

PRINTING PROCESSES AND TECHNIQUES ON SOUTH AFRICAN STAMPS: 1910 TO 2010

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It is worth your while to be cognisant of the various types of printing processes and techniques used in the printing of stamps you are collecting.

INTRODUCTION

When the Union of South Africa came into being on 31 May 1910 stamps were printed abroad by well-known printing houses. An exception was the first Air Post stamps of 1925.

Local printing of stamps commenced in 1927 when the same plates used by Waterlow & Sons Ltd. for the printing of the ½d, 1d and 6d stamps were passed to the Government Printer in Pretoria. Stamps were henceforth printed by the Government Printing Works, Pretoria.

After 1994 stamp printing was again referred to International Printing Houses.

PRINTING PROCESSES

Stamp printing is a huge and specialized subject and when reading/researching the matter, usage of different words (by stamp collectors) are experienced for the same thing.

The objective of this article is not to give an extensive description of the subject, but rather a brief explanation of each of the printing processes and techniques employed, showing the first stamps printed using such process/technique.

Basically, five printing processes were employed over the first hundred years of South African stamp printing, see 1 to 5 below.

Collectors, of which I am one, sometimes consider some techniques as actual printing processes, which they are not but is appropriate for the purposes of this article, see 6 to 12 below.

The processes and techniques are dealt with chronologically by year commissioned, using the most common philately name it is known by. (Other names used for the same process are given in brackets where applicable).

1. RECESS PRINTING (*intaglio, recess, line-engraving, copperplate, steel engraving or siderography*)

When the Union of South Africa was established in 1910, undoubtedly every intention would have been to issue postage stamps to commemorate the event. Unfortunately, the death of King Edward VII on 6 May 1910 necessitated the preparation of a new die showing the portrait of the heir to the throne, King George V. Time left towards the 31st May made the preparation of a new printing die impossible.

The opening of the Union Parliament on the 4th November 1910 saw a 2½d stamp issued to commemorate the occasion – the Union's first stamp.



The design is a full-face portrait of King George V surmounted by a crown and the name of the country in English and Dutch above and below the King's head. Shields on which the coat of arms of the four British Colonies, that formed the Union, appear in the four corners.

Printed in recess by Thos. De La Rue & Co. Ltd. of London, England, on white wove paper with multiple rosettes watermark.

Sheets consisted of 120 stamps in 10 rows by 12 columns with a center indicated line and perforated 14.

In this process the image (stamp design) is incised into a flat surface known as the matrix or plate. The incisions are created by etching, engraving, drypoint, aquatint or mezzotint in varying depths below the surface.

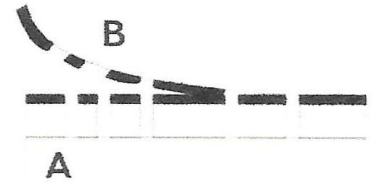
Ink is applied to the plate by wiping and/or dabbing the plate to push the ink into the recessed lines or grooves and excess ink removed. A damp piece of paper is placed on top of the plate.

The paper and plate are covered by a thick blanket to ensure even pressure when going through the rolling press. The rolling press applies very high pressure through the blanket to push the paper into the inked grooves on the plate, transferring the design to the paper.

The blanket is then lifted, revealing the paper and printed image.

The printed surface of the stamps bears a raised feel of the image, as the ink is sucked out of the recesses under great pressure onto the substrate.

The diagram shows the basic concept of this printing process. **A** is the plate or matrix. **B** is the paper. The thick black lines (exaggerated) are the inked areas.



In printing, blue is a very tenacious colour to the extent that difficulty is experienced in wiping the matrix/printing plate clean. This caused the surface of the paper to have a blueish tinge, varying in depth of colour on different sheets of paper during production.

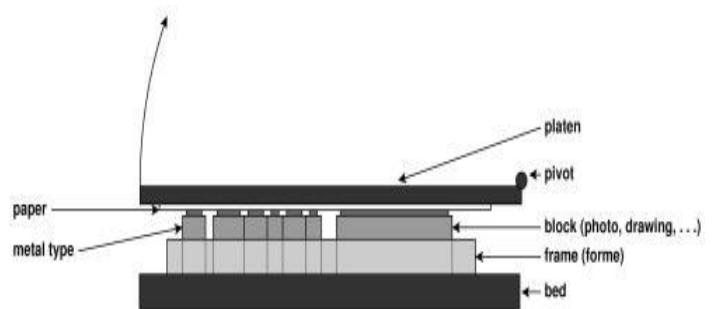
The triangular "Hope" stamp as well as the 2d, 3d, 4d, 1/-, 2/6, 5/- and 10/- denominations issued on 1 January 1926 printed by Bradbury, Wilkinson & Co (Ltd), London was also printed using this process.

2. TYPOGRAPHIC PROCESS: (*letterpress, relief-printing, surface-printing or typography*)

In Typograph printing, the stamp design was once transferred onto a metal plate using a greasy ink, with the rest of the plate being etched away leaving just the raised design to print from (think of a rubber stamp method).

Older typograph stamps could invariably be best identified from the reverse side because the design often felt raised to the touch due to the use of the metal plates and heavy pressure used.

Nowadays plastic plates are used for this process that tend not to leave the raised reverse.



The first Union Definitive Issue of 1913 was the first South African typograph printed stamps. They were printed by Waterlow and Son Ltd., London in sheets of 240 stamps (20 rows x 12 columns).

Perforated 14½ x 14 with an upright or inverted multiple Springbok head watermark.



Other stamps printed with this process is the ½d, 1d and 6d stamps of 1926 printed by Waterlow and Sons Ltd, London.

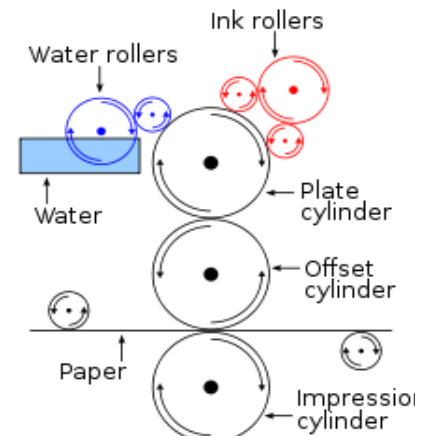
The Government Printer, Pretoria printed the first production of ½d and 1d denominations from the same plates and the 6d from a new set of plates.

On 16 August 1929 the second Airmail stamps that marked the inauguration of the Air Mail Service by the Union Government in that year was also printed by the Government Printer, Pretoria. Two stamps with 4d and 1/- values were issued.

3. LITHOGRAPHY (*offset, offset lithography, photo-lithographic offset*)

The printing process works by first transferring an image (photographically) to thin metal, paper or plastic printing plates. The inked image is transferred (or "offset") from this metal plate (Plate cylinder) to a rubber blanket or rollers (Offset cylinder) and then to the printing surface.

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



A photo-lithographic offset process was used by the Cape Times Ltd., Cape Town to print the 1925 Experimental Air Mail stamps, the **first** stamps ever to be printed in South Africa.



Stamps were printed on soft wove unwater marked paper in sheets, perforated 12. Each pane comprising six horizontal rows of ten stamps separated by a horizontal gutter of 15mm.

An interesting occurrence happened with the printing of the Centenary of the Burgerspond stamp in 1974.

These stamps were printed with the lithographic facility and not the rotogravure process of the Goebel 840 printing machine.

This feature in the printing process distinguishes it from any of the Union issues since 1930.



Block of six with cylinder numbers printed in the right margin also showing colour patches for measuring the photographic density of the image.

4. ROTOGRAVURE PRINTING: (*photogravure, gravure or rotaglio*)

This process always uses a rotary press running at high speed and best suited to produce large print runs.

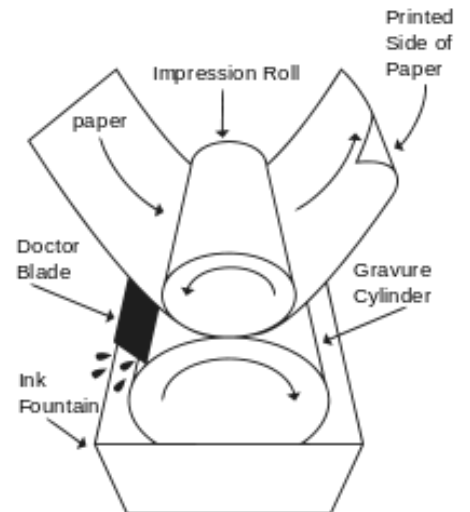
In rotogravure printing the stamp design is drawn larger than the required stamp and is then photographed. The negative is placed in a step and repeat camera that reduced the photographed design to the exact size of the required stamps. It is then duplicated as many times as required to make a complete sheet on a glass plate.

In the next part of the process the glass plate is used as a "negative" when a print is taken from it upon a photographic paper coated with colour pigment and gelatin called "carbon" tissue. The carbon tissue, being printed by exposure to strong light, is then transferred to a copper plate or cylinder which is to be used in the printing machine.

Paper rolls, gummed on one side, is fed through the machine first passing over the frameplate, then over the headplate on to the numbering and perforation sections.

Next to the trimmer to trim the margins and finally the cutter that cuts it into sheets.

After the import and installation of a Goebel AG 930 printing machine in 1929, all the Union stamps were printed by the Government Printer in Pretoria using the Rotogravure process.



The 1930 Pretoria Pictorials was the first stamps to be printed with this process. Effectively the first stamps to be printed was the 1d Van Riebeeck ship stamp in May 1930.

5. COMBINATION PRINTING

This term is used when more than one printing process are used on the same stamp. The stamp is first printed, for instance, by Rotogravure with Intaglio line work applied on top to enhance the printing.

5.1. ROTOGRAVURE AND PROCESS COLOUR

Only one stamp was issued on 14 March 1963 to commemorate the 50th anniversary of Kirstenbosch in Cape Town.

Bilingually printed on white unwatermarked paper in quadruple format of four panes. "A" occupying the top left quadrant, "B" the top right, "C" bottom left "D" the bottom right quadrant. Perforated 13½ x 14 in sheets of 100 stamps in 20 rows by 5 columns.

The design shows, in multicolour, a view of the lawns and gardens at Kirstenbosch with the well-known mountain peak "Castle Rock" in the background. A picture of a red Disa Uniflora is superimposed in the lower portion of the design.

For the first time on the stamps of South Africa, the Government Printer has used, what is known as, "process colours" to obtain a variety of colour tints. All previous South African stamps in two or three colours have had these colours as separate portions of a combined design.

The printing process involves combining two or more of the four subtractive colours, namely cyan, magenta, yellow and black. In four colour printing the cyan, magenta and yellow printing plates are carefully aligned with the key of the key black plate.

In this issue the colouring is superimposed to varying degrees, thus producing gradations of colouring from the three primary colours namely red, blue and yellow.

PANES A AND C



PANES B AND D



One *multipositive* was used for preparation of panes "A" and "B" and another one for panes "C" and "D".

The four cylinders utilized are inscribed in their respective colours on the right bottom margin of each sheet; Numbers 4 in red, 15 in blue, 14 in yellow and 6 in black.

5.2. ROTOGRAPHURE AND GOLD DIE-STAMPING

Two stamps, 2½c and 12½c, were issued on 24 August 1970 to commemorate the 150th Anniversary of the Bible Society in South Africa.

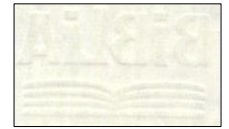
Printed on Harrison coated paper the 12½c sheets consisted of 50 stamps in 10 rows by 5 columns with 3mm phosphor bands. RSA tête-bêche watermark facing up and down.

The printing of the 12½c denomination was a new departure in the Republic's stamp printing processes.

Printing was started normally with the rotogravure process on the Goebel 840 machine and completed by a form of the letter press which impressed the gold of the inscription "BIBLIA" and the open book below. Gold foil was used to apply the gold printing.



The same equipment that allows foil stamping also enables embossing. The two processes are typically combined.



In this issue, the stamp was rather impressed, which is the opposite of embossing.



Cylinders 417 – 416A and 417 – 416B printed the 12½c stamps

5.3. ROTOGRAVURE COMBINED WITH INTAGLIO

To commemorate the 25th anniversary of the Voortrekker Monument one 4c stamp was issued on 6 December 1974. These stamps were on sale for two months. Printed on Harrison phosphorescent paper with perforation 12.5. Sheets consisted of 50 stamps in 10 rows by 5 columns with no watermark.

Intaglio is a family of printmaking techniques in which the image is incised into a surface known as the matrix or plate. See recess printing above.



Unusual colour patches for measuring the photographic density of the image on Pane A



5.4. SILK-SCREEN (screen printing, serigraphy)

Ten stamps, printed in offset lithography printed with a fragrance, were issued on 22 August 2008 to commemorate Namaqualand flowers. Printed by the Joh. Enschedé Stamps B.V., Haarlem, The Netherlands on self-adhesive stamp paper with backing paper in sheetlets comprising ten different designs in 5 rows by 2 columns. Stamps are separated by roulettes of 6.5 per 20 mm with a 4mm Green phosphor bands on right and bottom margins of each stamp.

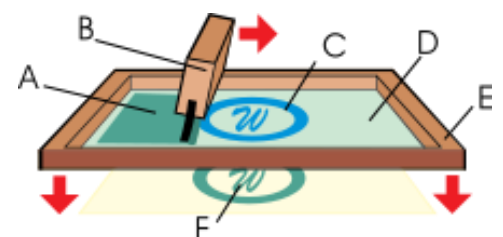


Each stamp has a fragrance in the paper coating. The printing technique utilized involve microscopic cells impregnated with perfume and printed on the stamps using silkscreen.

Rubbing the stamps releases the fragrance as it breaks open the cells. The fragrance can be preserved for many years.

The technique makes use of a mesh to transfer ink, in this case a perfume, onto a substrate. A fill blade is moved across the screen to fill the open mesh apertures with ink (perfume). A reverse stroke then causes the screen to touch the substrate momentarily along a line of contact.

This causes the ink (perfume) to wet the substrate and be pulled out of the mesh apertures as the screen springs back after the blade has passed. The ink (perfume) remains on the substrate.



A: Ink (Fragrance) B: Fill blade
C: Image D: Photo-emulsion
E: Screen F: Printed image

5.5. SUPERLITHO

Ten standard rate stamps were issued on 17 May 1997 to commemorate the year of Cultural Experiences in South Africa. Printed by The House of Questa, London on Tullis Russell Coatings 102gm² yellow/green phosphorised paper, perforated 13½ x 14. Sheets consisted of 10 stamps in 2 rows by 5 columns.

Superlitho is an improved lithographic printing process that can achieve a printing resolution of 850 lines per inch (lpi). This is much higher than the usual 350 lpi of older processes.



P/copy

Normal litho with 250-300 lpi.
Typical white spotty appearance,
rosette pattern and loss of detail



P/copy

Superlitho with 800-900 lpi with
micro-printing giving a superior
image quality and greater detail

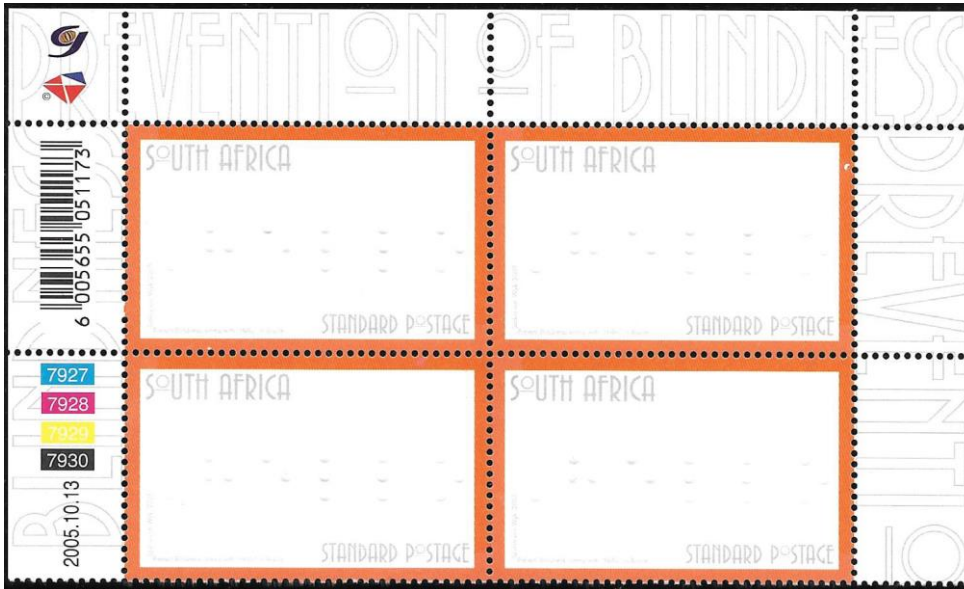
These were the first stamps in the world that was printed with the process described as **superlitho**.



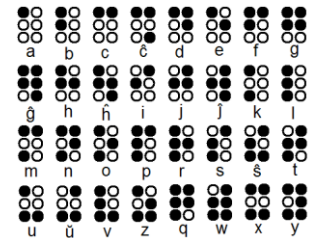
Cylinder numbers in their respective colour printed lower left under 1997.

5.6. OFFSET LITHOGRAPHY WITH BRAILLE INSCRIPTIONS

A commemorative stamp to create awareness of the prevention of blindness was issued on 13 October 2005. Printed by Southern Colour Print Limited, New Zealand in Offset Lithography on Tullis Russell yellow/green phosphor gum stamp paper it is perforated 14 with 4 mm phosphor bands on left and bottom of stamps in an "L" shape.



The raised Braille lettering spell the word "HELLO" and include the sign for a capital letter "H" as the first letter.



Braille alphabet



Perkins Braille typewriter

A braille embosser is an impact printer that represents text as tangible Braille cells. Using Braille translation software, a document can be embossed with relative ease, making Braille production efficient and cost-effective.

Standard Braille cells are always the same size, each character 2,5 mm wide by 6,2 mm high with the embossing character (dot) 1,2mm by 1,2 mm.

Visually impaired users tend to call all other printers "ink printers" to distinguish them from their Braille counterparts.

This is often the case regardless of the type of printer being discussed (e.g., thermal printers being called "ink printers" even though they use no ink).

5.7. OFFSET LITHOGRAPHY AND EMBOSSED

Twelve offset lithography printed stamps, Six Standard Postage rate and six International Airmail Small letter rate, was issued on 30 January 2009 to commemorate the 75th Anniversary of the South African Airways. Due to the printing problems with the gold foil, the issue was delayed until 13 March 2009.

Printed by the Joh. Enschedé Stamps B.V., Haarlem, The Netherlands in Offset Lithography on Sopal stamp paper in sheetlets comprising six different designs *se tenant* of each denomination in 2 rows by 3 columns, perforated 13.1.

The Standard Postage stamps feature Captain's cap and uniform insignia with embossing whereas the International Airmail Small letter rate stamps depicting Aircraft tail-planes showing SAA emblems.

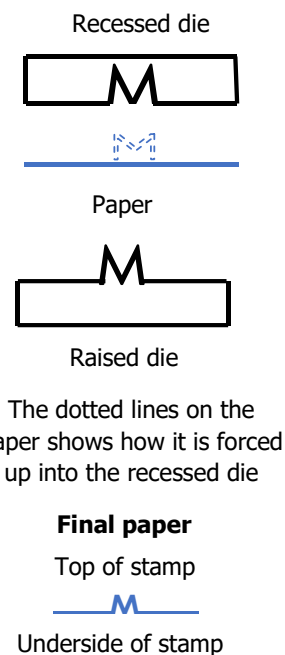
4 mm Yellow phosphor bands appear along the top and right margins of each stamp.

Often used in combination with foil stamping, embossing alters the surface of paper stock or other substrates by providing a three-dimensional or raised effect on selected areas. The procedure requires the use of two dies: one that is raised and one that is recessed. The dies fit into each other so that when the paper is pressed between them, the recessed die forces the stock into the raised die and creates the embossed impression. A specific level of pressure is applied to the dies to squeeze the fibres of the paper resulting in a permanently raised area in the paper.

When the dies are produced, a die maker engraves the desired image into several metal plates, which are the embossing dies for use on an embossing press. Generally, embossing is the process most often employed to attract attention or convey a high-quality textural contrast in relation to the surrounding area of the paper stock.



Cylinder numbers printed in the top left margin in their respective colours.



The same principle was used with the "BIBLIA" and "BRAILLE" stamps.

5.8. OFFSET LITHOGRAPHY WITH 3D EFFECT

On 2 November 2009, a self-adhesive dinosaur commemorative set of ten stamps were issued. Printed by Cartor Security Printing, France in Offset Lithography using anaglyph process to create a 3D effect. It was the first time in South Africa that a pair of viewing glasses were supplied with each stamp sheet.

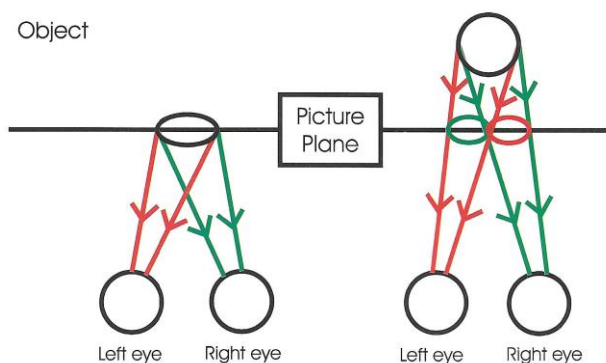
The stamps were printed on yellow-green phosphor paper in sheets of ten with a 4mm phosphor band on top and right. Perforated 10.

Five of the stamps depict skeletons of different dinosaurs, while the other five show images of what these creatures most probably looked like.

Postal rate: International Airmail Post Card.

The method used to create this effect is known as anaglyph. An anaglyph are pictures formed by the integration of two images - a stereographic image – printed in two colours, usually red for the left eye and blue or green for the right eye.

Anaglyph 3D images contain two differently filtered coloured images, one for each eye that requires special glasses with red and green (or blue) lenses for 3D viewing.



Separately coloured images are superimposed over one another.

When looking at it through 3D glasses, the lateral displacement between the two images create an illusion that the image is floating above the page.



No cylinder numbers were printed on the sheets.

COMMENTS

Although not a printing process as such, another two "firsts" that need to be mentioned has to do with phosphor bands/coatings. Both stamps were rotogravure printings.

The first use of phosphor bands printed on SA stamps was printed in 1969 on the 2½c stamp in commemoration of 100th Anniversary of the ZAR.



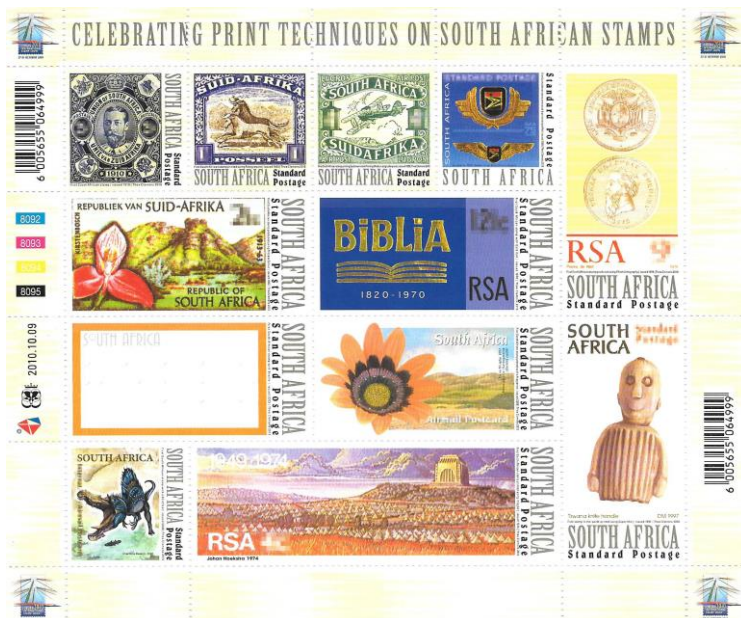
Paper with a phosphorous coating was introduced in 1972 when the 4c stamp that commemorates the Hendrik Verwoerd dam, nowadays the Gariep dam, was printed on such paper.



To celebrate World Post Day on 9 October 2010, South Africa issued a miniature sheet showcasing the first stamp(s) printed with a different print technique used on South African stamps for the period 1910 to 2009.

The sheetlet, comprising 12 redesigned stamps of Standard Postage rate (R2.40), was printed by Joh. Enschedé Stamps B.V., Haarlem, The Netherlands using an offset lithography process.

Sadly, the issue is not 100% factually correct. Some errors occurred with the description of stamps described as the first to be printed with a certain technique.



Original face values have been obscured by pixellation

The author would like to acknowledge and thank Glenn H Morgan (FRPSL) and Robin Messenger for their advice and support.

Readers' attention is also drawn to the following specialist articles on printing procedures of SA stamps that previously appeared in the SA Philatelist:

- The Rotogravure stamps of the Union of SA, G N Gilbert (RDPSA); May 1934.
- Multiple Comb Perforations of the Rotogravure Issues of the Union of South Africa, A. Hilton Sydow; March 1948
- Rotogravure and Planographic Printing Presses of the Government Printer, Pretoria, 1930 – 1990, W J Quik; June 2004.
- Types of Stamps and Labels Printed, Overprinted and Surcharged by the Government Printer in Pretoria over the period 1949 to 1961 Dr Gerhard Kamffer (RDPSA); August 2016.

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 Setempe, V 10 No 3 - July/Sept 2005 pp 8 - 9; V 13 No 2 - July/Sept 2008 pp 8 - 9; V 14 No 1 - Jan/Apr 2009 pp 6 - 8; V 14 No 3 -
 Sept/Dec 2009 pp 8 -10; V 15 No 3 - Sept/Dec 2010 pp 8 - 10
 Stamps of the Republic of South Africa – Handbook Catalogue, Philatelic Federation of SA July 1978 – pp Q8 - 11; Q86 - 9; Q136 - 7;
 Q148 – 50
 The Handbook of Stamp Production – 2017: Glenn H Morgan, pp 27 - 30
 The Stamps of the Union of South Africa 1910 – 1961: Handbook catalogue 1986: SJ Hagger, pp 1 - 2; 20 - 1; 62 - 3; 101 - 3;
 Various Internet websites accessed