tools, page, type, lines and shades. Toolbox has eight tools (arrow, angled line, straight line, text, rectangle, round-edged rectangle oval and picture cropper) for creating some simple graphic image.

Selection arrow is used with the mouse to move elements around the page to resize objects and to select

them for cutting, pasting, editing. The line tools create lines of any thickness, with or without shading. The rectangle, round-edged rectangle and oval tools make basic shapes, which can be black or which, open or filled with a pattern. Any shape can be resized and moved by arrow. Picture cropper is for pasting graphics anywhere on the page. It does not resize the graphic but blocks of parts that are unwanted.

Page Maker has three blue pencil tools to align elements on the page. The first is a snap-to grid, with which size of the grid is specified and all elements automatically line up to this grid. If it is turned off, elements will no longer line up with the grid. However it can be turned on to realign the elements.

The second alignment tool is the column guides which align text and other elements to the left, centre, or right side of the column margins.

Finally, there is set of ruler guides which help to line things up. Ten guides per page can be used. It has a built-in ruler (metric, inches or points).

# COMPUTER FORMS AND SECURITY PRINTING PRESS

## INTRODUCTION

Two incidental discoveries set the stage for what rightly be called the "Age of completion"™ in graphic communication, both incidents, through many years apart, brought about a new printing process, called photo offset lithography, commonly known as offset or photo-offset.

The process picked up its most common name "offset" printing, as the second incidental discovery. Ira Rubel, New Jersey Lithographer.

Printing is important in the line of education (books, magazines), sociology (wedding cards and greeting cards, birth day cards, politics posters etc.). Every day more and more people are adopting this phenomena and is now an integral part of every organization and business house.

Computer forms are ordinarily blank ruled or reprinted papers, according to the requirements. The papers are in the form of long sheets of definite width with holes on both sides for feeding it to the printer. The sheets are perforated at definite intervals to make handling easy. The width of the sheet is subject to the particular requirement and varies widely.

## MARKET SURVEY

In India the growth of the printing industry had been comparatively slow during the first 25 years after independence. According to Govt. of India statistical abstracts, the growth rate from 1961-62 to 1968-69 in the number of printing processes was about four percent. However, the growth rate has been faster since then due to increased industrial activity, growing literacy and mass communication programmes concerning health agriculture etc.

Today there are approximately 2,00,000 printing presses in India and the estimated investment in these is around Rs. 300 crore. However more than 65 percent of these presses are in small and tiny sectors, with annual turnovers in the neighbourhood of only 2.5 lakh per year. The return do not encourage re-investment in either technology or human resources skills.

Considering the Government's™ approach towards massive expansion in Indian industry, the printing industry has to grow in a similar way and there is a large scope for expansion in the following areas.

- (i) Commercial Printing
- (ii) Book Printing
- (iii) Business Forms Printing

## INK FOR HOT STAMPING FOIL

# INTRODUCTION

Printing inks are complex colloidal solid liquid dispersion consisting of pigment particles, a binder (usually a polymeric resin), a solvent or solvent blend and sometimes filler particles, which can act as rheology modifiers. The complex nature of these materials means that slight modifications in the formulation. By changing the source of the pigment can have marked effect on the properties of the inks.

ER 125 is an almost totally pure aliphatic hydrocarbon with less than 0.05% impurities content. Raw material for ER 125 is gilsonite resin a natural occurring hydrocarbon mineral.

Phenolic alkyd resin commonly found in black heated ink recipes. The makers produces a heat set ink by first making free flowing varnish, then a grinding media and finally gel varnish using one resin each ER 125 Phenolic and hydrocarbon. These varnishes essentially 50% resin plus 50% aliphatic solvent except for free flowing, which required extra solvent to yield the desired viscosity.

## Properties of Hot Stamping Ink

1. It has greatly increase inflow.
2. It has low tacking property and excellent tack stability.
3. It has low tack and high gloss level at the same time.
4. High gloss level at lower solid level.
5. It has excellent carbon black wetting.

## USES

1. It is used for printing in the hot foil for marking outer packages. It replaces expensive preprinting costly labels.
2. It is possible to mark messages in varying sizes and in different colours (red, blue, green, black etc.)
3. It may be used for marking date of manufacturing, expiring date, name and address of customers/manufacturer. Product name or code shipping instruction. Packing details net/weight/gross weight. Price in voice number/challan number, statutory number.
4. It improves finish and legibility.

## B.I.S. SPECIFICATION

There is no B.I.S. Number availability ink for hot stamping foil.

I.S. No Ink " Duplicating for single drum machine	1333
For twin cylinder machine	1222
Printing containers for round	3680
Ink for using glossary	4724

# ALUMINIUM PRINTING PLATE FOR OFF-SET PRINTING MACHINE

## INTRODUCTION

Printing is all around us. It is part and parcel of our lives twenty four hours a day. Is it possible to imagine our civilization without printing when the alarm rings you look at the clock to see the time, the face of clock is printed. You stretch and slide out from the between printed sheets and go to the bathroom. There you are surrounded by printed materials, tooth paste-tube, counter top, various bolts, containers, paper products, showers, curtains, soap wrappers, towels and possibly the wall paper. Even your tooth brush and comb

having printing on them. There are four main printing processes, relief or letter press, interglo or gravure, stencil or porous printing plates are used in offset on lithographic printing. It offset printing the matter to be printed is utilized in the plates. These plates are made up of various metals.

Most lithographic printing is done from aluminium plates.

## PROPERTIES

Crystals structure of aluminium is closer and finer, gives fine grain surface with better hold for water, but shorter in life than zinc. Aluminium takes slightly sharper and deeper grain than zinc and due to relative hardness is capable of giving longer impression.

Aluminium plate weights less than half of zinc and less cumberled carefully to prevent kinking, which cannot flatter. Aluminium being whiter and brighter makes the image areas visible.

Aluminium dissolves rapidly in caustic soda and caustic potash solutions with the evolution of hydrogen and formation of alkali aluminate.

## MARKET SURVEY

In the early part of the twentieth century, there was a great support in the printing industry all over the world because of spread of literacy and growth in trade and commerce. However the progress of the industry in India was very slow owing to foreign domination. The bulk of the print was obtained from Europe. But after independence situation changed rapidly. The bulk of the print which we were importing now we started producing in India itself. Government's various educational programme, nation building activities and the rapid development of trade and industry during the successive five year plans give a stimulus to the printing press.

Production of printing plate, which is normally confined to small scale production. With the tremendous increase in the printing process the demand for printing plates is vast with the increase in literacy, educational activities and all around development of the nation, the printing industry is getting the proportional boost. Different type of press which may be under private or public sector are buyer of the printing plate in comparison with other metal plate closer and finer gives fine grain surface with better hold for water; are in much demand in the market.

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