History of Liquid Toner Innovation

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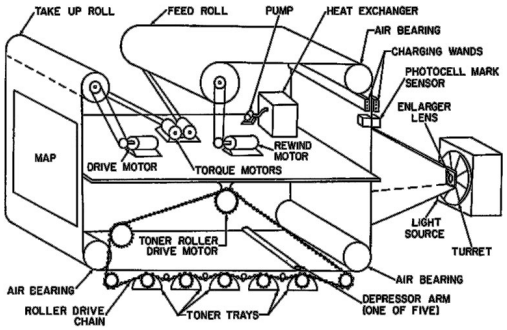
Abstract

Liquid toners are an entrenched part of the many methods by which people communicate or display information but they have a relatively short history in the timeline of the printed word. The following review of this history covers a wide variety of commercial product and technical introductions and describes the innovative features of several. However, due to limitations of time and space, this paper cannot include all the contributions to liquid toner imaging.

Introduction

Liquid toners are an entrenched part of the many methods by which people communicate or display information. The history of their conception, development, application and commercialization is relatively short in the timeline of the printed word, but extensive in terms of innovation and execution.

From an empirical beginning in Australia by workers in a Commonwealth of Australia department to global markets established by international organizations, liquid toners have developed into an industry which has provided the world with an elegant means of converting temporary electronic signals or light images into transportable, permanent images. Some companies directly involved with the development of liquid toners and applications are discussed as well as major success stories of various companies who saw the value of liquid electrophotography and related processes and utilised the technology for considerable commercial benefit.



Harris Intertype Map Printer

History

1953

Metcalfe & Wright discover liquid toners

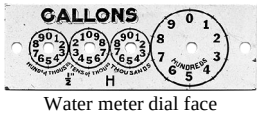
1956

Metcalfe & Wright file for patents

1958

1st commercial use of liquid toner

Metcalfe & Wright granted patent



Water meter dial face

1959

Founding of Research Laboratories of Australia Pty Ltd

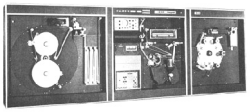
Ricoh granted license to use liquid toner technology in Japan, led to development of Ricoh BS-1

Ricoh BS-1

1961

A B Dick Videograph 910 - 1st liquid toner label printer

Addressograph Multigraph Mark II - 1st liquid toner ZnO paper copier



A B Dick Videograph 910

1962

Smith Corona Marchant SCM33 Copier

1963

Harris Intertype color map printer

APECO book copier

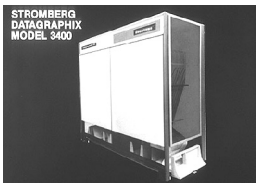
1965

REMAK colorproofing system

RLA & Canon formed International Image Industries

AB Dick 650 Copier/Platemaker

Canon Canall Copier



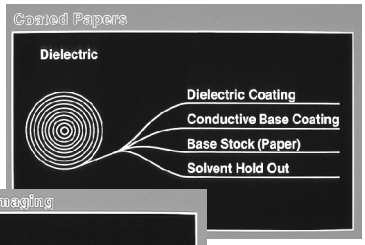
1967

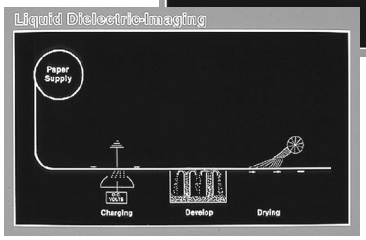
Stromberg Datagraphix 3400 Printer

Savin 220 Copier

1969

Gould 4800 Printer Plotter



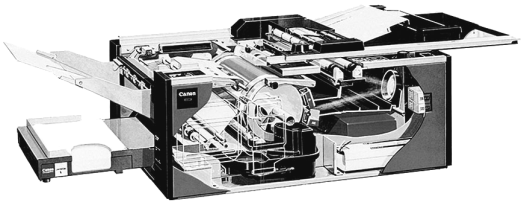


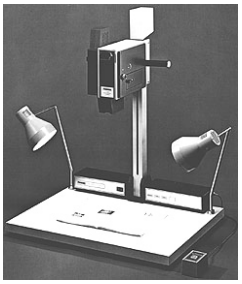
1971

Itek 171 Platemaker

Toray 8500 Printer

Canon NP70 Copier





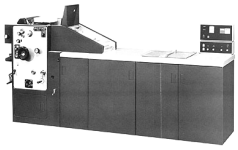
1972

Panasonic Panacopy 35mm Slide Maker

1973

A B Dick 1600 Platemaker

Hitachi Color Copier

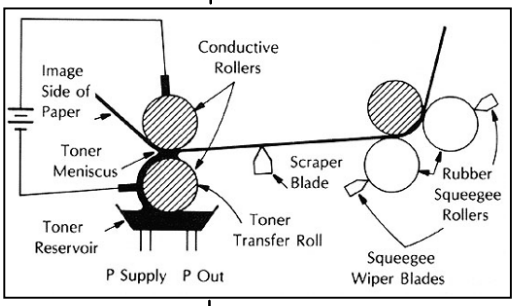


A B Dick 1600 Offset Platemaker

1974

Ricoh RiFax 600S

Honeywell Page Printing System (PPS)



Schematic of PPS Toning System

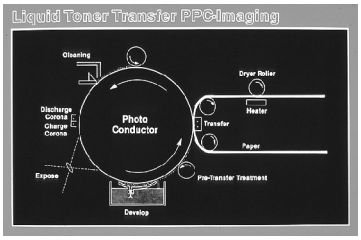
1975

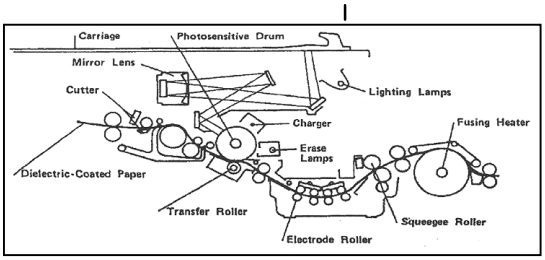
Ricoh DT1200 Copier

Minolta EG101 Copier

United Press Int'l Unifax2

Itek 175 Platemaker





Schematic of Minolta EG 101

1976

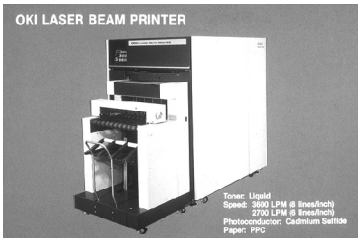
Versatec 8000 1st printer with textile capability

Ricoh CR1000 Color Copier

Mita Copystar 280 Color Copier

1978

Oki Data Electro Printer



1979

Canon LBP-10 Laser Printer

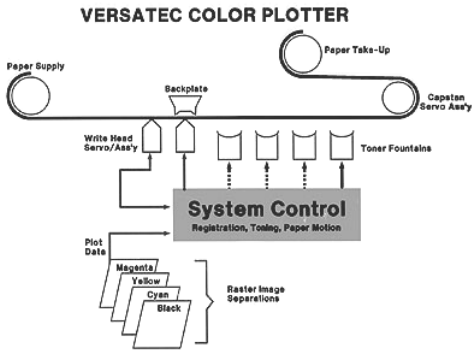
1981

Mergenthaler Omnitech 2000 Laser Typesetter

Polychrome OPC Direct Offset Plate System

1982

Versatec Electrostatic Color Plotter



1986

Kodak Signature Colorproof System

Stork Colorproofing Electrostatic Colorproofing System

1988

3M Matchprint Colorproof System

1989

Harris Graphics ElectroPress

1990

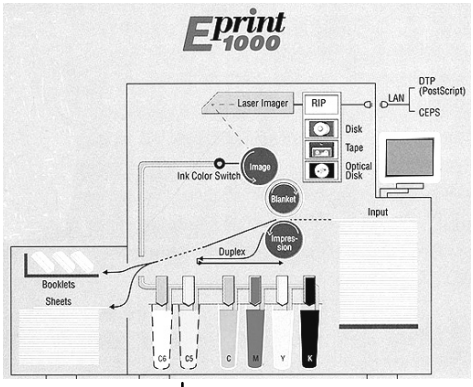
Synergy Computer Graphics Textile Printer

1992

Indigo 536 Plotter

1993

Indigo EPrint 1000 Digital Offset Press



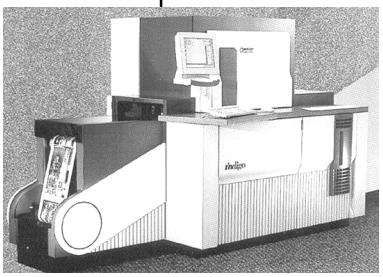
1994

Rastergraphics Digital Colorstation 5400

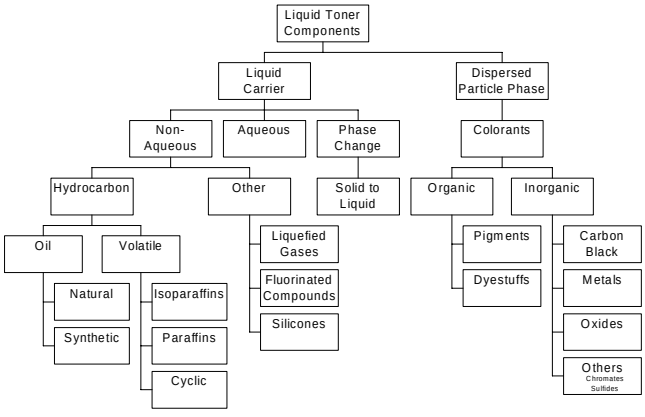
1995

Mitsubishi MD300

Indigo Omnius Digital Offset Label Printer



Liquid Toner Components



Liquid Toners–Future Challenges

Rarely do people embrace change without question or action. Especially when that change can be seen to be detrimental to their daily lives. The Environment, both global and local, impacts on each of us in some way. We all have seen many changes influencing the Environment which have occurred in our living history and which could not be construed by anyone to have had positive outcomes.

For many, the current perception of liquid toners and their processes is that they are environmentally unfriendly due to their emission of vapors and difficult to handle due to increasingly restrictive transport regulations. RLA has been aware of these objections for several years and has embarked on new developments with a two fold approach of applying modifications to both liquid toner chemistry and process.

The traditional chemistry of liquid toners relied heavily on the use of fossil fuel derived hydrocarbons as carrier fluids. Although such liquids are eminently suitable for this purpose, for they possess exceptionally compatible chemistry and good economics, in recent years they have gained notoriety as an undesirable pollutant to the atmosphere and are perceived as a waste of a finite resource. The combustibility of these hydrocarbons has also been a deterrent in some market applications.

RLA's approaches to these concerns have been to shift the long held paradigm of only using petroleum hydrocarbons and to investigate substitutions for these, concurrently redeveloping the chemistry of toners to accommodate new demands of the alternative carriers. Complementary processes which dramatically reduce airborne emissions are also being examined. These involve modify-ing imaging techniques to use highly concentrated liquid toners and managing those emissions which do occur through engineering.

RLA believes that by choosing environmentally friendly, safe liquids for the carriers, redefining the traditional concept of toner concentration and applying novel liquid and vapour management systems, liquid toners of the future will be able to meet the product demands of industry and the legislative requirements of environmental and transport regulatory bodies.

Biography

Charles E. Case formed Roger's Hill Associates in 1991 to serve the Elecrtronic Digitral Printing Industry in the areas of Strategic Consulting, Product and Market Development. He brings 22 years of industry experience to the company helping manufacturers & distributors achieve industry success.

Mr. Case has an extensive background in the Electronic Printing market and is a recognized authority on digital imaging technology, as well as a frequent speaker at industry events in North America, Europe, and Asia.

Mr. Case co-founded CAP International Inc. in 1985, now known as BIS Strategic Decisions. Prior to co-founding CAP, he was Vice President and General Manager of Philip A. Hunt Chemical Corporation, now known as Olin Hunt Specialty Products, Inc., managing the toner division. Involved for 12 years with the development and manufacturing of liquid and dry toners for OEM, color, black & white copiers, printers, facsimile equipment, along with other office and industrial automation hard copy producing devices. He has authored numerous articles on the supplies industry. Prior to working at Hunt, Mr. Case was co-founder of Sorbent Sciences Corporation, manufacturers of oil/water

filtration systems for which he holds several patents. Mr. Case holds a Bachelor's Degree in business from Pace University and is a member of IS&T.

Terence Laws joined RLA in 1963 and after qualifying as an Analytical Chemist from the South Australian Institute of Technology in 1968, became involved in all liquid toner projects of RLA. Senior Chemist of RLA since 1975, he has been responsible for the conception, development and conversion to production of numerous toners for many clients and a wide range of applications including photocopying, colorproofing, platemaking and high speed electrostatic printing. He holds 8 US patents in the field of liquid toners.