PUBLISHING A BOOK ON DIGITAL CONTROLLING UNIT FOR pH, CONDUCTIVITY AND RH IN SHEETFED OFFSET.

PUBLISHING A BOOK ON DIGITAL CONTROLLING UNIT FOR pH, CONDUCTIVITY AND RH IN SHEETFED OFFSET.

A Project Report in the partial fulfillment for the requirement of obtaining an award in the study of Diploma in Printing Technology

By

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Under the Guidance of

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MARCH-2018

SIGA POLYTECHNIC COLLEGE

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CERTIFICATE

This is Certify that entitled “PUBLISHING A BOOK ON DIGITAL CONTROLLING UNIT FOR pH, CONDUCTIVITY AND RH IN SHEETFED OFFSET.” is the Bonafide work of the following student of Diploma in Printing Technology, who carried out The Project under my guidance and supervision.

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I certify that the best of my knowledge the above mentioned Project is not Part of any other Project

Submitted for the end semester practical exams held on .....

Mr. V. John Fredrick, M.Sc., B.Ed., M.Phil., (B.Tech), PGDCA, COMP, DDTP.

Project Guide

Mr. J. Ignatius Adaikalaraj, B.E

Project Co-ordinator

Rev. Fr. P.T. Joseph, SDB

Principal

Internal Examiner

External Examiner

FOREWORD

This record is consonance with the curriculum for the Diploma in Printing Technology. The project work was undertaken by us for this beneficial objective.

This record consists of detailed description of the Raw water, RO water, Dampening solution, pH, Conductivity, and RH

This live experience and practical work will be helpful to our career. While doing this project we have learned to work together as a team recognized each other insight and wisdom.

ACKNOWLEDGEMENT

We express our sincere gratitude and inbedtedness to our guide Mr. V John Ferdrick along with our head of department as well as our project cooridanator Mr. J Ignatius Adaikalaraj, SIGA polytechnic college, their valuable suggestion in the field of pH, Conductivity and Humidity their constsnt encouragement,support and care throughout the course of our project work.

We are extremely thankful to

Rev. Fr. John Christy, SDB (Rector),

Rev. Fr. Stalin Dhanaraj, SDB (Vice Rector),

Rev. Fr. P.T. Joseph, SDB (Principal),

Rev. Fr. Charles Gaspar, SDB .(Vice Principal / Administrator)

for giving us various permssions to carry out this project work at SIGA. We are very thankful for their valuable support and encouragement. We express our sincere thanks to Mr. Muthu Kumar, Retd. Technician of Annamalai university Chidamparam and Mr. Vinoth, Offset Printer at SIGA for their concern and their help for compeleting our project.

We are thankful to all the teaching and non teachng staff of SIGA Polytechnic College. We adequately express our gratitude to our parents and to our family members whose love, encouragement and patience are beyond compare

Content

Chapter-I INTRODUCTION

1.1 Water quality in offset printing 1

1.2 Planning 1

1.3 Process 2

1.4 Machine selection 2

Chapter-II LITERATURE REVIEW

2.0 Introduction To Offset..... 3

2.1 Sheet-Fed Offset 4

2.2 Feeding unit 4

2.3 Dampening system 6

2.4 Prining unit..... 7

2.5 Delivery unit 8

Chapter-III METHODOLOGY

3.1 Dampening solution 9

3.2 Dampening solution ingredients 10

3.3 Water 10

3.4 Fount solution compenents..... 12

Chapter-IV EXPERIMENTAL OVERIVEW

4.1 pH meter..... 18

4.2 Conductivity meter..... 21

4.3 RH meter..... 22

4.4 Better quality prints with the right humidity..... 24

4.5 Measurement 26

Chapter-V FABRICATION

5.1 Preparation of cricuit Board 28

5.2 IDE 31

RESULT 39

BIBLIOGRAPHY 40

Dedicated to.....

To SIGA, for its loving Guidance and concern for us

COST OF OUR PROJECT

Travel Allowance	:	300
Draft Printout	:	250
pH Probe	:	1,449
Conductivity	:	1,449
Thermo Hygrometer	:	699
Circuit Board Preparation	:	2,500
Miscelleneous Expenses	:	1,200
Report Printing and Binding	:	2,400
Book Preparation	:	1,000
TOTAL	=	11,247

4.6 PROJECT WORKFLOW

12-12-2017 - Collecting the information on topic.

23-12-2017 - Study about pH, Conductivity in Sheet fed offset.

04-01-2018 - Study about RH in Sheet fed offset.

10-01-2018 - Measuring the parameters of pH, Conductivity and RH in Heidelberg SM 72. (SIGA Press)

19-01-2018 - First Review.

07-02-2018 - Materials bought for the project.

10-02-2018 - Circuit Board preparation.

12-02-2018 - Book preparation started.

16-02-2018 - Second Review.

23-02-2018 - Study about the working of pH, Conductivity meters and Hygrometer.

28-02-2018 - Preparation of Report.

07-03-2018 - Completion of digital pH meter and Conductivity meter.

15-03-2018 - Tested the prepared meter's in the press.

SYNOPSIS

Lithography is a chemical process with the potential for many variables to affect the quality of the printed job. The most common fact of printing prone to variation is fountain solution, but understanding it and controlling it can pay immediate dividends. To ensure that the fountain solution is doing its proper job, it is critical that two measurements are monitored and controlled – pH and Conductivity.

There are several reasons pH is monitored. One reason is its role in metal plate desensitization. Another reason is its effect on ink drying. When the pH of a fountain solution becomes too acidic (below 3.5), ink drying is severely retarded. It has been suggested that an increase in acidity from 4.0 to 2.0 can actually lengthen drying time by 400%. Excessive acidity often adversely affects the ink by breaking own its water resistance and causing problems such as tinting and piling. Conversely, a fountain solution found to be too alkaline can result in scumming, loss of plate desensitization and difficulties in re-starting clean after a press stop.

The pH range for most offset printing should be between 3.5 and 5.5. Achieving the proper pH level varies with the fountain solution manufacturer's recommendations but also with the chemical composition of the water that is being used. Unfortunately, a pH reading often will not give a true indication of a fountain solution's strength or concentration. That is better accomplished by measuring conductivity. This work is to prepare and establish a digital display and controlling unit for pH, conductivity of the dampening solution and the RH of the press room. A digitally connected pH and conductivity probe, inserted in the dampening unit, will display the pH and conductivity in a separate LED display unit in the press room.

When these parameters are changing within the stipulated range will alarm the operator visually and sound. This will aid operator for better control over the pH, conductivity and RH digitally. The quality of the printing is to improve along with better press room management.

Chapter-I

INTRODUCTION

The project aim is presenting the qualified dampening solution for the selected machine. Only the pH level doesn't gives the recommended value for the dampening, the major thing is that conductivity value has to be maintained. The press man or workers is not worried about the conductivity value for the dampening solution.The importance of conductivity is known to the printer but he is not paying much concentration to it.

Though, the print quality varries by the variation of pH value, the press man takes necessary steps to overcome it. The only way to overcome is to maintain conductiv ty level recommended. The press man tries to get more or less print quality. Once it is got ready, then he is able to run the given job. The level of maintaining conductivity level is not known to the press man or he people who use it. Here we have tried to maintain the conductivity level of different water samples used for dampening solution in sheetfed of fset.

1.1 Water quality in offset printing

The quality of printing in offset printing is highly inflenced by the presence of hardness producing salt in dampening solution. The quality and quantity of salt present in water along with the other parameters viz. acidity, alkalinity and conductivity are the influencing factors in the quality as well as the maintenance of the machine, wear and tear of machine components , etc.,

1.2 Planning

We have planned time schedule for your project. we have planned the work, that we were about to do. The process of our work flow is buying the probes for pH, Conductivity and RH. Also studying about the influence of pH and Conductivity in offset press.

We have prepared the individual digital meter for pH and Conductvity, also for RH we bought hygrometer. We visited various shops and consulted various persons about our topic and how to implement our project. Then we started our work flow as per the ideas given by our guide.

1.3 Process

The selection of topic mainly depends on quality work flow of the press. We are printing students, and so it is appropriate to work in press field. Though there were other options we choose the topic relating to the press field. The SIGA press is also giving various options for us to grow. So we are preparing the live feed of pH and Conductivity in the dampening unit, and also the RH in the press room we have try to know the various criteria which is influencing the printing process by dampening solution.

We have taken into consideration about the topic and its use in the press. We had measured the parameters of the dampening solution. The RH is also standardized through our project. The machine is also set for processing our project. Though there were many other machines which were avaliable in SIGA, which use to work in four color Heidelberg SM 72 sheet fed offset machine

1.4 Machine selection

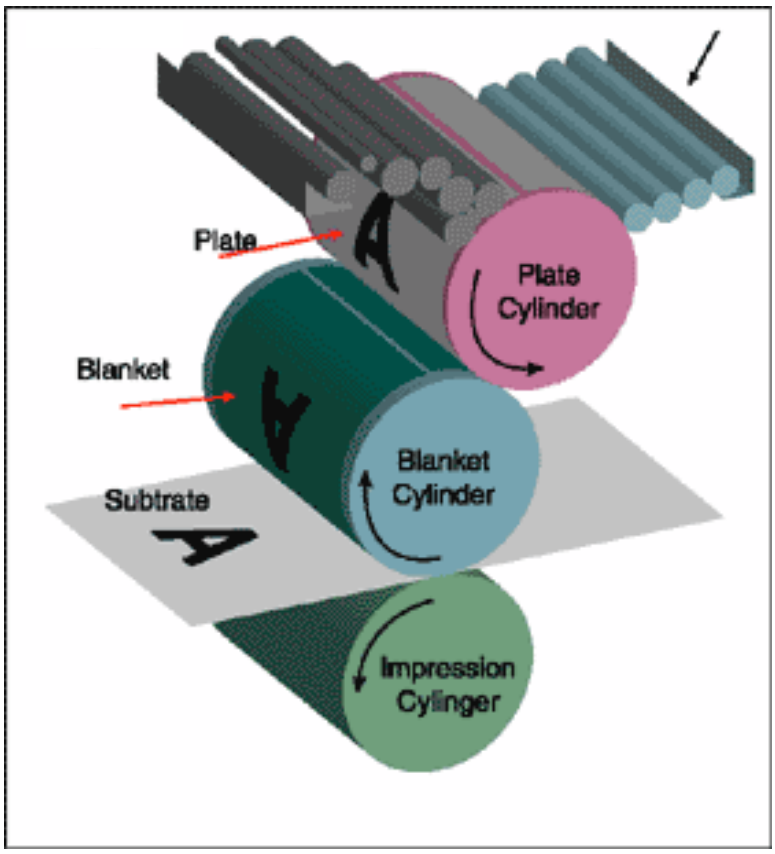
The famous machine from Germany, Heidelberg had produced a vast impact in the printing industry. We too have the same machines with us, in SIGA Polytechnic College. We choose to print in two color Heidelberg SM 72 machine because, the Heidelberg will be using constantly in the press for the job. And so, we choose to work in this machine. We have checked the room temperature, pH level, conductivity level for the dampening solution in the dampening unit.

Chapter-II

LITERATURE REVIEW

2.0 INTRODUCTION TO OFFSET

The invention of lithography is credited to Alois Senefelder in 1798 in Munich, the Kingdom of Prussia (now Germany). He became interested in letterpress printing and worked with different printing plates, inks and surface treatments. Offset lithography is the most widely used print process. About 40% of all print jobs are produced with offset printing. It is an indirect printing process which means that an image is transferred or offset, from one surface to another. A printing plate mounted on a cylinder transfers the image to a rubber blanket mounted on another cylinder. The image is then transferred from the blanket cylinder to the substrate as the substrate passes between the blanket cylinder and an impression cylinder. The image on the plate is "right reading" and when the image is transferred to the blanket it becomes "wrong reading". When the image is transferred to the printing surface it becomes right reading again.



Offset Printing Process

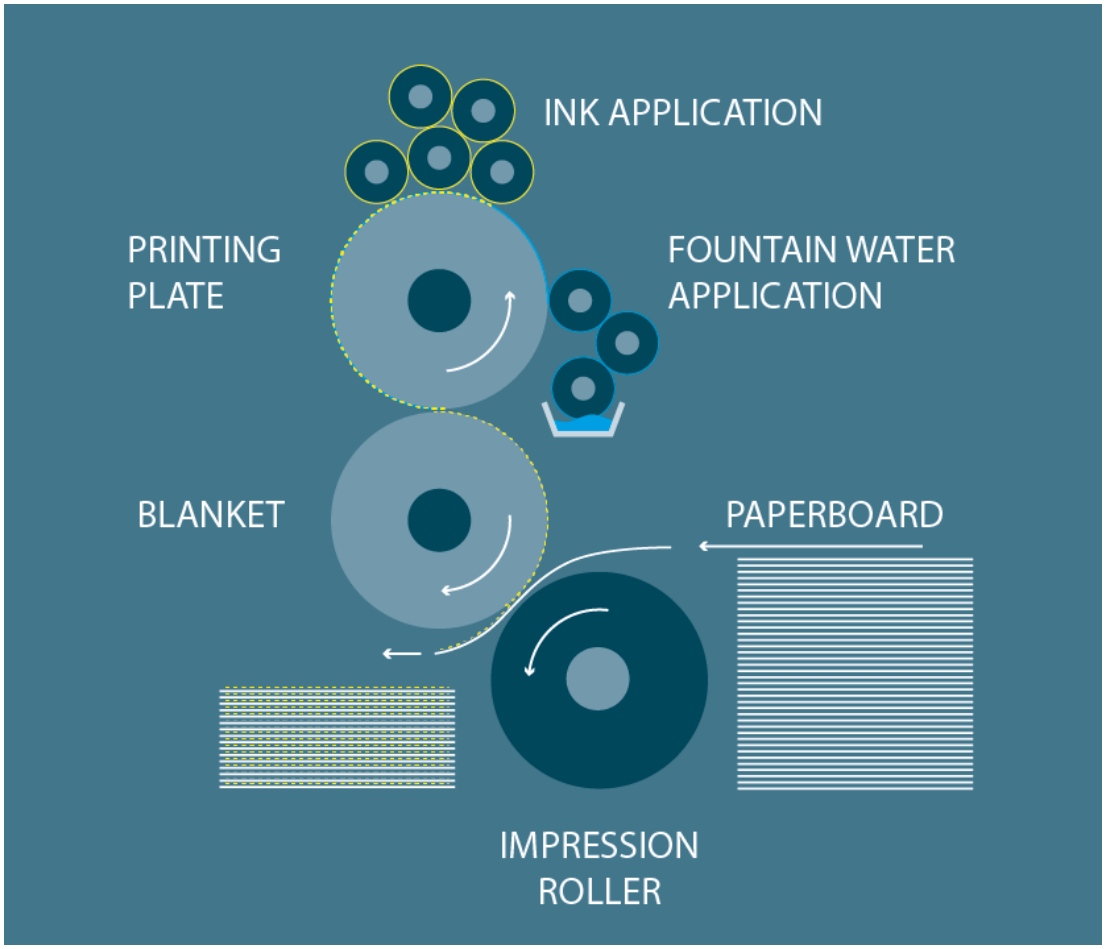
2.1 SHEET-FED OFFSET

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. When used in combination with the lithographic process, which is based on the repulsion of oil and water, the offset technique employs a flat (planographic) image carrier on which the image to be printed obtains ink from ink rollers, while the non-image area attracts a film of water, keeping the non-image areas ink free.

There are five main units present in Sheet-fed offset printing machines, they are:

- Feeding unit
- Inking unit
- Dampening unit
- Printing unit
- Delivery unit

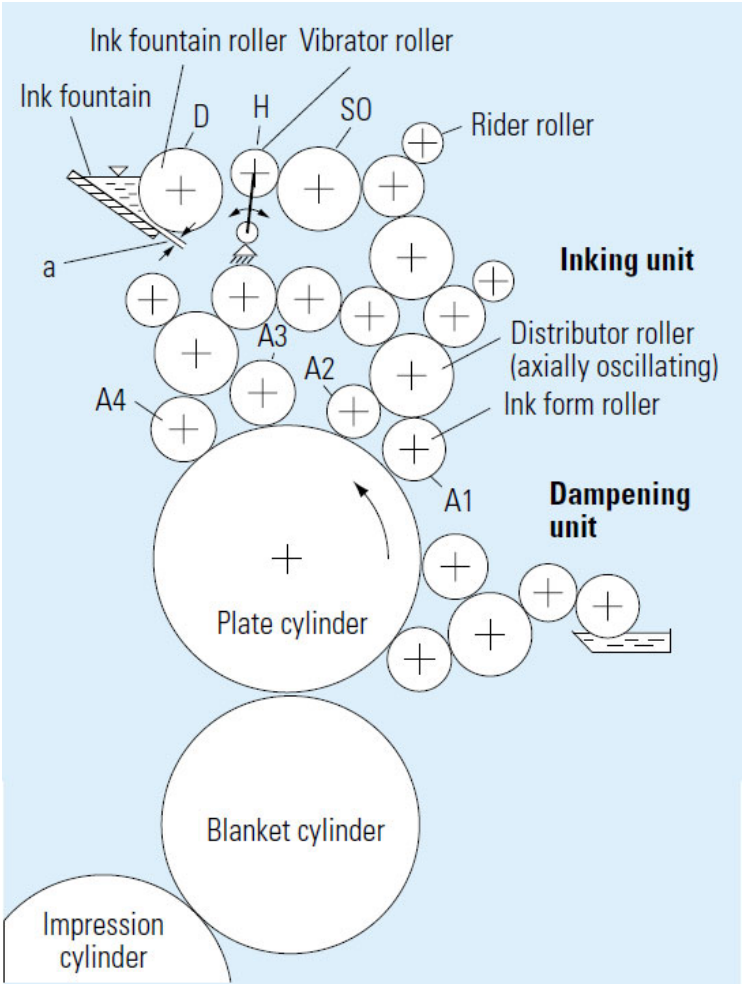
2.2 Feeding unit



Feeding unit

One of the overlooked requirements of successful offset press operation is the smooth and consistent flow of paper through the press. Two conditions must be met for satisfactory flow of paper. The paper must be reasonably flat and free from any pronounced tendency to curl, and it must be properly piled and lined up in the feeder.

Proper adjustment and timing of all sheet-handling elements must be maintained. Poor sheet control can necessitate frequent press stops resulting in color variation and ink/water imbalance. Inking system The inking system on offset presses consists of a fountain which holds the ink and a set of rollers, known as the roller train, which distribute the ink and carry it to the printing plate. A roller within the fountain draws the ink from the fountain into the roller train where it is milled into the prop er thickness.



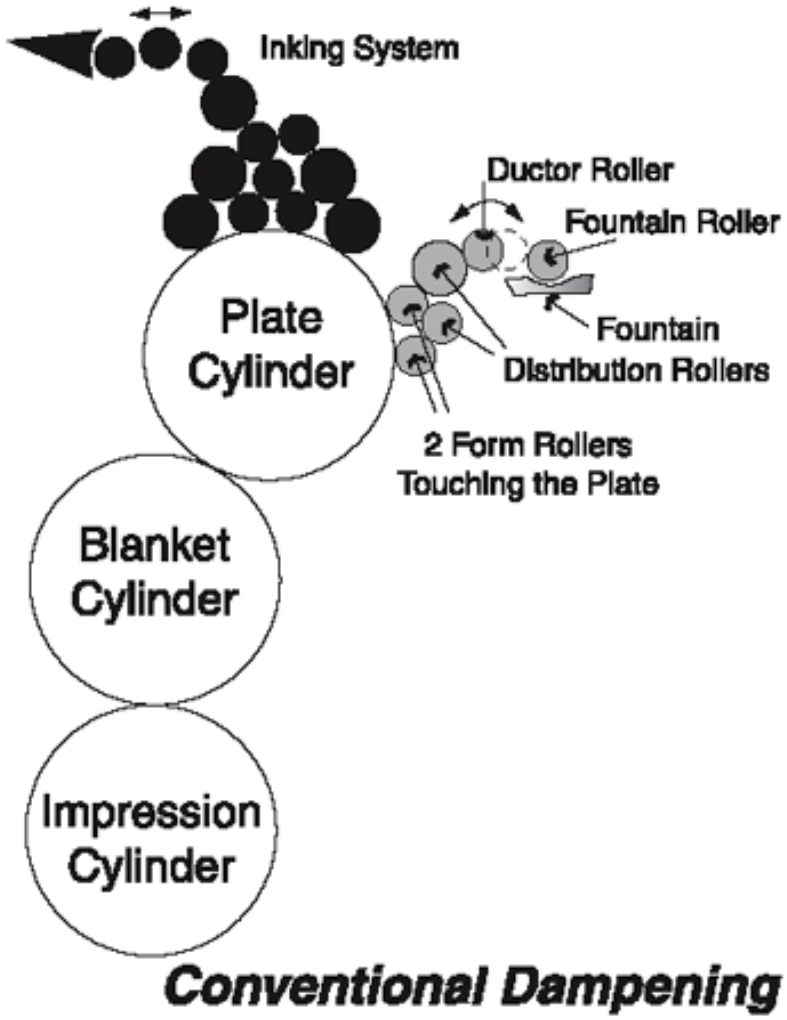
Inking system

It is then brought to the final rollers in the system called the “form rollers” which apply the ink to the plate.The number and type of rollers in an inking system varies widely between different types of offset presses. A small duplicator press may have only a minimum number of rollers to supply the flow of ink to the plate as most of the applications printed on a duplicator press are very basic.

A large web press used for printing complex applications in full color requires a larger number of rollers to mill the ink and several form rollers to apply the ink to the plate. The more rollers there are in an inking system, the better the ink will be distributed and the better the print quality will b e achieved.

2.3 Dampening Unit

The dampening system consists of a set of rollers that distribute the fountain solution to the plate. The fountain solution is necessary to keep the non-image areas of the plate free of ink. As with the inking system, the dampening system consists of a fountain which holds the dampening solution, a roller within the fountain that carries the solution into the dampening rollers, and form rollers that apply the dampening solution to the plate. Like inking systems, the type of dampening system can vary greatly between dif ferent types of presses.



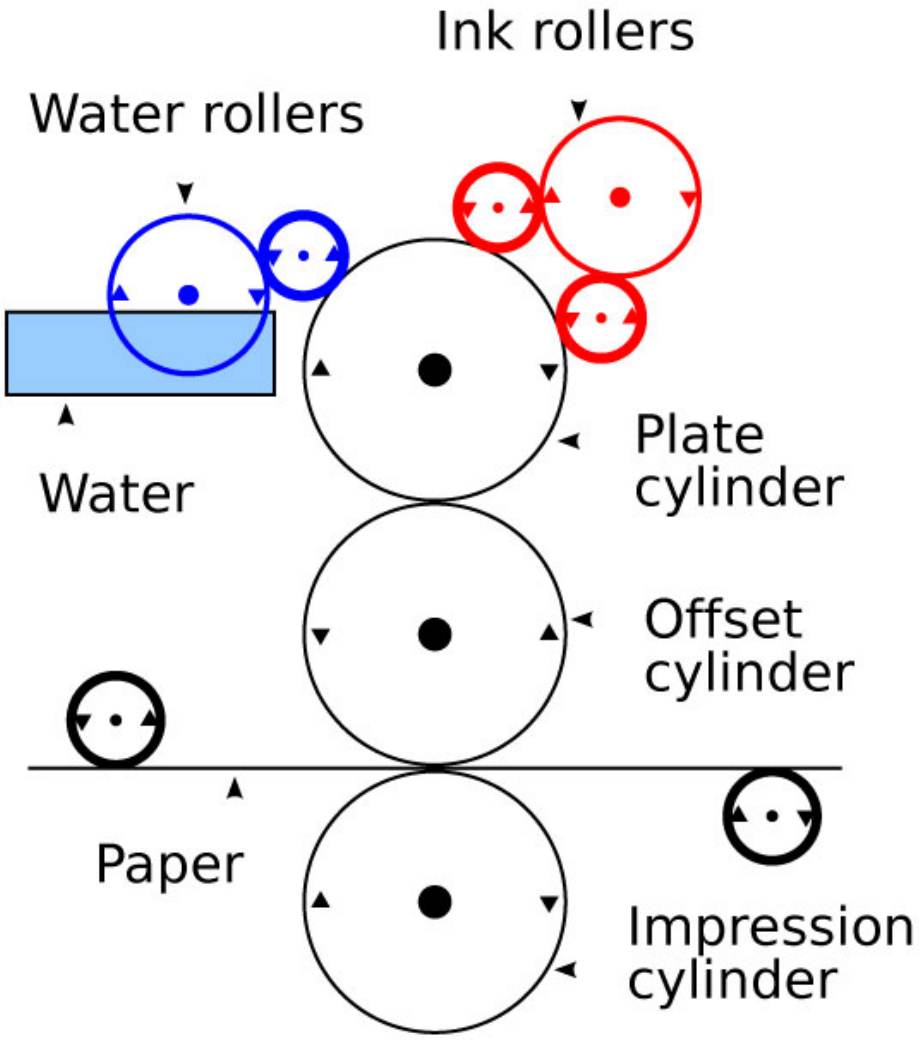
Conventional Dampening

2.4 Prining unit

This unit has three cylinders.

- Plate Cylinder,
- Blanket Cylinder, and
- Impression Cylinder.

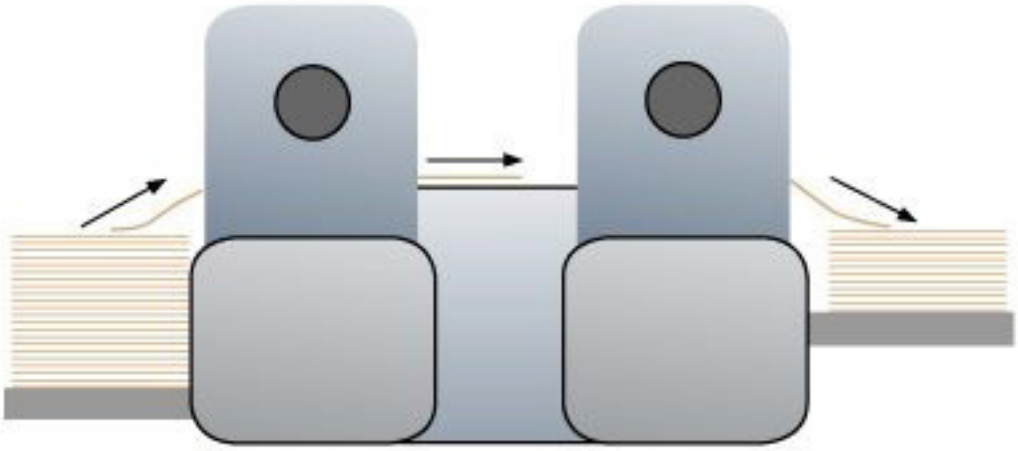
The circumference of the cylinders determine the size of the applications that can be printed on the press. For example, a press with printing cylinders of 17” in circumference is able to print applications with a depth of 17”, 8 1/2”, 4 1/4”, and so on. For an 8 1/2” application, there would be two separate 8 1/2 inch pieces printed per revolution of the cylinders. Presses are often named for the circumference of their cylinders, such as a “17 inch press”, or a “22 inch press.



Printing unit (Plate, Blanket and Impression)

2.5 Delivery unit

The delivery section begins as the sheet leaves the final impression cylinder. Delivery grippers take the printed sheet from impression cylinder grippers and transport it to the delivery pile (or) table. The grippers typically travel on gripper bars. Printing Processes Classification of Printing Machines. Delivery section is the section where printed sheets are jogged and stacked one on top ofanother. The first portion of the sheet control system that the press operator is a concerned with is the feeder section.



Delivery unit

Chapter-III

METHODOLOGY

3.1 Dampening solution

The influence of dampening solutions on printing quality is often underestimated. It plays acrucial role alongside the printing plate, blanket and ink. Only after all of these components work in perfect harmony can optimum results be achieved. It therefore stands to reason that due to care should be exercised when “brewing” dampening solutions, especially with alcohol reduced and alcohol-free printing.

The process water usually originates from the tap water. Tap water with a consistent hardness level of between 8 dH and 12 dH (or around1.5 – 2.5 millimoles of calcium carbonate per litre) is ideal. If these values are not achieved, the water will need to be treated.The most effective way of doing this is to use a reverse osmosis (RO) system that first desalinates the tap water before “re-hardening” it to the precise level required. It is none the less worth keeping a constant eye on the hardness level using, for e xample, test strips are used.

In printing, over soft water often leads to emulsification and excessively hard water to lime deposits that can damage ink rollers and blankets. In addition to the level of hardness, the pH value of process water is also significant. If the water is too acidic, the drying process is protracted. If it is too alkaline, this can have an adverse effect on the clean running of the plate. This can be counteracted by using dampening solution additives. When used correctly, these ensure a constant pH value of between 4.8 and 5.3.

The Isopropanol Alcohol (IPA) is often used to increase the wetting speed and flowability of the dampening solution. Normally, it represents 8 to 10 percent of the dampening solution. A percentage volume of 3 to 5 percent is recommended for alcohol-reduced, and thus low emission printing. It is important to note that less alcohol means higher surface tension and lower viscosity. In other words, for the same dampening system setting, less dampening solution reaches the printing plate than is the case with higher IPA concentrations. This means to compensate for this situation, the speed of the water pan roller must be increased.

The extent to which it must be increased, it can be determined using a special inking unit and dampening solution test form from Heidelberg. The quality of the dampening solution itself can be tested using a universal testing device. In addition to pH value and temperature, these devices often measure the conductivity, which provides information on impurities, etc. As a rough guide, as soon as the conductivity exceeds the measurement of the “fresh” dampening solution by around 800 microsiemens per centimeter, it is time to think about changing it. If we miss the window, we may notice info The products described may not be available in all markets. Further information is available in local Heidelberg representative. The plate running together during printing and instinctively increases the water supply.

However, this only results in the dampening solution being soiled by residual paper or ink being pushed over the limit at some point. It will then no longer be possible to maintain a stable emulsion in

the printing process. The consequences are similar, if the temperature of the dampening solution is too high. The temperature should be maintained at between 10 and 14 degrees Celsius. Peripherals from Heidelberg help to keep track of all these parameters. What's more, the CombiStar and FilterStar are true "guardians of the purity law." They ensure clean dampening solution over long periods with no need to change it.

3.2 Dampening solution ingredients

Dampening solutions are usually sold as concentrated solutions that are diluted with water to the proper concentration. In concentrated form, it is commonly referred to as fountain concentrate, fountain etch, or just etch. Most one-step concentrates already contain a natural or synthetic gum, an alcohol substitute, and other essential ingredients, and simply require being diluted with water.

With two-step concentrates, the first step generally contains all of the ingredients except the alcohol substitute, with the alcohol substitute added as a part of the second step. Although this extra step might be an inconvenience, it permits the press operator to control the alcohol substitute concentration better. Ink, plate, press speed, paper, temperature, and relative humidity are the principal factors that influence the need for various dampening solutions.

For example, a metallic or fluorescent ink may require an alkaline dampening solution. Most dampening solutions, however, are acidic with a pH of 3.5 to4 being typical.

The dampening system itself also influences the composition of the dampening solution. For example, some dampening systems require a percentage of alcohol or alcohol substitute due to the method of applying the solution to the printing plate. The proper mixture of chemicals making up the solution is critical for quality printing. Though there may be many chemicals that make up a given manufacturer 's dampening solution concentrate.The general ingredients common to most are described below:

- Water
- Isopropanol Alcohol (IPA)
- Fount

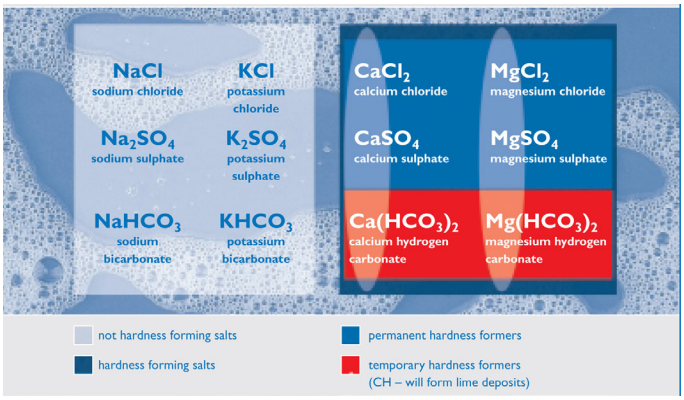
3.3 Water

The primary ingredient in dampening solution is water, which makes up about 95 to 99% of the solution in weight. Water serves to repel the oily ink from the nonimage areas of the plate surface and to help cool roller and cylinder surfaces of the press by evaporation.

Water consists of hydrogen and oxygen, but as tap water it reaches the printer in different qualities and different degrees of purity, depending on its origin (groundwater or other). Even in clean rain water, soluble gases and dirt particles are present. To asses the quality of water the water's hardness is measured, which largely depends on the quantities of calcium and magnesium present in it.

In any case, the hardness of the water must be calculated before any additives are introduced, since hardness is no longer easily determined in a prepared dampening solution. Depending on the concentration of calcium and magnesium salts, water is classified from hard to soft. Hardness is expressed in degrees. One degree German hardness is equal to 10 mg of calcium oxide per liter water.

Just as we cannot use drinking water from every tap in the world, we cannotexpect perfectly balanced water to be available for printing purposes aroundthe world wide.



There are several types of water treatment methods and one of them mostly used is reverse osmosis. In the process,the water is pressed against a membrane.Water treated like this, emerges with a very low residual salt content. Subsequently, this reverse osmosis water is reconditioned with salts, until it reaches a degree of hardness ranging from 8° dH to 12° dH.

Isoprop anol Alcohol (IPA)

Isopropanol Alcohol (IPA) is a damping solution additive. In printing presses with an alcohol-containing damping solution (all heatset presses and a large part of the sheet offset presses) Isopropanol alcohol (IPA) is added to the damping solution in addition to the common additives.

Alcohol substitutes

As one supplier likes to point out, in the early days of trying to print without IPA, printers looked for products with properties that could substitute directly for IPA, and so the first formulations were referred to as “alcohol substitutes.” Today’s more advanced formulations can more aptly be called “alcohol-free.” Alcohol substitutes differs from IPA in several key properties, including their effect on the viscosity, surface tension, pH, conductivity and TDS of a dampening solution. Alcohol-free products are not universal, and printers need to communicate closely with their suppliers to find the optimum dampening solution. Several kinds of substitutes are available. They are composed of one or more chemicals from the glycol and glycol-ether families plus other additives that perform the functions of IPA.

At first, a few substitutes were formulated to be combined with IPA, but today’s formulations are intended to completely replace IPA in dampening solutions and to offer their own range of properties.

One-step and two-step alcohol-free products are available for both web and sheetfed presses. According to one supplier, web printers use the one-step concentrates while sheetfed printers tend to use two-step syste ms. The trend toward considering the “total system” has led to the development of more all-in-one concentrates, in which all of the additives are formulated to work together. In general, one-step dampening solutions are deemed the most trouble-free.

Two-step products combine the dampening solution concentrate with a separate alcohol substitute and wetting agents. Some consider the twostep products more flexible because the first-step concentrate can be independently varied. For many years, only two-step products were available for sheetfed printers, but one-step concentrates for continuously dampened sheetfed presses have been developed within the last five years. The basic principle of lithography, the non mixing of oil and water, has remained unchanged (until only recently with the introduction of waterless plates).

This can determine the pH of a solution by simply dipping a glass electrode into the solution and reading the pH value on the display of the pH-meter connected to the electrode.

3.4 Fount solution compenents

Fountain solution is a water-based mixture specially formulated to dampen lithographic printing plates before they are contacted by the inking rollers. In concentrated form, it is commonly referred to as fountain concentrate, fountain etch, or just etch. The system on a lithographic sheetfed press applies a water-based dampening or fountain solution to the printing plate before it is inked. Dampening solution keep the non-image areas of a plate moistened so that they will not accept ink, and are applied to the entire plate. Most of the fountain solutions are made up of five basic ingredients.They are,

- Acid.
- A wetting agent (surfactants).
- Plate conditioners (chemical salts).
- Gum arabic.
- A buffering agent.

3.4.1 Acid

- Most dampening solutions are acidic in nature.
- Keeps the image area sensitive to ink and the non-image area more sensitive to water.
- Usually a mild acid, which helps to reduce the pH.
- Citric and phosphoric acids are used.
- Gum will become a desensitizing film only when in the presence of acid.
- A gum and water mixture would not work to desensitize the plate surface if the solution were not acidic. When pH is reduced to optimum levels of about 3.5 to 4.5.
- The gum molecules are converted into their acid counterparts, allowing the formation of a desensitizing layer on the plate surface. The proper
- concentration of acid in the solution is critical.

3.4.2 Plate conditioners (chemical salts)

- Plate conditioners are used to minimize the corrosive action of the acid on the surface of an aluminum or metal plate.

- It is designed to increase the print quality and to extend the life of the offet printing plates.
- It contains anti-foaming and anti-fungus ingredients.
- Anti-foaming agents are added to reduce problematic foam buildu p.
- Dampening solution acts a bit like soapy water in that, the solution tends to foam when worked.
- Fungus and bacteria can form very quickly in moist environments including dampening system pans, recirculation tanks, and water lines.
- Foam can affect the even transfer of solution in the dampening system.
- Fungicides helps to prevent the fomation of fungus and bacteria in the dampening system.

3.4.3 Gum arabic

- Gum arabic (a natural substance) or synthetic gum is a critical ingredientin dampening solution.
- Gum arabic has already been added to most fountain solution
- concentrates made today.
- It's function is to adhere to the plate's non-image area and protect it from accepting ink.
- Gum also serves to protect the plate from humidity and chemical attack
- during press stops.
- Very few manufacturers still use natural Sudanese gum arabic.
- The gum dissolves in water and coats the plate surface, replenishing the desensitizing film on the plate.
- Without gum, the plate might print clean for a short time, but soon the non-image areas would begin to pick up ink, a problem called scumming.
- In fact, gum can work its way into the inking system over time, coating the inking rollers with a thin coating of dried gum.
- When this occurs, rollers become stripped, meaning that they are desensitized and no longer accept ink well.

3.4.4 Fountain solution problems

Even though the fountain solution is added, some systematic problems occurs during high and low concentrations. The problems are listed below, Too much concentrate

- If the recommended dilution ratio of the fountain concentrate is 2 ounces
- per gallon, this does not mean that 4 ounces per gallon is twice as good.
- Excessive use of fountain concentrate will cause problems and increases
- chemical, material, and labor costs.

- When an overdose of a buffered fountain concentrate occurs, the pH
- reading will not indicate this excess, because the buffering salts limit the pH reading of the solution.
- A conductivity reading, on the other hand, will prove useful in determining excess concentrate.
- Ink emulsification (especially reds and blues).
- Background tinting.
- Poor ink-acceptance in image area, resulting in mottling or blinding of the plate and no transfer of image area on the subtrate.
- Premature plate wear from lack of ink lubrication.
- Slow drying of inks, possibly of chalking and stripping of the ink rollers.

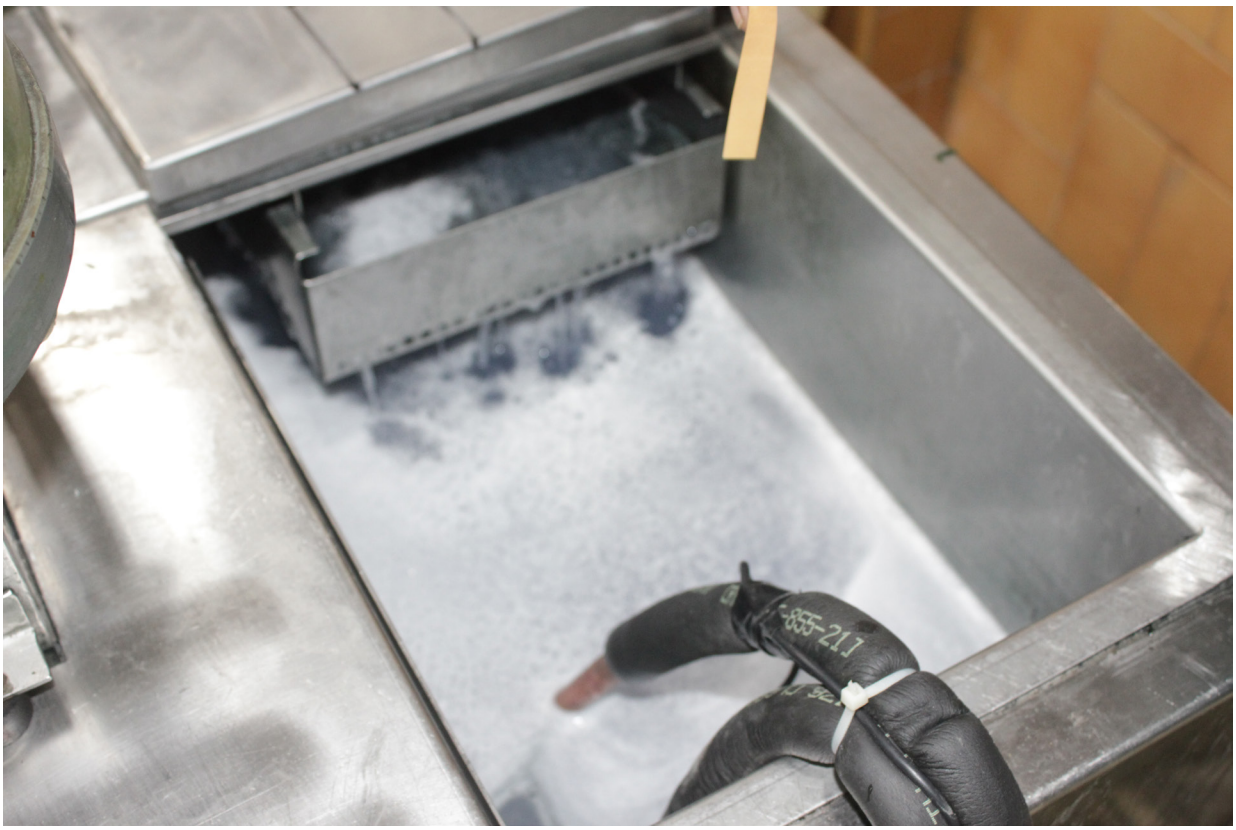
Machine specification

HEIDELBERG Speedmaster SM 72

Underlay sheet	Sheet size	550 × 750 mm (21.65 × 29.53 in)
Inking system	Total number of rollers	20
	Form rollers	4
	Diameter	70.5; 60.5; 55.5; 65.5 mm (2.78, 2.38, 2.19, 2.58 in)
	Ink zones	23
Dampening system	Type	Alcolor continuous-type dampening system or Alcolor Vario continuoustype dampening system (SM 72 and later)
	Total number of rollers	5
	Form rollers	1
	Diameter	75 mm (2.95 in)
Pile height, net	Feeder with pile carriage	945 mm (37.20 in)
	Feeder with pile support plate	875 mm (34.45 in)
	Normal pile delivery	500 mm (19.69 in)
	High pile delivery, removal from the front end	1000 mm (39.37 in)
	High pile delivery, removal from the side	860 mm (33.86 in)
Pile heights, gross	Feeder	1042 mm (41.02 in)
	Normal pile delivery	597 mm (23.50 in)
	High pile delivery, removal from the front end	1160 mm (45.67 in)
	High pile delivery, removal from the side	1020 mm (40.16 in)
Maximum pile weight	Feeder	350 kg (770 lbs)
	Normal pile delivery	190 kg (420 lbs)
	High pile delivery	420 kg (930 lbs)

HEIDELBERG SPEEDMASTER SM 72

HEIDELBERG SPEEDMASTER SM 72



Dampening Unit

Check pH Value In Siga Press

Chapter-IV

EXPERIMENTAL OVERVIEW

The follwing are the instruments used for measuring the parameters of dampening solution:

- ♦ pH meter
- ♦ Conductivity meter

4.1 pH meter

A pH meter is an electronic instrument used to measure the pH (acidity or alkalinity) of a liquid (though special probes are sometimes used to measure the pH of semi-solid substances). A typical pH meter consists of a special measuring probe (a glass – electrode) connected to an electronic meter that measures and displays the pH reading.

Digital pH meter

Digital pH meter

The pH probe measures pH as the activity of hydrogen ions surrounding a thin walled glass bulb at its tip. The probe produces a small voltage (about 0.06 volt per pH unit) that is measured and displayed as pH units by the pH level measuring meter. For a dampening solution to perform effectively, its acidity or alkalinity must be controlled not only during the initial mixing of the solution but also during the pressrun. If the mixing of proper level of acidity or alkaline is maintained, quality printing should be easier to produce. pH is a measure of the hydrogen ion concentration in water. A pH of 7 is neutral; less than 7 indicates an acidic solution and higher than 7 indicates a basic, or alkaline, solution. Acid dampening solutions should generally have a pH of 4.0–5.0. For quality printing, it is important to maintain the optimum pH for the dampening solution you are using.Note: The following explanation of pH levels is based on U.S. practices and products that work in the acidic range. European printers prefer products that work in a higher pH range.

Note, too, that U.S. papers are mostly clay-filled while those in Europe use calcium carbonate. Use of calcium carbonate, in both coated and uncoated papers, is increasing in the U.S. Low pH has a detrimental effect on these papers and has been known to attack coatings.

All acid dampening solutions are buffered to some extent so that, as the concentration increases, the pH initially drops and then levels off while the conductivity continues to increase in a straight line. Thus, conductivity is much better than pH for determining the amount of dampening solution concentrate contained in your solution. Regardless of the concentration of dampening solution, with most acid solutions, the pH must generally be below 5.0 for good printing. Gum arabic used in most of these solutions will not effectively desensitize plates if the pH is above

Because pH can change during the press run, re-check pH anytime there is a problem with tinting (ink emulsified in the dampening solution), plate blinding (the image on the plate does not take ink), scumming (ink adheres to nonimage areas on the plate), roller stripping (rollers do not hold ink), or when the ink is not drying properly on the paper .

If the pH is too high (above 5.5), the plates may scum. Excess water required to keep the plates clean could result in ink emulsification. If the pH is too low (below 3.5), plates may blind, inks may emulsify in the dampening solution, rollers may strip, and ink drying times may be excessive. Today's systems are so well buffered that pH is not as changeable as it once was, but noticing a drift in pH can help avoid many print problems. Major changes in the conductivity of incoming water can sometimes indicate a future pH problems.

4.1.1 Acidity

A dampening solution having an incorrect acid level or a solution in which the acid level changes excessively during a pressrun can cause several serious printing problems. Among these are slow drying or nondrying of ink, plate scumming, plate blinding, and roller stripping. The gum arabic film protecting the non-image areas of the plate is slightly acidic; however, it requires additional acid to adhere properly.

The acidic compounds added to the dampening solution enable the gum arabic to cling to the nonimage areas of the plate.Insufficient acid in the dampening solution lessens the gum's ability to adhere to the plate. Eventually, ink starts to replace the gum in non-image areas, causing plate scumming, the pickup of ink in non-image areas of the plate,

scumming can be caused by excessive acid if it attacks the plate metal and the protective coating. This type of scumming appears darker and more uneven than scumming due to insufficient acid.

Excessive acid also causes plate blinding, the loss of ink receptivity in the image area. The extra acid attacks the plate in the image area, causing the image to deteriorate. Another problem associated with excessive acid in the dampening solution is roller stripping, the failure of ink to adhere to the inking rollers.

Stripping that occurs at the beginning of a pressrun is usually caused by glazed roller surfaces, and stripping that occurs during a pressrun is probably caused by an excessively acidic dampening solution.

Poor drying or nondrying of ink can be caused by excessive acidity. Drying problems can arise independently of scumming, blinding, and stripping problems and become obvious only after the completion of the pressrun. Excess acid reacts with the cobalt drier in the ink, rendering it practically useless as a drying stimulator.

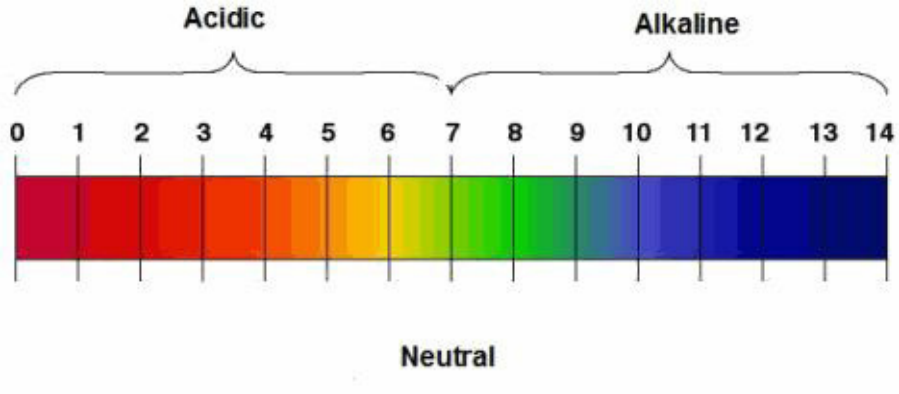
4.1.2 Alkalinity

Most dampening solutions are slightly acidic. Some dampening solutions, however, are alkaline, particularly those for offset newspaper presses. These alkaline solutions do not contain a desensitizing gum and are made more basic by adding sodium carbonate or contains a sequestering agent, a substance that prevents the calcium and magnesium compounds in the solution from precipitating, and a wetting agent, which lowers the surface tension of the water in the dampening solution.

- Roller stripping seldom occurs on inker rollers.
- Blankets do not become glazed because there is no gum in the solution.

- Fungus does not grow in the fountain pan.
- The surface tension of the water gets low in the dampening solu tion.
- Aluminum plates run clean and do not need to be gummed up.

In spite of these advantages of alkaline solutions for newspaper presses, almost all commercial offset lithography is done using acidic dampening solutions. The use of an alkaline solution in commercial offer lithography often results in the production of foam in the dampening solution, excess water emulsified in the ink, and bleeding of some pigments into the dampening solution, causing tinting.



The pH scale

4.2 Conductivity meter

Conductivity meter measures electrical contuctivity in a solution. It is commonly used in hydroponics, aquaculture and freshwater systems to monitor the amount of nutrients, salts or impurities in the water.

The conductivity meter reports conductance as the inverse of a resistivity measurement. Resistivity is measured in ohms/cm, so conductivity is measured in mhos/cm. A mho is the same as an ohm, and is defined as the Siemen (S), a unit of conductivity.

Conductivity may be measured by applying an alternating electrical current (I) to two electrodes immersed in a solution and measuring the resulting voltage (V). During this process, the cations migrate to the negative electrode, the anions to the positive electrode and the solution acts as an electrical conductor in this process. It is important that conductivity and pH levels on press be consistent and dependable. It is the practice of GATF to measure conductivity and pH for every fresh batch of dampening solution and every four hours when the press is running. Readings are taken in the water pan at each printing unit and in the recirculator. Water pan readings can provide an early warning about a potential print problem.

Conductivity is the measure of a material's ability to conduct electricity. Pure water, which approaches a conductivity of 0 micromhos, is a poor conductor of electricity. The conductivity of water is directly proportional to the amount of ions in it. As ionic materials dissolve into water, it becomes more conductive. Thus, conductivity can be used as an approximate measure of water quality. Non-ionizable or partly ionizable materials such as alcohol are poor electrical conductors and usually lower the conductivity of dampening solu tions.

Dampening solution conductivity should be measured before it is used on press. Unusual changes in conductivity may be caused by impurities from any source and justify re-checking the conductivity of the water and also the fresh dampening solution concentrate before assuming that the dampening solution was improperly mixed. It is normal for conductivity to increase during a pressrun since materials from ink and paper may contaminate the dampening solution. Measure pH when you measure conductivity.

Digital conductivity meter

4.3 RH meter

Why does humidity need to be conrolled in the printing industry

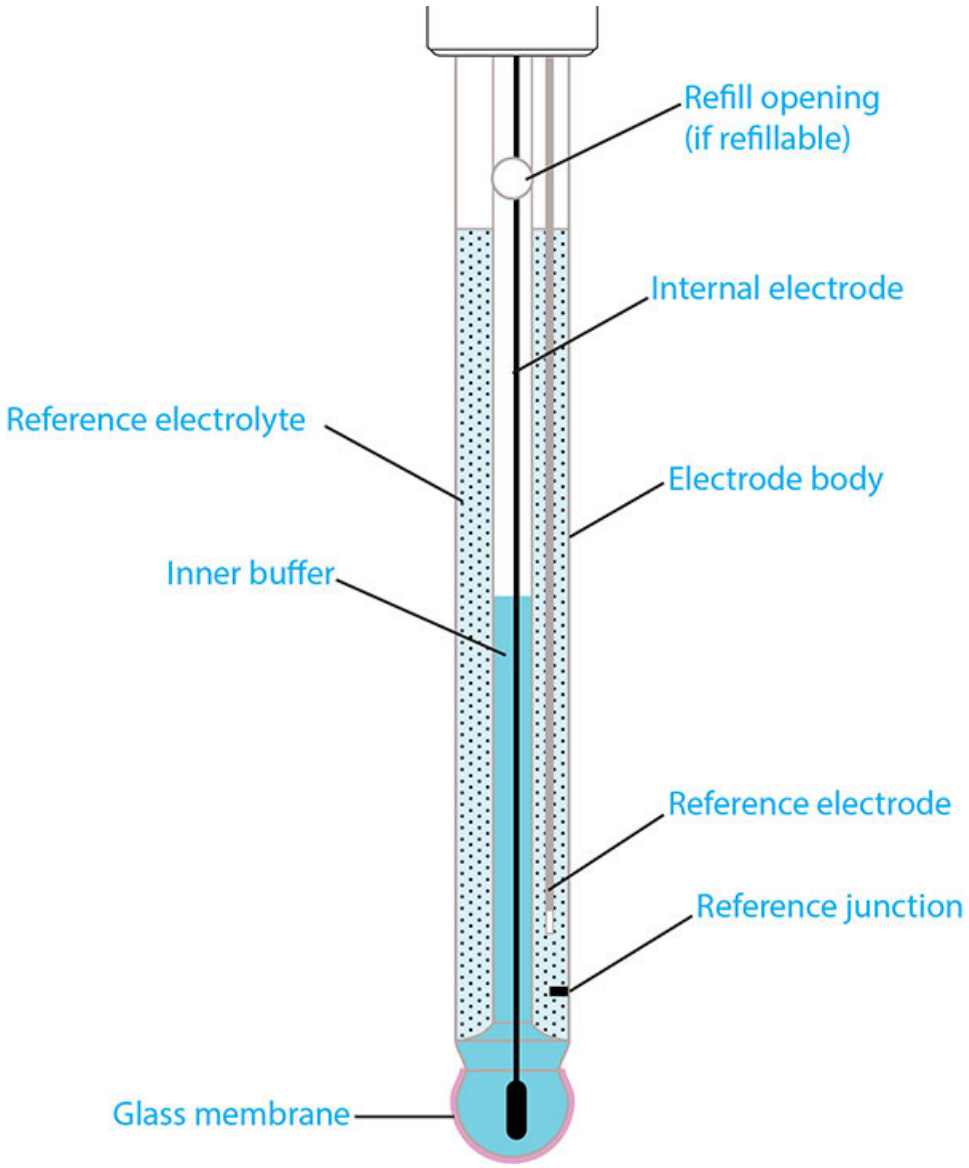
Paper is a hygroscopic material that tends to reach a condition of equilibrium with the temperature-humidity conditions of the surrounding environment. Any swings in temperature and humidity can cause dimensional variations and loss of paper flatness.

what are the absolute and relative humidity of paper

The absolute humidity of paper is the amount of moisture as a percentage of total mass, and varies based on grammage, typically from 5% to 10%.

Relative humidity, on the other hand, refers to the value at which the paper does not absorb or release moisture from/to the surrounding environment. Also for the latter, the value varies according to the grammage and type of paper, and is typically between 45 and 60%.

Absolute and relative humidity of paper are measured using specific instruments, both at the paper mill (before packaging), and once unpacked, before printing.



RH Probe

So how can these values be kept constant throughout the storage and processing stages

In the paper mill, paper and board are sealed in waterproof packaging, which prevents exchanges of moisture with the outside environment.

The product thus remains in its packaging until it is used. In addition, if paper is left unopened for several hours, it is recommended to wrap and seal the product again.

Where there is a significant difference in temperature between the paper storage area and the area where the printing machinery is located, the paper needs to be kept close to the machine for a few days before unpacking it, so it can adapt to the ambient temperature where it will be used. The time needed to reach equilibrium depends on the size of the ream and the difference in paper-ambient temperature. In general, a time of at least 24/72 h is recommended.

Even during the printing process, temperature and humidity conditions should be kept constant and controlled within a defined range, to ensure efficiency, quality and reproducibility of the printing process.

Generally, ambient temperature is kept at around 23°C, while the best relative humidity level is between 55-60% for offset printing, and between 50-55% for other types of printing. Once the set point has been defined, these levels must be maintained with a maximum tolerance of +/- 5%.

4.3.1 Summer time conditions:

Air conditioning can be used as a tool to reduce the moisture content of indoor air. To understand this concept, one must have and understanding of the relationship between moisture and air. Warm air can hold more moisture than cold air. Absolute moisture content is measured in grains of water per pound of dry air. Air at 70°F can hold 110 grains/lb., while air at 40° F can hold only 36 grains/ lb. When warm, moist air is cooled beyond its capability to hold water, the excess condenses and becomes liquid. When this air is reheated, the lower absolute humidity translates to a lower relative humidity. This is illustrated in the above example. One pound of air at 85° and 85% relative humidity contains 157 grains of moisture. If that air is cooled to 50°F., its ability to hold moisture is reduced to 54 Grains, thus the excess 103 grains is condensed and turns to liquid. When the condtioned air is reintroduced to the inside environment and reheated to 70°F., the relative humidity becomes 54%.

4.3.2 Temperature

The temperature of paper can play and will play an important role in the temperature/relative humidity equation as explained in the previous text. Therefore, the environment in which paper is stored and used should be a major consideration for anyone utilizing paper. This one factor can significantly effect ones ability to efficiently use paper in the printing or converting process. In fact, careless exposure to the wrong environment can render it unusable. Paper mills will not normally honor claims for climatic/ moisture related problems if the product was made to the correct moisture specification.

The actual temperature of paper when it is introduced to the ambient environment is a very important factor in the practical use of printing paper.

When cold paper is exposed to air at normal Relative Humidity (40-50%), the air around the paper is cooled past its dew point, or its ability to hold moisture. Like a frosty beer mug, the air condenses its moisture and it is absorbed into the edges of the stock creating the condition known as wavy edges.

When wet paper is exposed to dry air the edges of the paper will loose its moisture to the ambient conditions. When this occurs, the paper will develop tight edges. In the printing process, this usually manifests itself in a wrinkle beginning in the center of the sheet. This is the result of a baggy condition.

Paper is sealed in a moisture barrier to contain its own environment. The temperature of paper within the controlled environment and the relative humidity will remain

constant because it cannot react to the ambient conditions outside of the barrier. Therefore, the paper can be exposed to extreme hot or cold conditions and, as long as the stock is brought to the same temperature as the pressroom when used, there should not be a equilibrium problem.

4.4 Better quality prints with the right humidity

Paper is made of vegetables fibres (cellulose) and is intrinsically hygroscopic, which means that it is very susceptible to changes in relative humidity. In cold

seasons, as the heat generated by printing equipments and heating systems dries the air, the water content in the paper drops producing changes in the dimensions and the mechanical properties of the paper. For optimum printing and paper storage conditions the relative humidity should be kept between 50 and 60%

A correct and stable level of humidity can assure better quality prints, can boost productivity and increase efficiency minimizing costs for machinery downtime and wasted materials.

A humidity control system:

- Reduces printing misalignments due to dimensional variations of the paper.
- Avoids paper cracking during automatic feeding.
- Avoids paper curling and waving.
- Eliminates electrostatic damage, adhesion and dust attraction.Optimizes ink absorption. ProductQuality

Changes in the level of humidity cause variations in the length of the fibres of the paper which affect the correctness of all cutting and printing operations. For example, in multi-pass colour printing processes, dimensional variations between runs of different colour processes create blurred and poor quality images

Productivity

In low humidity environments, curling or corrugation of the sheets of paper is due to uneven shrinkage between the external and exposed surfaces of stacks or rolls of paper (where moisture is drawn quickly) and the centre of the paper. Cracking of the paper fibres also occurs as they dry.

Electrostatic charges

Relative humidity levels lower than 30% make it easier for electrostatic discharges to be generated. It's then diffi cult for the machines to ensure correct paper feed, imprecise stacking of the sheets occurs and the presence of static electricity tends to attract the dust present in the environment worsening the quality of the print. Adiabatic cooling

The atomisation of water directly into the room both ensures the required relative humidity and

provides adiabatic cooling, due to the heat absorbed by the water when evaporating. A typical application with the atomisation of 100l/h of water removes around 75kW of heat from the air.

4.5 MEASUREMENTS

pH measurement

In offset printing, one of the prominent branches of printing, fountain solution is prone to variation. While the cause and nature of these variations seems to be complicated, controlling them is relatively simple. pH is used in the press-room as a means of aiding in fountain solution control. Conductivity measurement is used as a factor in fine tuning the fountain solution mixture.

Most fountain solutions contain four basic ingredients, each serving a specific purpose in the offset process. The acid in the fountain solution is to reduce the pH, keeping the plate image area sensitive to ink and the background area sensitive to water. The wetting agent in the fountain is to lower the surface tension of the water, allowing it to maintain the wetting characteristics of the non-printing areas of the plate.

By reducing the amount of water necessary to keep the plate clean, they also reduce the amount of ink required. Plate conditioners in fountain solutions serves to minimize the corrosive action of the acid on the aluminum. This will extend plate life and improve overall print quality. The gum in the fountain solution is to adhere to the plate's non-image area to protect it from accepting ink. Gum also protects plate from humidity and chemical attacks during press stop.

One important factor in preparing fountain solution is the quality of dissolved ingredients in the solution. Conductivity measurement permits adjusting and monitoring the level of dissolved ingredients. When adding a buffered acid concentrate to prepare fountain solution, the pH will drop to a certain level and then plateau at that level, regardless of how much buffer concentrate is added. But the addition of concentrate raises the conductivity reading. If only pH is monitored, optimum solution concentration may be exceeded .

In preparing fountain solution, the manufacturer's mixing directions should be followed. Most concentrates are formulated to produce a working fountain solution with a pH of between 4.5 and 5.5. For optimum results, fountain pH/ Conductivity should remain constant from day to day

Conductivity measurement

Conductivity is a measure of the capacity of a material to conduct electricity. Extremely pure water is a very poor conductor of electricity. As materials dissolve or go into a solution, they form ions and the water becomes conductive. The conductivity of matter (ions). Low (partially) ionizable materials such as alcohol and gum Arabic are poor electrical conductors and usually lower conductivity of dampening solution.

Pure water approaches a conductivity of 0 micromhos. Typical tap water might have conductivity of 200 micromhos or more. As the amount of dissolved matter increases, the conductivity increases directly in straig ht line.

Thus, conductivity is commonly used as a measured of water purity. Soft water has a conductivity of

0-225 micromhos and hard water has conductivity greater than 450 micromhos.

The relationship between water hardness and conductivity varies somewhat, depending g upon the specific minerals and compounds in the water

If the conductivity of different amounts of dampening solution concentrates in water is know, it is easy to measure the strength of a solution by measuring its conductivity.

The following procedure can be used to develop a graph that plots conductivity and pH against concentration:

- Measure the conductivity and pH of the water normally used to make the dampening solution.
- Place water in a clean 1-gal. (3.8-L) bottle.
- Add 1 oz. (29.6 mL) of fountain solution concentrate.
- Remeasure both conductivity and pH. Record these values.
- Add another ounce (2 oz. total) of fountain solution concentrate and remeasure both conductivity and pH.
- Repeat this process until the amount of fountain solution concentrate added exceeds the manufacturer 's recommendations.
- Plot these values on a graph that has concentration (oz./gal. or mL/L) on the horizontal axis and conductivity and pH on the vertical axis.

A similar graph can developed if alcohol is also used in the dampening solution. New graphs must be made when ever the water or fountain solution concentrates changes If the conductivity of the dampening solution is known, the amount of rather dampening solution concentrate or alcohol can be read directly from the graph. The most important factor in preparing dampening solution is to make

sure that is the proper concentration. Most acidic dampening solutions are buffered so that, as the amount of concentration increases, the pH drops initially but then levels off, while the solution's conductivity increases in the dampening solution.

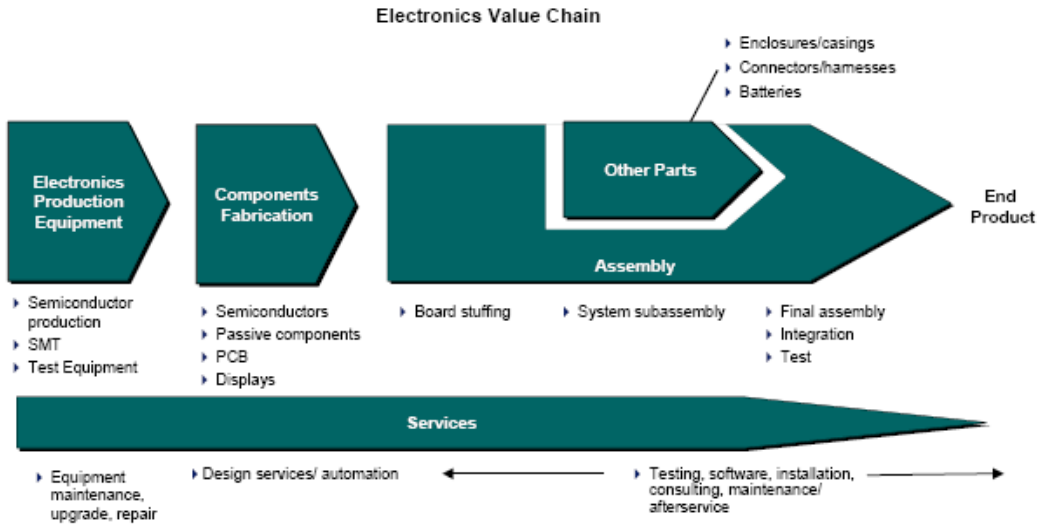
However, the pH must still be measured, because the Ph must be between 4.0—5.5 for good printing. With neutral dampening solutions and neutral (pH 7) water, the pH of the solution is constant, regardless of concentration. Therefore, conductivity must be used to measure the concentration of neutral or slightly alkaline dampening solutions.

Any unusual conductivity readings justify rechecking the conductivity of the water and the dampening solution concentrate. It is normal for the conductivity to increase during the press run because materials from the ink and paper contaminate the dampening solution. Therefore, conductivity measurements should be made before the dampening solution is used in the press.

Chapter-V

Fabrication

5.1 Preparation of cricuit Board



Electronics Production Equipment

- Semiconductor production equipment

The production equipment category is further classified by technology type; however, two broad classifications are along two major component types: semiconductor production equipment and circuit board assembly equipment.

- Surface Mount Technology Equipment
- Test Equipment

Component Fabrication

- Semiconductors

Integrated Design and Manufacturing Companies (IDMCs) such as Intel, Motorola, Texas Instruments in the United States, Infineon and SMT in Europe and Toshiba and NEC in Japan. IDMCs are primarily located in North America, Japan, South Korea and Western Europe. IDMCs produce both commodity semiconductors and more specialized semiconductors for particular end markets such as automobiles, communications, etc.

Assembly, Packaging and Testing (APT) Companies such as Amkor, ChipPac based in the United States but with assembly plants in Asia. ASE Group in Taiwan and Carsem in Malaysia primarily have their plants in Asia and some in the North and Central America. Few have assembly operations in Western Europe such as Philips in Malta and others in Ireland.

- Passive Components
- Printed Circuit Board

- Displays

Custom and Other Fabricated parts

- Enclosures and Casings
- Connectors and harnesses
- Batteries

Assembly

- Board Level Assembly
- System Sub Assembly
- Final Assembly
- Integration - Testing

Electronics Production Services

- Equipment Maintenance, Upgrade, and Repair
- Design Services/Automation
- Testing, software, installation, consulting, maintenance/after service

5.1.1 Semi-conductors

The three major types of value-added players in the semiconductor markets are:

Semiconductor Foundries such as TSMC and UMC in Taiwan, Chartered Semiconductors in Singapore and Anam/Dongbu in South Korea. Foundries are mainly located in Asia – Taiwan, South Korea, Singapore and China -- although there are several in the United States and Eastern and Western Europe. These foundries produce commodity semiconductors used in virtually all end markets, particularly for the consumer electronics market.

Integrated Design and Manufacturing Companies (IDMCs) such as Intel, Motorola, Texas Instruments in the United States, Infineon and SMT in Europe and Toshiba and NEC in Japan. IDMCs are primarily located in North America, Japan, South Korea and Western Europe. IDMCs produce both commodity semiconductors and more specialized semiconductors for particular end markets such as automobiles, communications, etc.

5.1.2 Printed Circuit Boards

The segments of the printed circuit manufacturing are differentiated by the layer count and degree of complexity on the circuit. There are four different segments of the printed circuit board industry:

- Microvia characterized by circuit boards
- Low Complexity, One to Eight Layer Boards
- Mid Complexity with Eight to Fourteen Layers
- High Complexity with Fourteen Plus Layers

Displays

The two segments in the Electronic Display area are differentiated by technology – the older traditional display technology involving picture tubes and the newer display technologies of the flat panel kind.

- Traditional Display Technologies
- Emerging Technologies Displays/Flat Panel Displays

Connectors

The two segments of the connectors/cables are also differentiated by technology types– the commodity connectors and the non-commodity connectors.

- Commodity Connectors
- Non-Commodity Connectors

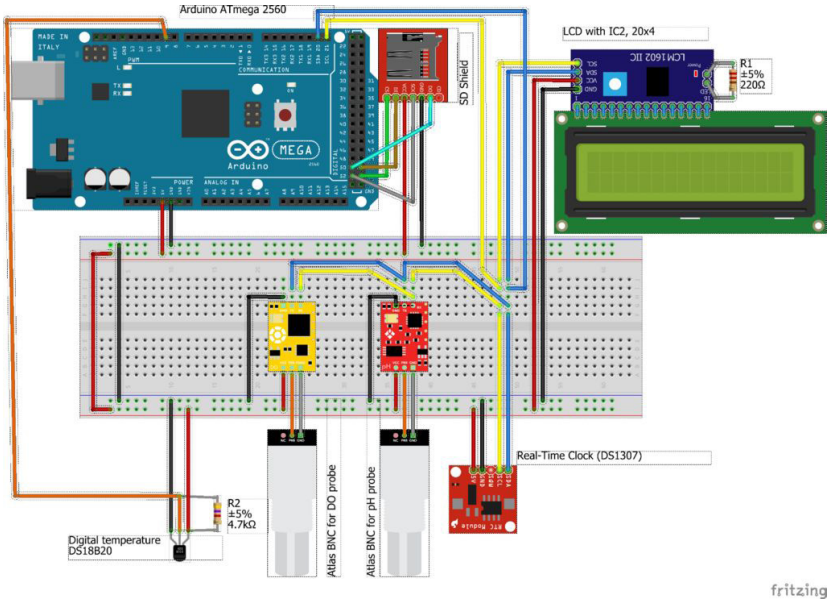
Batteries

The segmentation in the battery market is based upon dual criteria – technology and end-use market. There are segments within the battery market – single use zinc carbon/alkaline batteries, rechargeable lead acid batteries, rechargeable nickel or lithium based batteries.

- Single use zinc-carbon or alkaline batteries
- Rechargeable lead acid batteries
- Rechargeable nickel or lithium batteries

5.1.3 Assembly Services

- High Volume Low Mix Assembly
- High/Medium Volume and Medium Mix Assembly
- High Mix Low Volume Assembly

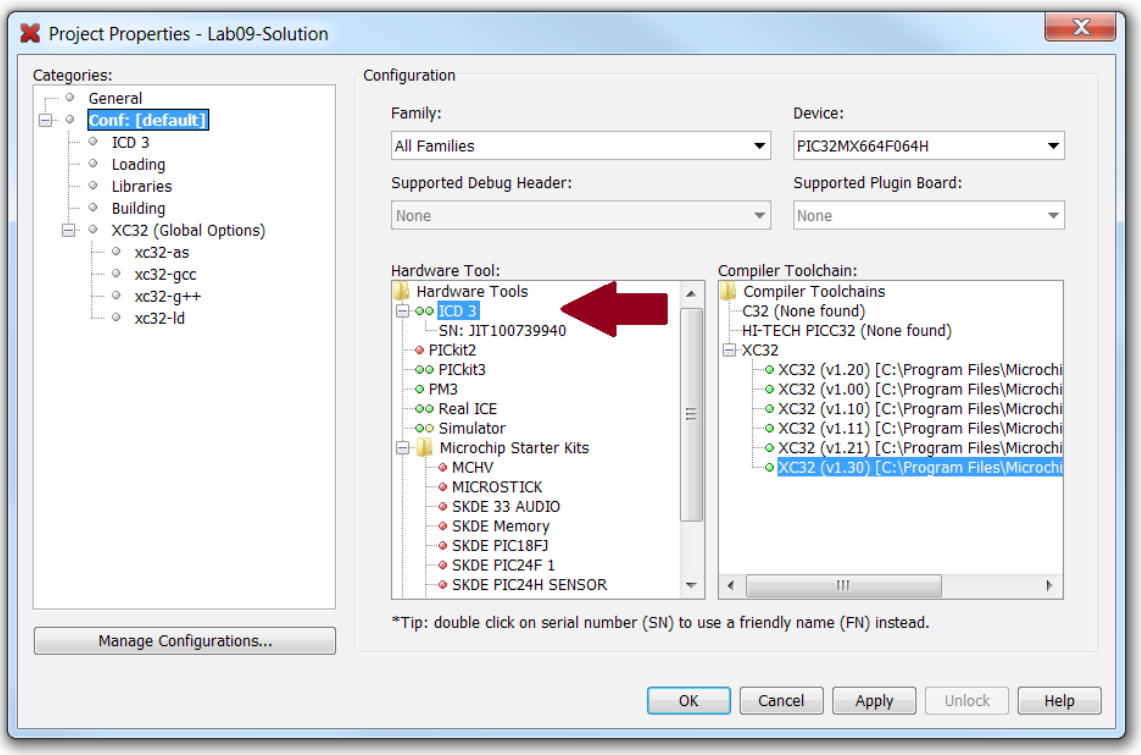


5.2 IDE

What Is An Integrated Development Environment (Ide)

An integrated development environment (IDE) is an application that facilitates application development. IDEs are designed to encompass all programming tasks in one application. Therefore, IDEs offer a central interface featuring all the tools a developer needs, including the following:

Code editor: This feature is a text editor designed for writing and editing source code. Source code editors are distinguished from text editors because they enhance or simplify the writing and editing of code.



Compiler: This tool transforms source code written in a human readable/writable language into a form executable by a computer.

Debugger: This tool is used during testing to help debug application programs.

Build automation tools: These tools automate common developer tasks.

In addition, some IDEs might also include the following:

Class browser: This tool is used to examine and reference the properties of an object-oriented class hierarchy.

Object browser: This feature is used to examine the objects instantiated in a running application program.

Class hierarchy diagram: This tool allows the programmer to visualize the structure of object-oriented programming code.

History of IDEs

Before IDEs, developers wrote their programs in text editors. They would write and save an application in a text editor; then run the compiler, taking note of the error messages; then go back to the text editor to revise the code.

In 1983, Borland Ltd. acquired a Pascal compiler and released it as TurboPascal, which featured, for the first time, an integrated editor and compiler.

While TurboPascal launched the idea of an integrated development environment, many believe Microsoft's Visual Basic (VB), launched in 1991, was the first real IDE. Visual Basic was built on the older BASIC language, which was a popular programming language throughout the 1980s. With the emergence of Visual Basic, programming could be thought of in graphical terms, and significant productivity benefits emerged.

5.2.1 Benefits of IDEs

The overall goal and main benefit of an integrated development environment is improved developer productivity. IDEs boost productivity by reducing setup time, increasing the speed of development tasks, keeping developers up to date and standardizing the development process.

Faster setup: Without an IDE interface, developers would need to spend time configuring multiple development tools. With the application integration of an IDE, developers have the same set of capabilities in one place, without the need for constantly switching tools.

Faster development tasks: Tighter integration of all development tasks improves developer productivity. For example, code can be parsed and syntax checked while being edited, providing instant feedback when syntax errors are introduced. Developers don't need to switch between applications to complete tasks. In addition, the IDE's tools and features helps developers organize resources, prevent mistakes and take shortcuts.

Further, IDEs streamline development by encouraging holistic thinking. They force developers to think of their actions in terms of the entire development lifecycle, rather than as a series of discrete tasks.

Continual learning: Staying up to date and educated is another benefit. For instance, the IDE's help topics are constantly being updated, as well as new samples, project templates, etc. Programmers who are continually learning and current with best practices are more likely to contribute value to the team and the enterprise, and to boost productivity.

Standardization: The IDE interface standardizes the development process, which helps developers work together more smoothly and helps new hires get up to speed more quickly.

5.2.2 Languages Supported by IDEs

Some IDEs are dedicated to a specific programming language or set of languages, creating a feature set that aligns with the particulars of that language. For instance, X code for the Objective-C and Swift languages, Cocoa and Cocoa Touch APIs. However, there are many multiple-language IDEs, such as Eclipse (C, C++, Python, Perl, PHP, Java, Ruby and more), Komodo (Perl, Python, Tcl, PHP,

Ruby, Java script and more) and Net Beans (Java, JavaScript, PHP, Python, Ruby, C, C++ and more). Support for alternative languages is often provided by plugins. For example, Fly check is a syntax checking extension for GNUE macs 24 with support for 39 languages.

5.2.3 Different Types of IDEs

There are a variety of different IDEs, catering to the many different ways developers work and the different types of code they produce. There are IDEs that are designed to work with one specific language, cloud-based IDEs, IDEs customized for the development of mobile applications or for HTML, and IDEs meant specifically for Apple development or Microsoft development.

Multi-Language IDEs

Multi-language IDEs, such as Eclipse, NetBeans, Komodo, Aptana and Geany, support multiple programming languages.

Eclipse: Supports C, C++, Python, Perl, PHP, Java, Ruby and more. This free and open source editor is the model for many development frameworks. Eclipse began as a Java development environment and has expanded through plugins. Eclipse is managed and directed by the Eclipse.org Consortium.

NetBeans: Supports Java, JavaScript, PHP, Python, Ruby, C, C++ and more. This option is also free and open source. All the functions of the IDE are provided by modules that each provide a well-defined function. Support for other programming languages can be added by installing additional modules.

Komodo IDE: Supports Perl, Python, Tcl, PHP, Ruby, Javascript and more. This enterprise-level tool has a higher price point.

Aptana: Supports HTML, CSS, JavaScript, AJAX and others via plugins. This is a popular choice for web app development.

Geany: Supports C, Java, PHP, HTML, Python, Perl, Pascal and many more. This is a highly customizable environment with a large set of plugins

5.2.4 IDEs for Mobile Development

There are IDEs specifically for mobile development, including PhoneGap and Appcelerator's Titanium Mobile.

Many IDEs, especially those that are multi-language, have mobile-development plugins. For instance, Eclipse has this functionality.

HTML IDEs

Some of the most popular IDEs are those for developing HTML applications. For example, IDEs such as HomeSite, DreamWeaver or FrontPage automate many tasks involved in web site development.

Cloud-Based IDEs

Cloud-based IDEs are starting to become mainstream. The capabilities of these web-based IDEs are increasing rapidly, and most major vendors will likely need to offer one to be competitive. Cloud IDEs give developers access to their code from anywhere. For example, Nitrous is a cloud-based

development environment platform that supports Ruby, Python, Node.js and more. Cloud9 IDE supports more than 40 languages, including PHP, Ruby, Python, JavaScript with Node.js, and Go. Heroku is a cloud-based development platform as a service (PaaS), supporting several programming languages.

IDEs Specific to Microsoft or Apple

These IDEs cater to those working in Microsoft or Apple environments:

Visual Studio: Supports Visual C++, VB.NET, C#, F# and others. Visual Studio is Microsoft's IDE and is designed to create applications for the Microsoft platform.

MonoDevelop: Supports C/C++, Visual Basic, C# and other .NET languages.

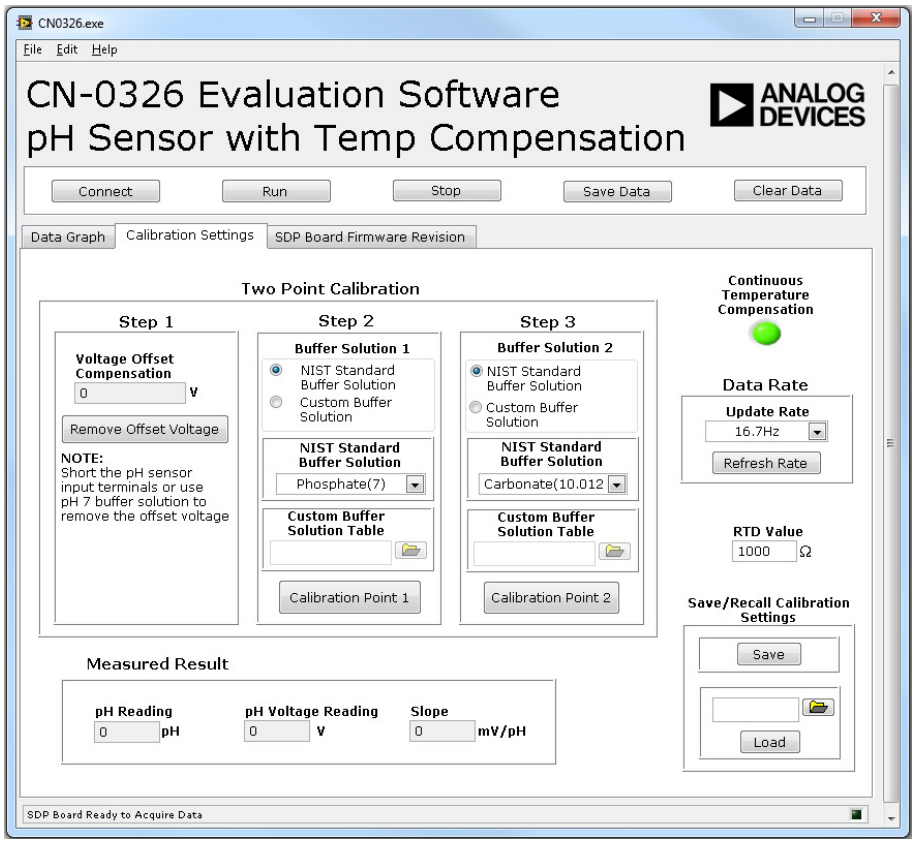
Xcode: Supports the Objective-C and Swift languages, and Cocoa and Cocoa Touch APIs. This IDE is just for creating iOS and Mac applications and includes an iPhone/iPad simulator and GUI builder.

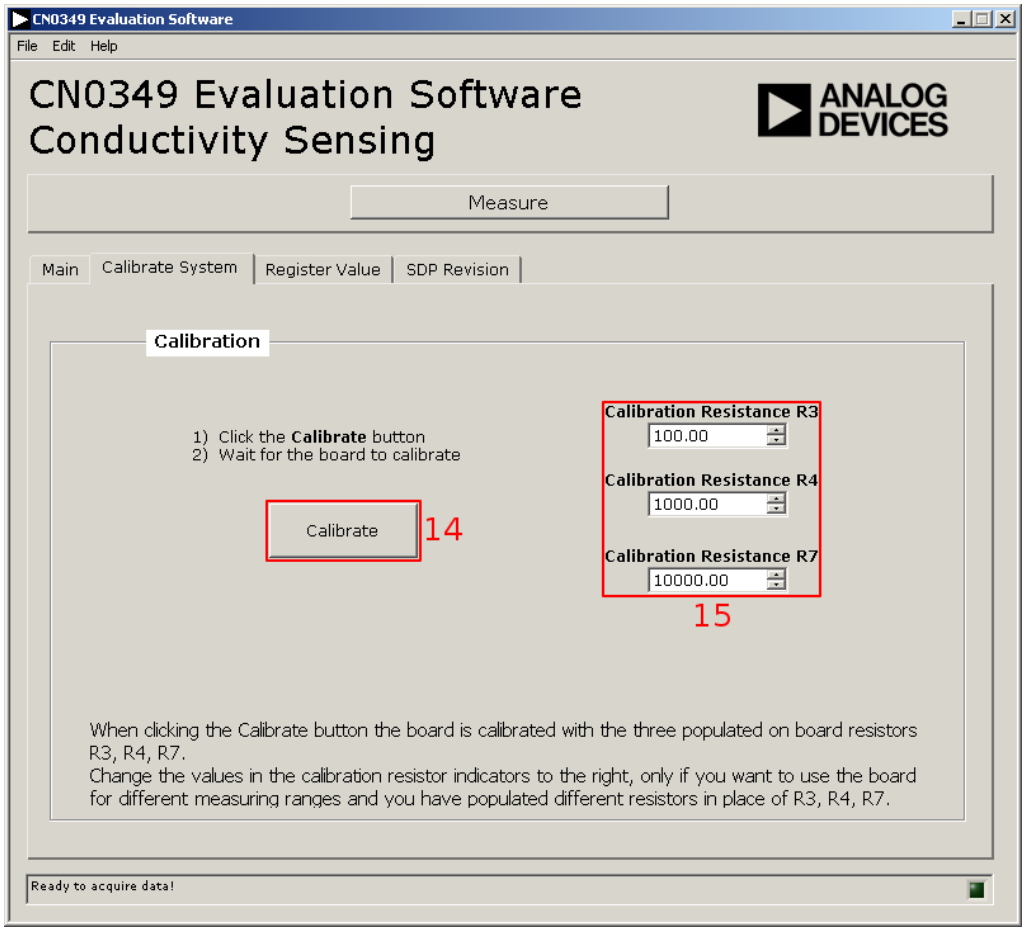
Espresso: Supports HTML, CSS, XML, JavaScript and PHP. This is a tool for Mac web developers.

Coda: Supports PHP, JavaScript, CSS, HTML, AppleScript and Cocoa API. Coda bills itself as "one-window development" for the Mac user.

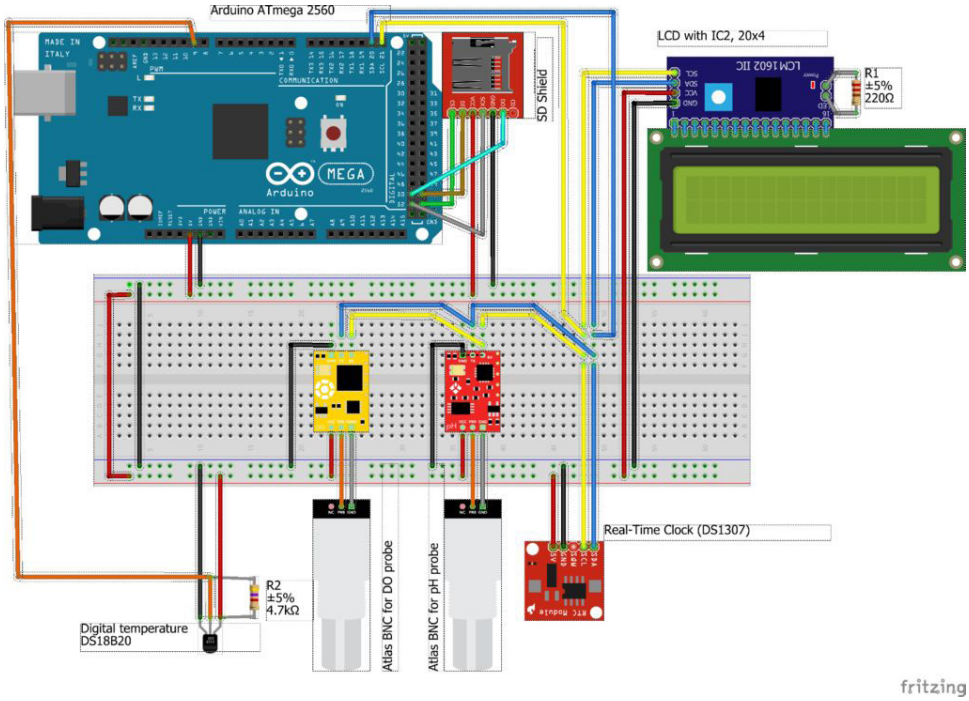
5.2.5 IDEs for Specific Languages

Some IDEs cater to developers working in a single language. These include CodeLite and C-Free for C/C++, Jikes and Jcreator for Java, Idle for Python, and RubyMine for Ruby/Rails.

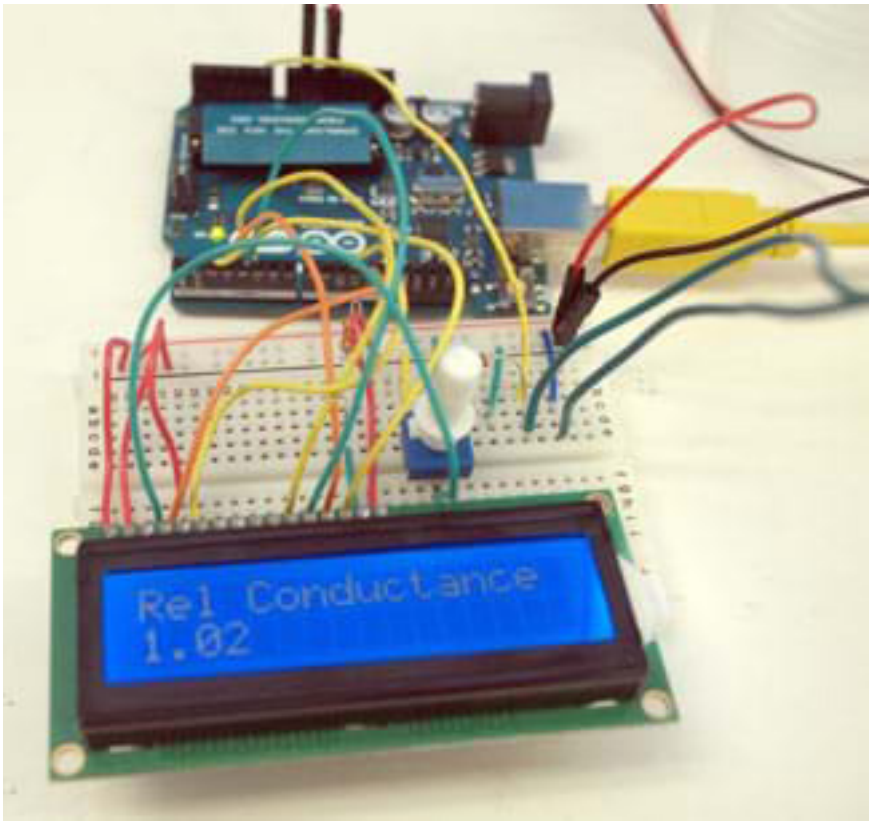




FINAL PRODUCT



pH



Conductivity

Relative Humdity

Reading of pH, Conductivity and Rh in Heildberg SM 72

Job. No	Job description	Quantity	Reading	pH	Conductivity (ms/cm)	RH (%)
12482	Magazine-March1st issue	7200	First Hour	4.8	1051	47
			Second Hour	4.7	1010	50
12485	Arumbu-March issue	22,300	First Hour	5.3	1202	48
			Second Hour	5.0	1160	50
			Third Hour	4.9	1127	53
13007	New Leader- March issue	7200	First Hour	4.9	1073	55
			Second Hour	4.8	1044	55
13010	Agri book	2000	First Hour	5.1	1090	52
13022	Magazine-March 2nd issue	7200	First Hour	4.8	1024	53
			Second Hour	5.0	1121	53

Reading of pH, Conductivity and Rh in Heildberg SM 72

Job. No	Job description	Quantity	Reading	pH	Conductivity	RH
13045	Magazine-Aprl 1st issue	7,700	First Hour	4.9	1150	47
			Second Hour	5.1	1110	50
13057	Magazine-Aprl 2nd issue	7,700	First Hour	5.3	1210	54
			Second Hour	5.0	1183	57
13061	Drawing Book	1,500	First Hour	4.8	1056	53
13073	Arumbu-April issue	22,000	First Hour	4.6	991	47
			Second Hour	4.9	1063	49
			Third Hour	5.1	1187	52
13078	New Leader- April issue	7,200	First Hour	4.7	1095	45
			Second Hour	4.9	1145	48

RESULT

The importance of pH level and Conductivity level for dampening solution is not known to various people. The press machine operator is ready to do any work, but do not know the importance of pH level and Conductivity level for the dampening system. The machine operator adds the fountain solution to a certain amount with water and iso propyl alcohol to buffer the pH level of dampening solution.

During the press run, the pH level of dampening raises of dampening solution raises slowly. So the machine operator uses the fountain solution to buffer the pH level all the time whenever the pH level increases, it results in the increase of conductvity level. Due to this the print quality is affected and also it results in wear and tear of the machine. So we have prepared the digital unit of pH, Conductivity and RH for the machine and the press room. It gives the knowledge about maintaining the dampening solution and the temperature which is recommended in the press room. It helps us in the future, when we work in press about how to maintain the print quality in the press room.

The pH is the measure of the acidity and alkalinity of a solution, the Conductivity is a meaasure of the capacity of a material to conduct electricity. These two factors are the main contributer for maintaining the printing quality in the press. If any one of the factor exceed or decerese their recommended range it affects the blanket cylinder. Further it also process the wear and tear in the machine.

These problemes can be nullified if the machine operator pays little attention towards the level while working. And also one should maintain the RH level in the press room. When the RH level goes up, high moisture content is in the press room. Resulting in paper breakage, scumming and ink driness in the substrate. the concentration of dampening solution, with most acid solutions, the pH must generally be below 5.0 for good printing.

pH can change during the press run, re-check pH anytime there is a problem with tinting plate blinding scumming roller stripping or when the ink is not drying properly on the paper .

If the pH is too high the plates may scum. Excess water required to keep the plates clean could result in ink emulsification. If the pH is too low plates may blind, inks may emulsify in the dampening solution, rollers may strip, and ink drying times may be excessive.

Today's systems are so well buffered that pH is not as changeable as it once was, but noticing a drift in pH can help avoid many print problems. Major changes in the conductivity of incoming water can sometimes indicate a future pH problems.

As, I conclude this project report with love and gratitude to the SIGA Polytechnic College. I am specially thankful to our project guide, **Mr. V. John Fredrick** along with Offset Service Engineer, **Mr. Vinoth** for motivating and guiding us to finish this project work succesfully. And also I am grateful to SIGA management, staff for giving us various permissions to finish this project work.

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