

BANK OF TANZANIA



TANZANIA AUTOMATED CLEARING HOUSE

CHEQUE STANDARDS AND SPECIFICATIONS

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ABBREVIATIONS

ABR	Average Background Reflectance
ANSI	American National Standards Institute
BOT	Bank of Tanzania
BRE	Bottom Reference Edge
BS	British Standards
CBS 1	Clearing Bank Specification 1
CSS	Cheque Standards and Specifications
DPI	Dots Per Inch
ICR	Intelligent Character Recognition
ISO	International Standards Organization
MICR	Magnetic Ink Character Recognition
OCR	Optical Character Recognition
PCS	Print Contrast Signal
PIS	Paper Instrument Standards
TACH	Tanzania Automated Clearing House
UV	Ultra Violet
URT	United Republic of Tanzania
VRE	Vertical Reference Edge

FOREWORD

In October, 1999, the Bank of Tanzania (BOT) issued the maiden cheque standards known as the Paper Instrument Standards (PIS, 1999). These standards provided the banking industry with specifications for designing and printing of cheques in the country. The standards were also used to automate the clearing house operations in Tanzania, through the implementation of Bank of Tanzania Electronic Clearing House (BOTECH) system in 2002.

Contemporary business changes and dynamics in payment systems through technological advancements have rendered the BOTECH system inefficient, necessitating its overhaul and implementing a fully automated clearing house system known as the Tanzania Automated Clearing House (TACH).

In order for TACH to be effective in processing cheques, the PIS, 1999 required an extensive review to align with the new system developments, an exercise that went through stakeholder consultations and resulted in development of new Cheque Standards and Specifications (CSS, 2013) document that includes international standards and best practices. The new standards have been developed in order to provide consistency in the printing and efficiency of processing cheques based on technological developments that require enhanced security features on cheques. The CSS, 2013 includes the following features;

- Minimum mandatory security features.
- Standardization of fields' placement on cheques.
- Image property specifications for cheque processing.
- Specifications for bank, branch codes and account number (MICR code line).
- Guidance on the printing process and personalization

The introduction of these standards and specifications coupled with modernization of cheque clearing operations in Tanzania is a major step towards increasing efficiency, integrity and convenience of the cheque clearing process. These initiatives are expected to enhance risks mitigations on the use of the payment instrument.

I, therefore, urge every member of the Tanzania Automated Clearing House to abide by these Cheque Standards and Specifications.



Prof. Benno Ndulu
GOVERNOR

1. INTRODUCTION

The Tanzania Automated Clearing House (TACH) performs clearing operations based on the data and electronic cheque' images submitted by member banks. The clearing process has adopted cheque standards that conform to imaging and security requirements to ensure that images contain essential information and are useable and legible as detailed herein. The use of cheque images for clearing depends on a number of factors including design, layout, background colour, security features, ink used to print MICR data and other required factors and information.

Accordingly, the CSS, 2013 has been prepared in consultation with various stakeholders. The explicit standards specified in this document provide mandatory requirements for the designing and printing of all cheques that are cleared and settled among banks in Tanzania.

2. SCOPE AND APPLICATION

Members of TACH, cheque printers and personalisers shall comply with these standards.

3. CHEQUE LAYOUT SPECIFICATIONS

This section covers the basic structure of a cheque. It provides specifications of the cheque layout that shall conform to the CSS. Banks shall observe the requirements for the dimensions of each mandatory field. Except where specifically stated, the dimensions and position of the fields depend on the amount of information needed to be entered, the size of the cheque and the overall layout rules. The efficiency of Cheque imaging processing depends on the quality of information entered in the specific field or area and the means of entry.

Boxes or lines around the area where the amount in figures and signature are entered on a cheque can create recognition problems for ICR and hence any borders to the amount box must be printed in such a way that they "drop out" and are not "seen" by the image capture system.

3.1. CHEQUE TYPES AND DIMENSIONS

There shall be two types of cheques used in Tanzania; Personal Cheques and Corporate Cheques. The cheque shall be rectangular in shape with the following dimensions;

Table 1: Dimensions for Personal and Corporate Cheques

Type of Cheque	Length	Width
Personal	178mm	77mm
Corporate	203mm	90mm

3.2. REFERENCE EDGES AND MEASUREMENTS

All horizontal dimensions shall be measured from the right hand edge known as the Vertical Reference Edge (VRE) and all vertical dimensions shall be measured from the bottom edge known as the Bottom Reference Edge (BRE). In the case of cheques printed in continuous form, measurements shall be taken from the perforations.

3.3. TOLERANCE

The measurements given in this Standard for the various elements in the design of a voucher are the nominal dimensions and locations. It is accepted that it is not possible to maintain position absolutely during printing and therefore the following tolerances relative to the nominal location of each field are acceptable:

±1/16" (1.6mm) vertically

and

±1/20" (1.3mm) horizontally.

Reliance on the use of printing tolerances to make undersized or oversized features or mandatory element positions from the Reference Edges or from each other, is not acceptable practice.

3.4. FRONT SIDE OF THE CHEQUE

The front side of the cheque is broadly divided into two areas; Clear Band Area and Business Area.

3.4.1. CLEAR BAND AREA

The MICR clear band area runs from the right to the left vertical edges of a cheque, along the BRE, on the face and the reverse of the cheque.

The clear band, preferably white, shall be measured 16mm from the BRE and may be indicated by a horizontal line (the clear band divider) with a width of 0.5mm to 1mm, across the face of the cheque. This divider shall not be joined to any other line or text. Any wording such as "please do not write below this line or fold this document," shall be positioned at the center above the clear band.

Nothing visible shall be printed or written, at any time, on the face or reverse of the document in the clear band area. This includes visible security features, other than an approved MICR code line on the face only.

Figure 1 and 2 illustrate the general layout of the front side of the Personal and Corporate cheques respectively.

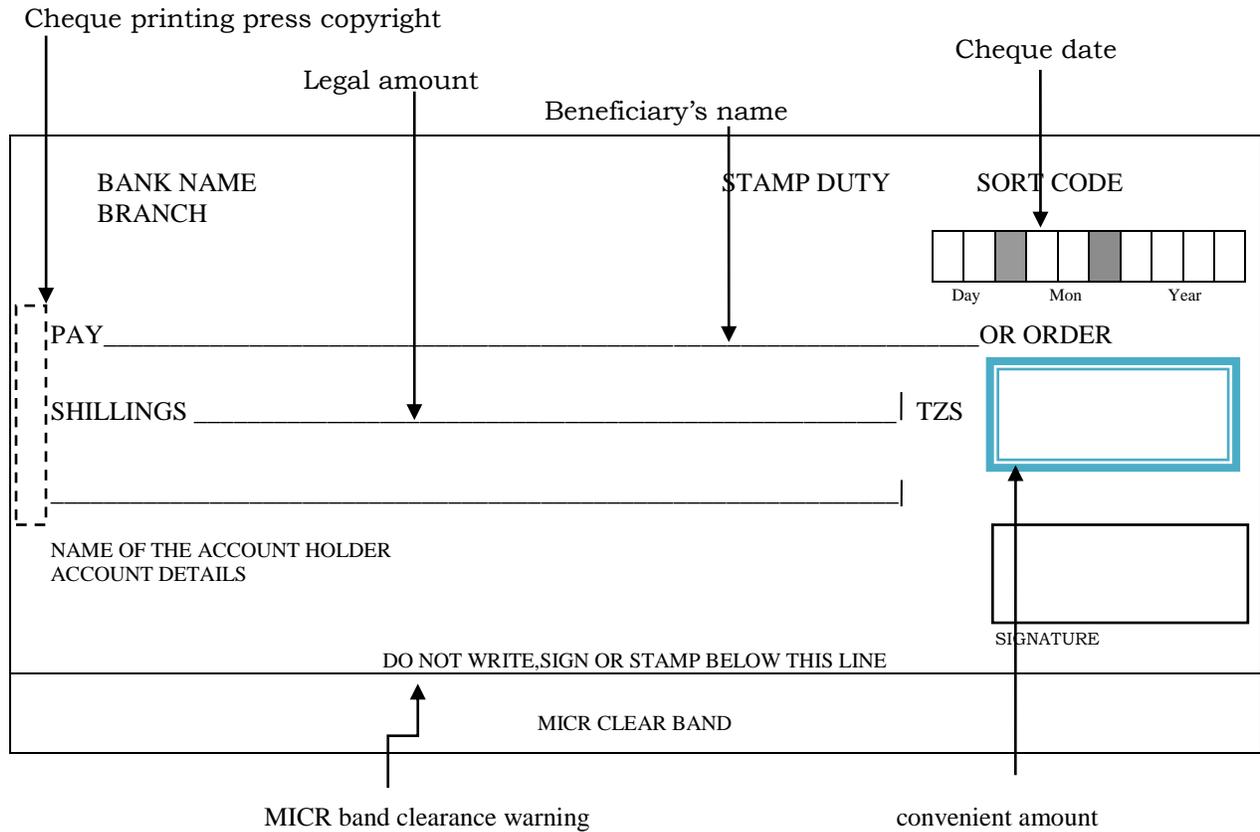


Figure 1: General Cheque layout – Personal cheque

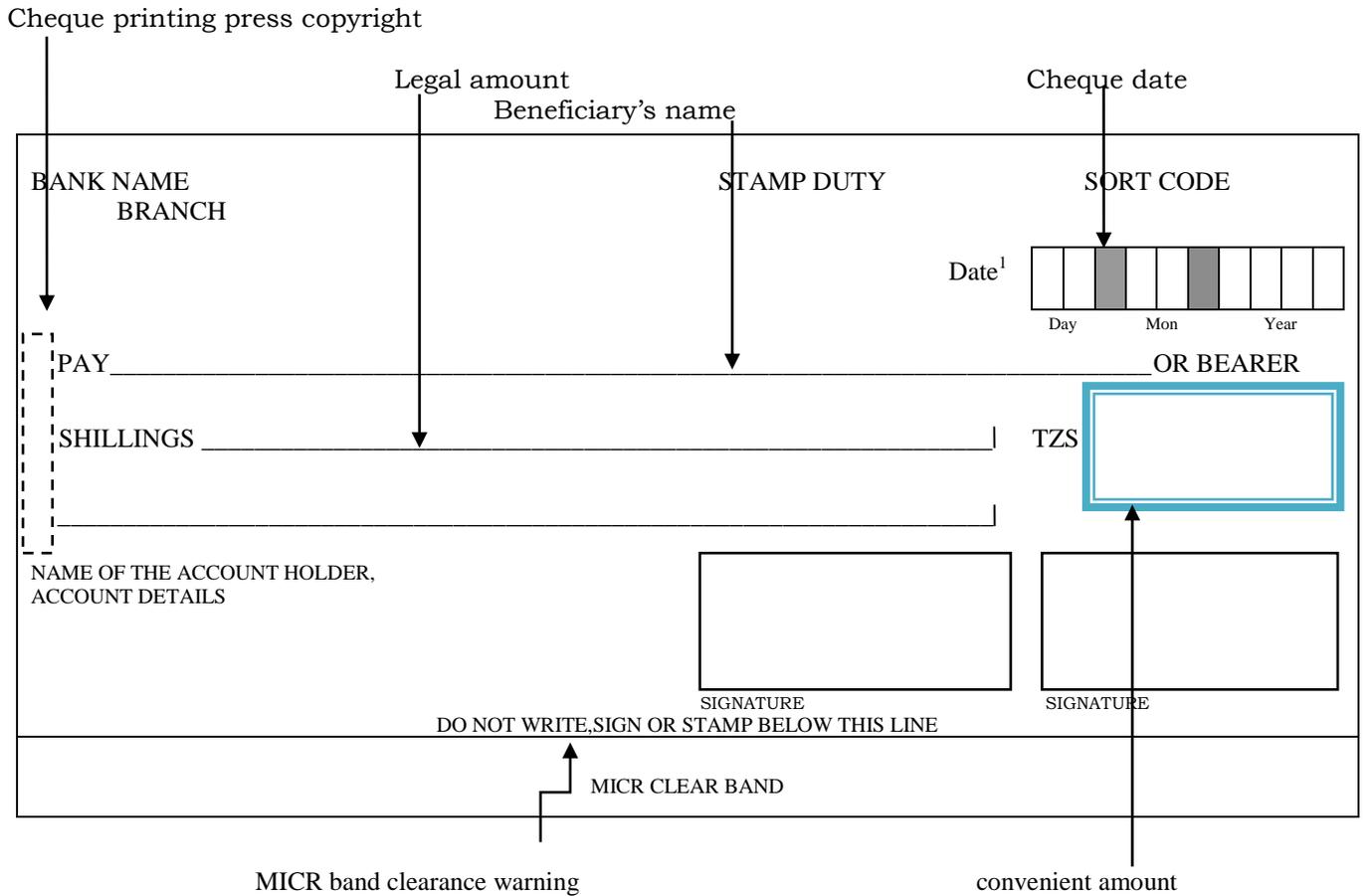


Figure 2: General Cheque layout – Corporate cheque

¹ A line may be used in cases where the date is printed by a software application and positioning within the box is difficult. The format to be used is DD/MM/YYYY.

3.4.2. BUSINESS AREA

The Business Area is categorized into two, mandatory fields consisting of a specific location field and optional fields (non-specific location information). If a bank or its corporate customer decides to print any non-specific location information, it shall not be printed in the clear band area and shall not interfere with any mandatory fields of the cheque. However, these optional fields shall ensure legibility of the clear representation of the cheque.

3.4.2.1. Date field

The cheque shall have a common format to facilitate easy recognition of the date. This area shall include the “Date” field label and a constraint date box (with a separate box for each digit). The outline of the date box shall be printed as scan, non-readable, in a colour such that the Print Contrast Signals (PCS) of the outline, with respect to its background, does not exceed 0.30.

3.4.2.1.1. Constraint date box

The date box shall have a common format of DDMMYYYY to encourage a standardized numeric representation of the date. The first two digits of the constraint box will denote the day, the second two digits will denote the month, and the last four digits will denote the year. Two spaces to separate each field are provided, and no slashes, dots or other symbols are permitted.

3.4.2.1.2. Date Field indicator

The Field Indicators “Day”, “Month”, and “Year” shall be clearly printed below the date box to guide the drawer. The Print Contrast Signal (PCS) of the Field Indicator with respect to the background shall be at least 0.60.

3.4.2.1.3. Location of Date field

The date field shall be positioned at the top right corner of the cheque above the amount in the figures area as specified in Table 2.

Table 2: Location of the date field

Location	Specifications Personal cheques	Specifications Corporate cheques
Width	41mm	41mm
Height	7mm	7mm
Distance of the upper edge of the date box from BRE	65mm	78mm
Distance of the lower edge of the date box from BRE	58mm	71mm
Distance of the right edge of the date box from VRE	6mm	6mm
Distance of the left edge of the date box from VRE	47mm	47mm

3.4.2.1.4. Date label

The “Date” label shall be printed to the left of the date box.

3.4.2.2. Payee Name

The Payee name field is a mandatory field and shall be positioned in a manner that is easily recognizable. The location for the payee name shall be on the left end of the cheque, below the issuing bank name and shall be above the “amount in words” area. That location is 53mm and 63mm from the BRE for personal and corporate cheques respectively. The line for entering payee name shall be printed as scan non-readable. The last letter “R” of the word “BEARER” or “ORDER” must be no closer than 56mm and 62mm to the VRE for personal and corporate cheques respectively. The field for payee name shall not interfere with any other field.

When completed on a computer printer or by typewriter, the payee name shall be left justified and the space to the right of the payee name shall be filled with asterisks.

3.4.2.2.1. Pay label

The “Pay” label shall be printed immediately to the left of the space, where the payee name will be written or inserted. The label shall be placed right above the “Legal Amount” label.

3.4.2.2.2. Or Bearer/ Or Order label

The label “Or Bearer” or “Or Order” shall optionally be printed at the end of the payee line, where the payee name will be inserted.

3.4.2.3. Amount in words

The amount in words also known as “Legal Amount” shall be a mandatory field and the cheque layout must enable the correct amount of the cheque so that it can be easily determined at a glance. It shall be free of any other printing, enabling the human eye to detect any fraudulent alterations in the original physical cheque or its image.

The area for amount in words shall be provided to the left of the amount in figures box and below the payee name field. The space shall be two lines at 35mm and 44mm for personal cheques and 45mm and 54mm for corporate cheques above the BRE. The distance of the amount in words lines shall be 90mm and 107mm for personal cheques and 110mm and 127mm for corporate cheques. The lines shall be printed as scan non-readable.

When completed on a computer printer or by typewriter, the amount in words should be preceded and followed by two asterisks and left justified.

3.4.2.3.1. Amount Label

The position for the amount label i.e. “Shillings” or “Dollars” shall be located below the pay label at the beginning of the amount in words Line.

3.4.2.4. Amount in Figure

The amount in figures also known as “Convenient Amount” shall be a mandatory field. The cheque layout must enable the value of the cheque to be quickly and accurately determined at a glance. The amount in figures field shall be an imaginary rectangular area or box at the right hand side of the cheque. The location of the amount in figures shall be to the right of the amount in words.

When completed on a computer printer or by typewriter, the amount in figures should be preceded and followed by two asterisks and left justified in the Amount Box. Care should be taken that the leftmost asterisk does not touch or overwrite the currency symbol, which is to the left of, and just outside, the Amount Box.

3.4.2.4.1. Location of the amount in Figures Field

The amount in figures shall be filled in the amount in figure box.

Table 3: Location of the amount in figure field

Location	Specifications Personal cheques	Specifications Corporate cheque
Width	41mm	46mm
Height	9.5mm	9.5mm
Distance of the upper edge of the amount box from the BRE	44.5mm	54.5mm
Distance of the lower edge of the amount box from the BRE	35mm	45mm
Distance of the right edge of the amount box from the VRE	6mm	6mm
Distance of the left edge of the amount box from the VRE	47mm	52mm

3.4.2.4.2. Location of currency symbol

The currency symbol e.g. “TZS” or “USD” shall be printed in black outside the amount box area to the left and centered vertically on the box.

The space between the right side of the “TZS” or “USD” symbol and the left side of the amount box area shall be at a distance of 0.5mm. The measurements shall be taken from the inside of the left side vertical border, if present, or the left side of the amount box area.

3.4.2.4.3. Printing and writing in the Amount in Figures Box

To facilitate better value recognition, it is recommended to print the background security pattern or screen in scan non-readable ink inside the amount in figures box. A clear area of 4mm shall be provided around the amount in figures box to facilitate value recognition.

3.4.2.5. Drawer signature field

The drawer signature area shall be a mandatory field and designed to ensure that the signature(s) of the drawer(s) can be easily located. They shall be at the bottom of the cheque with sufficient space separating it from the clear band area in order to ensure that a signature does not encroach upon the MICR clear band area.

3.4.2.5.1. Drawer signature box

The drawer signature area/s shall be at the bottom of the cheque. The drawer signature box shall be located 6mm above the MICR clear band area and 6mm away from the VRE. Each box is separated from its adjacent box by 6mm.

Table 4: Location of drawer signature box

Location	Specifications Personal cheques	Specifications Corporate cheque
Width	45mm	45mm
Height	10mm	15mm
Distance of the upper edge of the drawer signature box from the BRE	32mm	37mm
Distance of the lower edge of the drawer signature box from the BRE	22mm	22mm
Distance of the right edge of the drawer signature box from the VRE	6mm	6mm
Distance of the left edge of the drawer signature box from the VRE	51mm	51mm and 102mm

The signature boxes shall be printed above the wording, "Please do not write or sign below this line". The drawer signature boxes and wording shall be printed as scan non-readable.

3.4.2.6. Drawee bank details

The Drawee bank details shall be printed in visually clear print prominently featured against all other information on the cheque.

3.4.2.6.1. Drawee bank Logo, bank name and branch name

The location of the bank logo, bank name and branch name field is at the top left corner. The distance of this field from the BRE for personal cheque is between 58mm – 77mm and for corporate cheques is between 72mm – 90mm.

3.4.2.7. Customer details

This item provides personal details of the bank's customer, therefore shall be a mandatory requirement.

3.4.2.7.1. Areas for customer details

The customer's name, logo, address and account number shall be adjacent to the left of the signature and above the clear band area. These items shall not be more prominent than the information on drawee bank so as to be mistaken for the name of the drawee bank. These items shall also not interfere with the signature box area or the MICR clear band area. The company stamp, personal seal or advertisements on this area are not permitted.

3.4.2.8. Sort Code

The Bank Sort Code shall be printed in OCR-B1 font with the base of the characters positioned at 72mm and 84mm from BRE for personal cheques and corporate cheques respectively. The position from the VRE shall be measured between 6mm and 21mm for both personal and corporate cheques.

3.4.2.9. Duty Paid

The "Duty Paid" mark where applicable shall be positioned from BRE between 65mm and 75mm for personal cheques and 78mm and 88mm for corporate cheques. The mark from VRE shall be positioned between 61mm and 76mm for personal cheques and 71mm and 86mm for corporate cheques.

3.4.2.10. Crossing

Any crossing shall consist of two parallel lines, printed bolder than any adjacent lines on the cheque, placed vertically or diagonally across the centre of the cheque and may incorporate a band of distinctive colour or shade. It shall not extend into the Clear Band. All corporate cheques shall be crossed.

Any wording associated with the crossing shall be placed between the parallel lines.

3.4.2.11. Cheque printing press

The name of the printing press shall be printed vertically on the face of the cheque to the extreme left-hand edge of the cheque using a small but legible font. Banks shall use accredited security printers. The printer details shall be in small font, but clearly readable. The details shall include the following:

Printer's Name:	e.g. ABCD Ltd.
Print Location:	e.g. Dar es Salaam, Tanzania
Printing Date:	Month and Year e.g. 07/13

3.4.2.12. Bar Codes

A bar code may be printed on the cheque, other than in the Clear Band area, provided that it does not interfere with processing. Dimensions of the bar code must not be larger than 45mm long and 25mm high.

4. MAGNETIC INK CHARACTER RECOGNITION (MICR) SPECIFICATIONS

The following specifications in respect of MICR code line shall apply, unless reviewed by the banks as per section 7:

4.1. Font to be used

The font for printing of the MICR code line shall be E-13B, which can be readily recognized by high-speed magnetic recognition equipment.

The E-13B MICR font consists of ten numerals (0-9) and four symbols (␣ ␣ ␣ ␣):

0 1 2 3 4 5 6 7 8 9 ␣ ␣ ␣ ␣

Figure 3: E-13B MICR font character set 1

4.1.1. Sorting Code Symbol (␣)

Sorting code symbol indicates to the reader sorter that the numerals between those symbols are the sorting code that identifies the Bank on which the cheque is drawn and also where the document should be sent for processing.

4.1.2. Amount Symbol ()

Amount symbol indicates to the reader sorter the boundaries of the amount field. The amount of the cheque appears between the two amount symbols.

4.1.3. 'On us' Symbol ()

The 'on us' symbol indicates to the reader sorter where to start reading the account number and where to start and finish reading the cheque reference (or serial) number.

4.1.4. Dash Symbol ()

Dash symbol indicates a divider or hyphen to the reader sorter. The dash symbol is used to separate the Bank Branch Code from the Bank Code.

4.2. MICR Code Line Content and Format

The MICR code line is divided into five (5) fields. Every field shall be closed either by the appropriate closing symbol or by the opening symbol of the following field.

The code-line shall be printed such that the bottom edge of its characters is 6 mm from BRE with a horizontal tolerance of ± 1.6 mm.

The code-line shall be printed between the specified margins and shall contain the six data fields listed below (in order from the left edge):

Table 5: MICR line encoding fields

NO	FIELD	MAXIMUM SIZE
1	Serial Reference Number	6 digits
2	Sort code Bank code Branch code	3 digits 3 digits
3	Account Number	10 digits
4	Transaction code	2 digits
5	Amount	10 digits.

An example of MICR code line location and detail is shown on figure 4 below:

44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
■	Serial Reference Number						■		Bank Code	■	Branch Code	■	Account Number										■	Trans code	■	Amount										■							

Figure 4: MICR line encoding locations and details

4.2.1. Position 1: Amount Symbol

The amount symbol at position 1 is mandatory as the opening symbol of the amount field. The right edge of the amount symbol shall be 8mm measured from the right reference edge.

4.2.2. Position 2-11: Amount Field

The amount field can either be encoded or left blank. For encoding, the amount field should be fixed in length and in position (position 2 to 11 consists of 10 digits). This field shows the actual amount. The amount field is right justified and a digit shall be printed in each position. All unused positions to the left are filled in with zeros. The MICR character set does not have a comma or decimal point. Accordingly, the amount is encoded as a string of numerals with an implied decimal. (Example: an amount of TZS 1,234.50 is encoded as 123450).

4.2.3. Position 13: Amount Symbol

The amount symbol at position 13 is mandatory as a closing symbol of the Amount Field.

4.2.4. Position 14-15: Transaction Code

This field shall contain two digits at position 14-15.

4.2.5. Position 16: On Us Symbol

The 'on us' at position 16 is mandatory as an opening symbol of the account number field.

4.2.6. Position 17-26: Account Number

The account number field is fixed in length (with 10 spaces) and positions are 17-26. Accordingly, a zero shall be printed in each remaining blank position.

4.2.7. Position 28: Sorting Code Symbol

The sorting code symbol at position 28 is mandatory as an opening symbol of the Bank and Branch Codes.

4.2.8. Position 29-31: Branch code

The Branch Code (at 29-31) is fixed in position and in length. The Branch Code shall be separated from the Bank Code on its left by the dash or separator symbol, and a zero shall

be printed in each remaining blank position.

4.2.9. Position 32: Dash symbol

The dash symbol at position 32 is mandatory as a separator between the Branch Code and Bank Code.

4.2.10. Position 33-35: Bank Code

The Bank Code (at 33-35) is fixed in position and in length. The Bank Code shall be separated from the Branch Code on its right by the dash or separator symbol, and a zero shall be printed in each remaining blank position.

4.2.11. Position 37: On Us Symbol

The 'on us' symbol shall be printed in position 37 on all cheques as an opening symbol of the Cheque serial number field.

4.2.12. Position 38 – 43: Serial number

Six spaces are allocated for the cheque serial number or cheque number.

4.2.13. Position 44: On Us Symbol

The 'on us' symbol shall be printed in the position 44 on cheques as a closing symbol of the cheque serial number field.

4.3. Location and dimensions of the MICR code line

The MICR code line shall be printed within a band of 16mm above the BRE. The right margin of the MICR code line shall be 8mm measured from VRE to the right edge of the opening symbol for the amount field. A left margin shall provide at least 8mm.

4.4. Ink and MICR code line printing

All MICR characters shall be printed in a single line within the clear band. Only black magnetic ink, which can be magnetized and sensitized, shall be used in printing E-13B characters in the MICR code line. The E-13B characters shall be printed in accordance with the technical specifications of E-13B characters and magnetic ink prescribed by the International Standardization Organization (ISO) BS ISO 1004:1995 shall be used. Since the MICR code line data is considered as electronic payment information, the ink, print precision and print quality shall facilitate easy recognition of the MICR code line by cheque scanning and other cheque processing equipment.

The MICR clear band area shall remain free of background screening. Other than the prescribed MICR characters in the MICR encoding line, no writing, stamping, perforation, stapling or other intrusion shall be allowed on this area. The E-13B characters shall not be printed in other areas of the cheque.

Extraneous magnetic ink, fade ink, voids, negative or positive embossment within a character or any irregularity of characters, shall be avoided to ensure the quality of MICR printing. Extraneous magnetic ink areas larger than 0.003 inch x 0.003 inch (0.0762 mm x 0.0762 mm) shall not be in the MICR clear band. The fields including account number, Bank/branch code and the cheque serial number must be pre-encoded. The drawee bank shall exercise adequate care in verifying the accuracy of information in those fields before giving their approval to the proofs. The presenting Bank may encode the amount field.

5. CHEQUE PRINTING

Banks issuing cheques are required by BOT to submit an International Standard Organization (ISO) certificate of their respective cheques printers.

5.1. Physical Characteristics of the Cheque Paper

The paper on which cheques are printed shall conform to minimum paper specifications given on table 6 below to enhance operational efficiency of MICR readers, sorters and imaging equipment irrespective of grain direction. The paper to be used in printing of cheques shall conform to CBS 1 specification.

Table 6: Cheque physical paper specifications

Descriptions	Technical Specifications	Relevant Standard
Grammage	95.0 g/m ² ($\pm 5\%$)	ISO 536 - 1976 {BS 3432:1980}
Thickness	Minimum 105 Micrometres Maximum 130 Micrometres	ISO 534 {BS 3983:1989}
Bendsten Roughness for both surface	Maximum 150 ml/min	ISO 8791-2:1990 {BS 4420:1990}
Stiffness	Machine Direction (MD) : Min. 7.9mN Cross Direction (CD) : Min 3.1 mN	ISO 2493:1992 {BS 3748:1992}
Air Resistance (Gurley method)	Min: 27s100ml or equivalent value derived using alternative test methods	ISO 5636-3 {BS 6538-2: (1992)}
Internal Tearing Resistance	Both directions Min: 705m/N	ISO 1974 {BS 4468:1990}

5.2. Quality of Paper

Cheque printing paper shall be:

- White, smooth, flat and free from embossment, heavy engraving and excessive tendency to curl;
- Free from holes, tears, and damages edges;
- Relatively low level of visible spots and fibre contamination to avoid any misreading of information or UV features on the cheques.

5.3. Chemical sensitivity

The cheque printing paper shall have chemical sensitivity to acid, alkaline bleach, polar organic solvents and proprietary ink eradicators which provide visible evidence of fraudulent alterations.

5.4. Reflectance of the paper

The reflectance of the paper shall be maintained at a high level (78-80 %). The paper shall be free from the following factors, which can adversely affect reflectance:

- magnetic or metallic inclusions ;
- carbonizing on the reverse side;
- chemical coating; and
- contamination by fluorescent;

5.5. Perforation and Trimming

The edges of cheques shall be clean and sharp to minimize the possibility of mutilation and processing problems. Perforations shall give a clear tear. Perforations at the right and bottom edge of the cheque shall be avoided. The cheques printed in continuous form shall have “deep cut” perforation. Any cheque stubs joined to the cheques shall be printed to the left of the cheques. Pinhole perforation is not permitted.

5.6. Multi-copies cheque

In the case of multi copies cheques, the original copy shall not be coated on the reverse with any carbon or carbon-back ink for transfer to the second copy, to avoid any black patches in the images of the backside of the cheque.

6. CHEQUE IMAGE STANDARDS AND SPECIFICATIONS

Image capture technology is used by the majority of cheque processors to improve the automation of cheque processing and to keep an audit trail of items passing through the clearing system. This electronic imaging of cheques places specific requirements on the overall design of cheques. The use of cheques properly designed for image processing ensures that all essential fields are captured by the imaging process; that the images are useable and legible, and that the file sizes of images are small enough to be stored and moved in a cost efficient manner.

The contrast between the written information and the printed background will become a critical factor for reliable detection and recognition of information on the cheques by the human eye. The background colour, screening, background pattern, security patterns and ink used to print the data have a significant bearing on successful imaging and recognition as discussed in the subsequent sections.

6.1. Automated Signature Verification

A cheque imaging technique facilitates an automation of cheque signature(s) verification. The alignment and background of cheque signature areas is designed and specified as per section 3.3.2.5 (Drawer signature box). The background printing in the cheque signature areas may include UV features, and are required to provide a cheque signature imaging that is visible in grayscale and Black & White format.

6.2. Background of the Cheque

The background printed on the cheques shall be image-friendly and shall cover only the business area of the cheque (excluding the MICR clear band area). The scan non-readable light pastel colours and standard safety tints are suitable for background screening. Heavily reflective ink, heavy inks and dark colours shall be avoided.

The background design of a cheque shall be printed using water soluble and chemically soluble inks, enabling the banks to identify easily any fraudulent attempt to change information on the cheque. Banks may print pictorial backgrounds, but shall not interfere with the legibility of any information; either printed or written, on the original cheque or that may appear on its image.

Background printing/tinting processes shall not affect the quality of subsequent MICR E-13B character printing. It shall have a high average background reflectance (ABR) greater than 60% (0.60).

In order to facilitate conversion of electronic grayscale and Black & White images to binary images and to minimize the size of the electronic image file, any information, either printed or written on the original Cheque shall not be obscured by the background clutter.

6.3. Mandatory Fields

The following areas are referred as “mandatory fields” since they contain critical information of Cheques which are to be imaged:

- Drawee bank/branch name;
- Amount in figures field (convenience amount box) ;
- Amount in words field;
- Date field;
- Drawer’s signature field;
- Payee name;
- Drawer information.

The Average Background Reflectance (ABR) value of amount in figures field and date field must be greater than 60%. The ABR value of other mandatory fields shall be greater than 40% to ensure that those mandatory information boxes are easily visible to the human eye. Any scan readable printing (other than the labels specified as scan readable in this document) that exceeds PCS 0.30 shall not be present in these mandatory fields to avoid interference with the mandatory information. Inverse printing and slanted printing shall not be used in the mandatory field. The pixel count of background in mandatory field shall be 12 or less.

6.4. Date and Amount Fields

The date and amount fields shall be printed with an average background reflectance (ABR) value greater than 60% to ensure that they are easily visible to the human eye. A low contrast border or outline may be printed outside those boxes in scan non readable white or light pastel colours, such that the PCS of the lines with respect to its background does not exceed 0.30. If not, boxes may be printed in a different shade or of light pastel colours. The PCS of the background printing immediately outside the date and amount boxes shall have a PCS less than 0.30.

6.5. Pre-printed Labels of Mandatory Field

The pre-printed labels of mandatory fields shall be in Swahili and/or English to guide bank customers to fill in required information appropriately on the cheque. The pre-printed label shall be in black or alternative dark ink to black. All labels shall be visible with a PCS greater

than 0.60 relative to the darkest parts of the immediately adjacent area. The currency symbol shall be printed in bold capital letters.

6.6. Printing on the Reverse of the cheque

Backgrounds on the reverse side of the cheque shall be printed in scan non-readable ink(s) to avoid any interference with endorsements of customers and stamps placed by banks.

6.7. Security Features

Banks and their corporate customers who print their own cheques shall apply the following security features in order to detect any fraudulent alterations and counterfeiting:

6.7.1. Mandatory Cheque Features

i. Paper type

The cheque paper to be used must be CBS1 paper, which shall be dull under ultra violet light, i.e. it shall not fluoresce or brighten when tested under ultra violet light.

ii. Watermark

All cheques shall carry a standardized watermark applied at paper manufacturing stage, with the word “TACH” surrounded by a circle with diameter of 4.5 cms, which can be seen when held against any light source. Each cheque shall have at least one full watermark.



Figure 5: TACH watermark

iii. Micro-texting /Micro-lettering

The banks shall use micro-text in areas that are susceptible to alterations. The line to fill in the payee's name and the amount in words shall have the bank's name written in micro letters, which will be visible to the naked eye only under a magnifying glass.

iv. Bank's logo printed with ultra-violet ink

The bank's logo shall be printed in ultra-violet (UV) ink. The logo will be captured by/visible in UV enabled scanners/lamps.

v. Bleeding ink

The use of bleeding-Ink on MICR code line shall ensure that the code line is visible through the paper, both at the front and the back of the cheque.

6.7.2. Optional Features

Banks may optionally consider including additional security features as per their risk perception such as; a supplementary watermark containing their own logo; embedded fluorescent fibres; fugitive ink; secondary fluorescent ink; copy-void pantograph; toner fusing; check-sum; patterns; floral designs; structural magnetic; security thread; hot stamped holograms; auto-detection tools; pre-encoding of amount field on the MICR band for pay orders (above a self-decided cut-off) before issue to customers; use of check-sum on the face of pay orders (other than the MICR band); use of UV band on sensitive and mandatory fields on a cheque such as Legal Amount (Amount in Words), Convenient Amount (Amount in Figures), Signature and Payee Name, micro-texting on the crossing etc.

The banks should take care of the following while incorporating optional security features:

- (i) The additional security features do not overlap or be in very close proximity or clash against the prescribed minimum security features.
- (ii) The features are compatible with CSS.
- (iii) The features are not image heavy, i.e., increase the image size.

- (iv) The features should not block any important data on images or hinder payment processing.
- (v) Presenting banks are not expected to verify the additional features.

6.7.3. Mandatory cheque handling procedures

i. Prohibiting alterations/corrections on cheques

No changes/corrections should be carried out on the cheques (other than for date validation, if required). A new cheque shall be issued for any change in the payee's name, convenient amount (amount in figures), legal amount (amount in words), and signature.

ii. Printing of Customer information

All cheques shall be issued with the account number field pre-printed as per the section 3.3.2.7.

iii. Clutter free background

Background of cheques shall be kept as clutter free as possible for improving quality and clarity of images.

6.8. Image specifications

The images specification for cheques shall be as specified in the table below;

Table 7: Cheque image specifications

No.	Image Type	Minimum DPI	Format	Compression
1.	Front Grayscale	100 DPI	JFIF	JPEG
2.	Back Grayscale	100 DPI	JFIF	JPEG
3.	Front B&W	200 DPI	TIFF	CCITT G4
4.	Front UV	100 DPI	JFIF	JPEG

The image quality of the grayscale images (1&2 above) shall be 8bits/pixel.

6.9. Completion (Infilling) of Cheques

Where the payee name is printed using a computer or a typewriter, the payee name shall be left justified and the space to the right of the payee name shall be filled with asterisks. The

amount in figures and words shall be preceded and followed by two asterisks and left justified.

6.9.1. Computer Printers

6.9.1.1. Impact Printers

Where cheques are to be completed on computer printers it is strongly recommended that impact printers with permanent ink ribbons be used. Ribbons must be changed regularly so as to maintain good print quality. One time, or total transfer ribbons must not be used.

Faint print caused by a worn out ribbon makes a cheque much easier for a fraudster to alter.

6.9.1.2. Laser Printers

Only laser printers listed and approved as per PIRA/ Cheque and Credit Clearing Company shall be used to infill cheques.

Where non-impact printing using magnetic "ink" toner is used the Clear Band divider line must not be printed in the magnetic "ink" toner because of the potential for displaced toner particles affecting the subsequent code line reading process.

6.10. Typewriters

Where the mandatory information fields on the Cheques are filled using typewriters, ribbons of dark colours shall be used. The total transfer (correctable) ribbons shall not be used.

6.11. Hand-written Cheque

Where the mandatory information fields on the Cheques are filled by hand, indelible pen (ballpoint) or permanent ink of dark colours, such as black or blue, shall be used. Company rubber stamp, pencils, fugitive or non-permanent ink shall not be used. Banks and their customers shall refrain from circling or underlining information and keep free the mandatory fields.

7. CHEQUE PERSONALIZATION

7.1. Approval Cheque Personalization

The Approval for Cheque Personalisers is open to all local printers wishing to personalize cheques that are intended to be cleared through the TACH system. Companies wishing to personalize cheques shall apply to the Bank of Tanzania and shall meet the criteria specified in Annex 3 of these standards for TACH.

7.1.1. Non-Impact Printing

The Cheque Personalizer intending to use any form of non-impact MICR printing equipment must ensure that the printer has been listed and approved as per Pira/ Cheque and Credit Clearing Company's list of non-impact printers.

8. REVIEW

BOT shall review these standards from time to time after consultation with stakeholders.

ANNEX 1 GLOSSARY OF TERMS

The following defines a glossary of terms and important conventions used in this cheque design and specifications document.

Air Resistance:	The resistance of paper to a passage of air under a specified pressure through paper is defined as air resistance. It is measured as the average time in seconds required displacing 100ml of air through a one square inch (25.4 mm ²) area of paper under pressure of 4.88 inches (123.952 mm) of water. If the air resistance is too low, the documents are likely to cause double feeds in sorter transport systems.
Average Background Reflectance (ABR):	Average background reflectance is the simple arithmetic average of the background reflectance from at least five different points on a paper sheet. It is expressed as a Percentage.
Background:	The basic colour of a Cheque.
Background Clutter:	The remnants of the background in a binary image that could interfere with legibility of written or printed information on the Cheque.
Binary Image:	Black and white image, where each Pixel can be stored in memory by one bit of information since as it is black (value = 1) or white (value = 0).
Bottom Reference Edge:	The bottom edge of a Cheque when. All vertical fields' positions are made with reference to this edge.
Cheque Image:	A digital representation of the front and the back of the Cheque.
Drawer:	The person who issues a Cheque.
Drawee Bank:	The Bank on which a Cheque is drawn. It holds the drawer's account on which a Cheque is drawn.
E-13B:	It is the standardized ISO 1004:1995 font used for MICR printing.
Embossment:	Printing process that results in the characters being raised above the surface of the paper.

Field:	A rectangular region of an image that is assigned for characters to be recognised.
Grain Direction:	The direction in which most of its fibres lie. The paper properties largely depend on the grain direction. Long grain papers have fibres aligned with or parallel to the long dimension of the sheet. In contrast fibres of short grain papers are aligned with the short dimension. Papers having weight of 24 pounds (90 g.s.m.) or more can be used in either grain direction.
Grayscale image:	An image where each pixel can have a full range of grey tonal values, between 16 and 256 levels. This varies according to the system used.
Image:	Image refers to a digital representation of a cheque, either a grayscale image or a binary image.
Imaging:	The process involved in taking copies of both sides of a cheque and storing it in an electronic file as a digitised picture, which could be identified by a unique identifier code.
Long Grain Paper:	Fibres of the paper are aligned with the long dimension of the sheet.
Magnetic Ink Character Recognition (MICR):	A process by which cheques are printed using magnetic ink and characters of a special design to create machine readable information for fast automated document processing. These characters can be recognised visually and also be processed by high-speed magnetic recognition equipment.
MICR Code Line:	The line of Magnetic Ink Character Recognition numbers at the bottom of a cheque in the clear band area printed in magnetic ink, which can be read by machines to facilitate automated data capture. The MICR code line has an established format, which consists of fields viz. amount field, transaction code field, account number field, Bank/branch code field, cheque serial number field. The MICR line should be printed using a special font and magnetic ink.
OCR-B1	Approved printing font for cheques.
Payee:	The party to which a cheque is payable.

Paxel:	A group (about 6 to 9) of black Pixels in a binary image (0.01 squared). That is the smallest dark area of background clutter, which can exert an impact on the legibility of hand written data on images.
Pixel:	The smallest area of a cheque considered in capturing an electronic image.
Presenting Bank:	A Bank, which collects and presents cheques or their images for clearing on behalf of its customers.
Print Contrast Signal (PCS):	<p>The PCS is a ratio of the difference of the reflectance of a particular printed point and the reflectance of the background on which it is printed. This is expressed on a scale of zero to one. A dark colour has a low reflectance relative to the paper it is printed on, to which the PCS method gives a high value. A light colour has a high reflectance and has a low PCS value.</p> <p>Mathematically PCS is defined as: $PCSB = (RB - RP) / RB$</p> <p>Where:</p> <p>RB: is the average reflectance of the background within the area of interest</p> <p>RP: is the reflectance of a small measurement area centered on point P.</p> <p>The reflectance, and the PCS, is measured with an aperture 0.008 inch (0.2032 mm) in diameter. This measurement is carried out by using the black-backing method.</p>
Reflectance:	The relative brightness of an illuminated paper surface as seen by the human eye. It is expressed as a value between 0 and 100%.
Vertical Reference Edge:	The right edge of a Cheque when its face is viewed. The left edge of the payment item when its back is viewed. This is also called as the leading edge.
Stiffness:	The rigidity or bending movement that the paper can withstand is defined as stiffness. Generally thicker papers are stiffer. Lighter papers are likely to bunch up or wrinkle in the reader sorters. Heavier papers lead to paper jams due to their less ability to bend.
Thickness or calliper:	Thickness is the density of a sheet of paper with a given basis weight. Uniform thickness is important for quality printing. It is expressed in micrometers or thousandths of an inch.

ANNEX 2 REFERENCES

The following references were used to build this cheque design and specifications as per the latest technologies in secure document printing in the field of banking instruments.

- ANS X9.7: Bank Check Background and Convenience Amount Field.
ANS X9.13: Specifications for Placement and Location of MICR Printing.
ANS X9.18: Paper Specifications for Cheques.
ANS X9.27: Print and Test Specifications for Magnetic Ink printing
Method for sampling to determine the average quality of paper and board (ISO 186)
BS 3430: Method for the conditioning of paper and board for testing
BS 3431: Method for determination of grammage of paper and board (ISO 536)
BS 3432: Method for the determination of resistance to bending of paper and board (ISO 34)
BS 3748: Method for determination of thickness and apparent bulk density or apparent sheet density of paper and board (ISO 34)
BS 3983: Method for determination of folding endurance of paper (ISO 5626)
BS 4420: Method for the determination of the internal tearing resistance of paper (ISO 1974)
BS 4468: Specification for print for magnetic ink character recognition (ISO 1004)
BS 4810: Method for visual assessment by grid assay, of dirt in paper for character recognition
BS 5477: Information Processing – Magnetic Ink Character recognition – Print Specifications.
ISO-1004: Information Processing – Magnetic Ink Character recognition – Print Specifications.

ANNEX 3 CRITERIA FOR APPROVAL

A company seeking for approval to become the TACH Cheque Personaliser at minimum shall submit to the Bank, an application letter accompanied with proof of the following requirements:

1. Be incorporated in the United Republic of Tanzania;
2. A relevant and valid trade license;
3. A physical address within the country;
4. Demonstrated capabilities for cheque personalization;
5. A list of reference clients, if any; and
6. Proof of compliance of ISO 27001 and any other relevant standards.