HANDBOOK
for
Cheque Design Standard's Specifications for Imageable MICR Encoded Cheques

Payment System Division
Remittance & Payments Partnership (RPP) Project
Department of Currency Management and Payment Systems
Bangladesh Bank

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FOREWORD

This *HANDBOOK* summarizes cheque design standards specifications for imageable MICR encoded cheque for instruments to be processed through the automated cheque processing system.

This *HANDBOOK* includes the modifications made during the last few months in consultation with the payment system experts and vendor engaged in implementation of Bangladesh Automated Cheque Processing System (BACPS). Instructions/specifications contained in this document will supersede relevant cheque design standards and specifications in the "Cheque Design Standards Specifications for Imageable MICR Encoded Cheque" provided earlier. Issues relating mainly to paper specification and standards, design updates of both sides of cheques, MICR line rearrangement have been clarified in this *HANDBOOK*.

The specifications incorporated in this *HANDBOOK* are based on the composite experience of Central Banks and Clearing House organizations around the world especially of Singapore, the United States, Canada, the United Kingdom, India, Australia and Malaysia. The standards are applicable to financial institutions, government departments and any other organizations using negotiable instruments.

For details, the book titled "Cheque Design Standards Specifications for Imageable MICR Encoded Cheque" issued earlier vide our letter no. IAS: 26-B (Clearing)/2006-894-942 dated 23/05/2006 may be consulted.

We hope that this *HANDBOOK* will clarify the ambiguities regarding paper quality, cheque design standards specifications for imageable MICR encoded cheques and will prove to be useful for all participants of BACPS.

Dated 24 February 2009

(Chowdhury Mohidul Haque)
Executive Director, Bangladesh Bank
&
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1. PAPER SPECIFICATIONS

1.1. Cheque Paper: CBS1 Standard.

The paper on which debit vouchers, including cheques, are printed must be the CBS1 (Clearing Bank Specification 1) standard. Samples of paper tested shall be taken as conforming to the CBS1 specification. The paper is to be free from an excessive tendency to curl and from any magnetic inclusions. Other properties, including security features, must be as normal for this grade of paper. The CBS1 has specific standards for chemical sensitivity.

Table: Physical Security of the CBS1 Paper

Test	Metric Standard
Basis Weight /Grammage	BS ISO 536: 1995, 95.0 g/m2 (± 5%)
Thickness	BS EN 20534 : 1993, Min 105 micrometres, Max 130 micrometres
Bendtsen Roughness	BS 4420: 1990 (1995)(ISO 8791-2), Both surfaces: Maximum 150 ml/min
Stiffness	BS 3748:1992 (ISO 2493), MD: Min. 7.9 mN, CD: Min. 3.1 mN **Note:** The following stiffness values, obtained using alternative test methods, can be considered equivalent to the above. TABER method using 10mm test length MD: min. 3.3 Taber units CD: min. 1.3 Taber units CLARK method TAPPI T451pm 74 MD : min. 124 Clark flexing resistance units CD : min. 50 Clark flexing resistance units
Air Resistance (Gurley)	BS 6538-3: 1987 (1995) (ISO 5636/5), Min: 27 s/100 ml
Air Permeance (Bendtsen)	BS 6538-2: 1992 (ISO 5636/3), Max: 450 ml/min
Internal Tearing Resistance	BS EN 21974: 1994, Both directions, Min. 705 mN
Folding Endurance	Not applicable to CBSI
Reflectance	Ideally around 78-80%
UV dull	Should exhibit little or no fluorescence when illuminated by a UV light.
Spots and Fiber Contamination	Should be completely free from extraneous visible fiber and UV spot and fiber contamination.

1.2. Paper Quality

The CBS1 paper to be used for printing cheque is required certified by bonafide testing authority so that the paper quality meets the specified standard mentioned above. Banks will obtain such certificate for ensuring the quality of the paper.

2. CHEQUE DESIGN DATA ELEMENTS

The purpose of the cheque design process are to ensure a design that not only incorporates the Magnetic Ink Character Recognition (MICR) symbols conventionally used in automated cheque processing but also to ensure a design that is "image friendly" to allow the use of cheque imaging technology from the beginning of the introduction of the automated cheque processing system. The design for the front of the cheques will allow a clean image to be taken from the cheque during the scanning process. The back of the cheque will be used for endorsement.

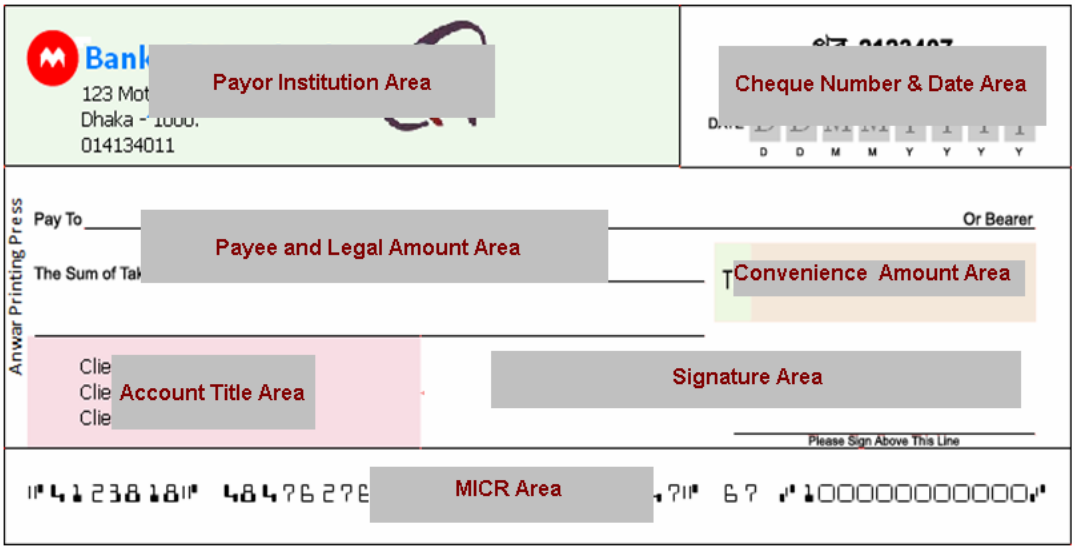


Figure 1: Cheque Areas of Interest

2.1. Payor Institution Area

The payor institution name is to be printed on the top left corner of the cheque. The institution name and full address are to be written clearly in this area. A Bank Logo can be included as an option. The document must be conspicuously labeled in the logo/name area with the institution name, location, and routing number on which the document is written. The logo/name area may also include the legend "payable through" followed by the name of the payable-through institution.

2.2. Crossing by Drawer

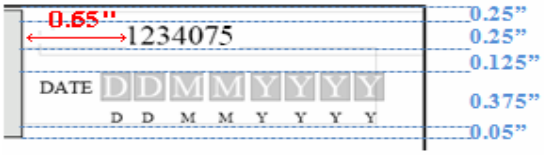
Crossings, if used, shall only be used at the top left corner of the cheque. The crossing will consist of two parallel transverse lines placed diagonally. This must not interfere with the Payee or Amount in Words portion of the cheque.

2.3. Cheque Number and Date Area

The cheque number will be required to be printed on all cheques. The date is written by the payor and represents the day on or after which the transfer of the amount of the

cheque may take place. The date field is to be located towards the upper right corner of the cheque

The dimensions for Cheque Number and Date area are as follows:



Cheque Number must be exactly 7 digits long and it should start exactly 0.65" from right edge of the Payor Institution Area. For Cheque Number less than 7 digits, it has to be made 7 digits long by putting leading zeros. As for example, if the Cheque Number is 1257, it has to be written as 0001257 and the first zero must be exactly 0.65 inches from the right edge of the Payor Institution Area. 'Prefix' or 'Suffix' are allowed with Cheque Number. The length of prefix/suffix should be based on the need of the bank. As for example:

Prefix, if used, should be placed within the 0.65" gap in front of the Cheque Number. Suffix, if used, should be placed with sufficient gap from the Cheque Number*. All type size shall be minimum 8 point.

2.4. Payee and Legal Amount Area

The area provided for the amount in words on the cheque is located to the left of the Convenience Amount and is preceded by the words "The Sum of Taka". On the cheque, the right side of the Amount in Words generally ends just short of the Convenience Amount area.

In modified cheque design "Pay To" line is extended upto the edge. The gaps between the three lines (i.e. the 'Pay To' and the 'The Sum of Taka' lines) are extended and "Please sign above this line" should be 0.0875 inches from the top edge of the MICR clear band.

2.5. Convenience Amount Area

The pre-printed box provides a target for the writer of the cheque. To prevent alteration of the amount it should be left justified to the preprinted box. The Convenience Amount Rectangle should be a low-contrast element. Convenience Amount Area is lowered to allow space for the "Pay To" field.

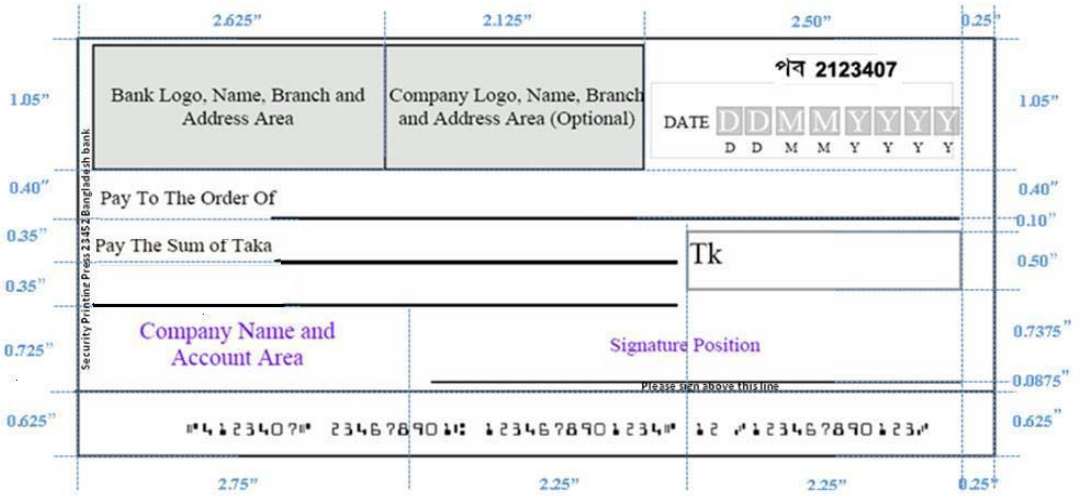


Figure 2 – Detailed Area Measurements

The Convenience Amount Field includes: the Amount, Rectangle and Taka sign.

2.5.1 Convenience Amount

Definition: The amount in figures on a cheque that shows the payable amount.

2.5.2 Convenience Amount Rectangle

Definition: The area that restricts the location of the convenience amount.

2.5.3 Pre-Printed Taka Sign

A pre-printed Taka sign (English /Bangla) is located adjacent to the convenience amount rectangle. The Taka sign (Tk) is taken inside the Convenience Amount Area.

2.6. Account Title Area

The title of the account is to be printed in the lower left corner of the cheque, directly above the MICR codeline, as shown in Figure 2. This area provides the customer information which must at a minimum identify the Customer Name(s) and Account Number authorized to withdraw funds from the account. Account Number will remain 13 digits. Most system assigned Account Numbers include a product code and a branch code in addition to the actual Account Number. Actual account number does not exceed 10 digits. As for example, in Flexcube, the total account number field is 16 digits long, but it consists of Branch Code(4), Product Code(3), Account Number(8) and Check Digit(1). If the banks want to maintain their existing account number per system, they simply need to write a table lookup to link the account number field (upto 13 digits) to the account number assigned by the system (which is more than 13 digits). This is a common practice. For banks having account number less than 13 digits, they have to put leading zeros and make it 13 digits long. As for example, banks with 11 digit Account number can convert to 13 digits by putting two leading zeros.

2.7. Signature Area

The Signature Area is located in the bottom right portion of the cheque (above the MICR area). “Please sign above this line” is 0.0875 inches from the top edge of the MICR clear

band. This limit is set to avoid interference of a written signature. The signature area may contain more than one signature line for accounts requiring multiple (two, three or four) signatures to provide control of the account. In addition to the signature line(s), this area may contain control information such as notations that only cheques for more than a certain Taka amount require a second or third signature. Multiple signatures can be accommodated within the Signature Area.

2.8. MICR Area

Magnetic Ink Character Recognition (MICR) is the machine-readable method that enables the automatic handling of cheques within the cheque processing system. It is also critically important that the only magnetic printing in the MICR Encoding Strip and MICR Clear Band be associated with the E-13B MICR characters.

Clear Band (MICR)
A rectangle 0.625-inch high measured from the aligning edge, parallel to that edge and extending the length of the document on the front and back is reserved for imprinting of MICR characters. This area, containing the Optical Clear Band and the MICR Print Band, must be free of all magnetic printing other than the E-13B MICR characters in order for MICR recognition systems to properly read the E-13B font.

3. DESIGNS FOR CHEQUE TYPES AND MEASUREMENTS

All cheques and cheque types i.e. Personal Cheques, Government Cheques, Business Cheques (Both Computer Generated and Handwritten), Non –Standard Payment Instruments (NSPI) and Credit Card Cheques* will have the same measurements and information i.e. 7.5 inches long and 3.5 inches wide. Cheques may be printed using either English or Bengali characters.

3.1. Detailed Cheque Measurements

The designs of cheques with detailed measurement information are provided below:

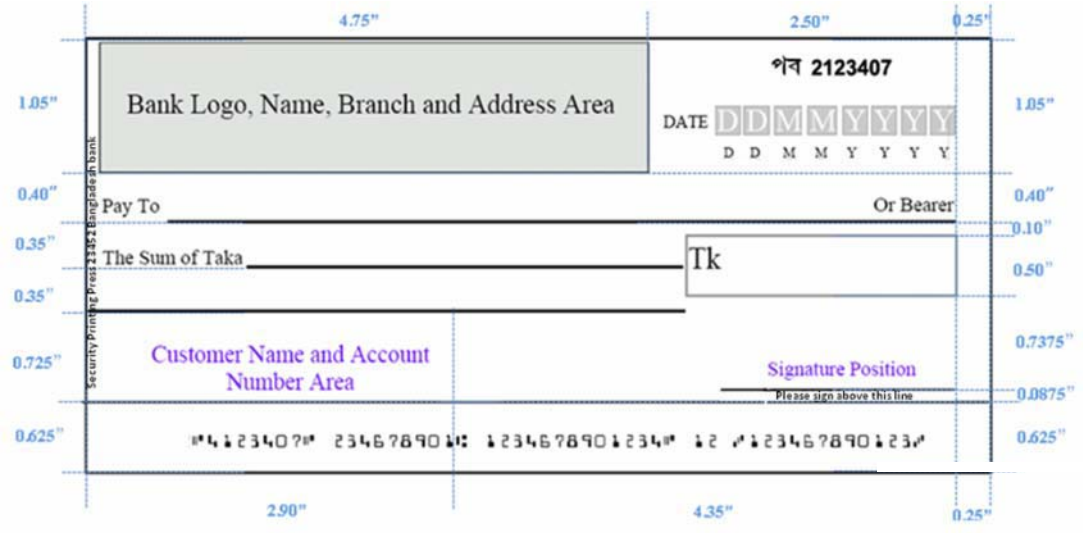


Figure 3 – Front Side for Personal or Government Cheque
(Personal or Government Cheque design)

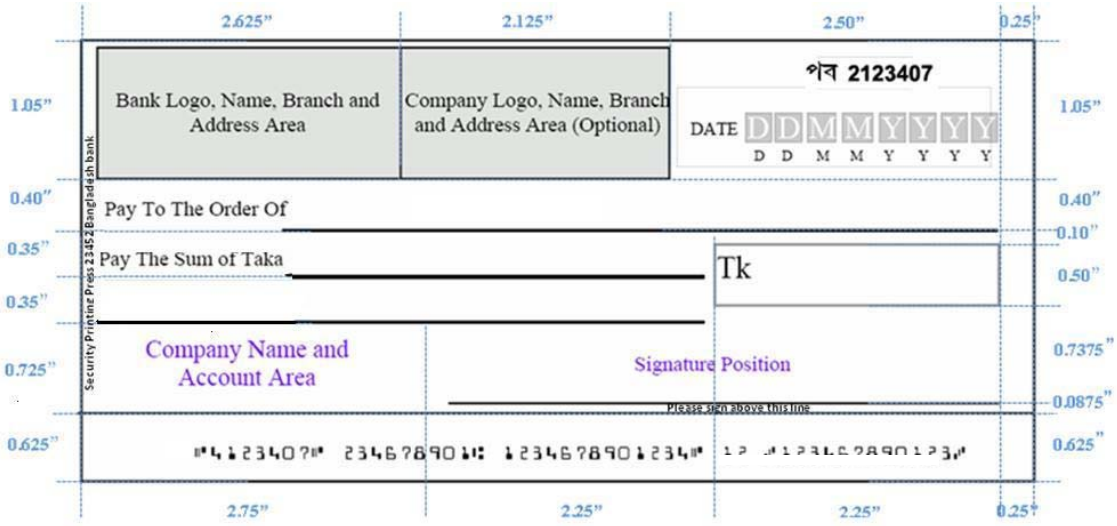


Figure 4 – Front Side for Computer generated Business Cheque
(Computer generated Business Cheque design)

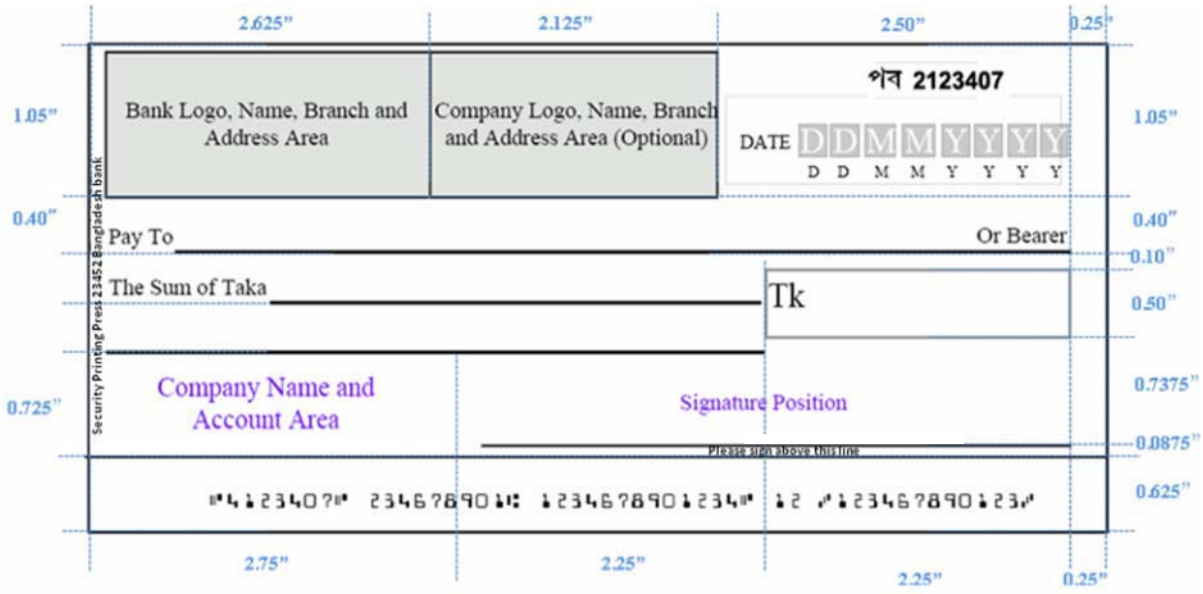


Figure 5– Front Side for Hand written Business Cheque
(Hand written Business Cheque design)

3.2. Back of the Cheque Design and Specifications

Cheque back side design is modified to expand area for endorsement. In this area a unique 23 identification number will be printed on the instrument by the reader/sorter machine. This number will consist of the following:

- 9 digits for Routing Number.
- 8 digits for Running/Item Sequence Number.
- 6 digits for Presentment Date (DDMMYY)

Back side design of the Cheque is provided below

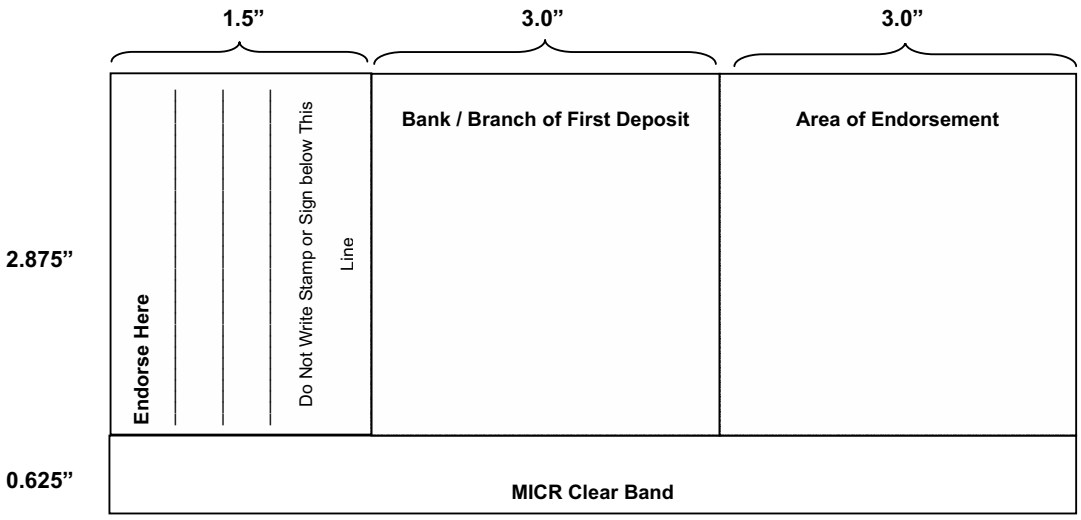


Figure 6: Back-Side of Standardized Cheque

3.2.1 Endorsement targets

Suppliers of cheques are required to provide well identified endorsement targets to ensure proper endorsement area designators or targets on personal, business and government cheque designs to encourage payee endorsement in the correct location, and to identify the area that is reserved solely for the endorsement by the Bank of First Deposit.

3.2.2 Legibility of Endorsements

Because a document may have to be returned to the Bank of First Deposit (e.g., in cases such as insufficient funds), it is imperative that the routing number of that financial institution be clearly visible in that financial institution's endorsement. To enhance the readability of endorsements, it is recommended that any printed patterns on the back of the cheques have relatively high reflectivity. Certain random patterns of background should be avoided, as they tend to obscure endorsements more than highly structured patterns such as vertical or horizontal bands.

3.2.3 Security symbol

A security symbol represented by the eye was designed on the front and back side of the cheque. This symbol is omitted from both the sides.

4. SPECIFICATIONS FOR MICR ENCODING

The area containing the MICR band measures .625 inches (1.59 cm) from the bottom edge of the document. In the MICR band, the use of magnetic ink is restricted to the printing of the prescribed E-13B characters. No informational printing shall appear anywhere in this area on the face of the document except the prescribed E-13B characters. It is required that the MICR band remain clear of background screening. Borders are not permitted within the .625 inches (1.59 cm) clear MICR band. No magnetic ink printing should appear on the reverse side of the document within the .625 inch (1.59 cm) area along the bottom of the document.

4.1. Composition

Ink used for MICR-encoding must contain 50% to 60% iron oxide.

4.2. Machine Language

The machine language used is type E-13B. This consists of fourteen characters. The ten digits are:

The four symbols are:

Symbols	Description
	The **Transit Number Symbol** indicates to the reader-sorter the boundaries of the Transit Field
	The **On-Us Symbol** indicates to the reader-sorter where to commence reading the Account Number or where to commence and finish reading the Serial Number Field.
	The **Amount Symbol** indicates to the reader-sorter the boundaries of the amount field. Printers will not use this symbol ordinarily but it is reproduced here for recognition purposes.
	The **Dash Symbol** is a divider or hyphen to the reader-sorter.

4.3. MICR Encoding – Fields and Areas of the Encoding Line

4.3.1 MICR-Encoding Area

Below is a detailed diagram of the .625 inches (1.59 cm) MICR area, an important part of the document format. There are placement specifications governing the location of the encoded characters printed in this area. The area containing the MICR band measures .625 inches (1.59 cm) from the bottom edge of the document. In the MICR band, the use of magnetic ink is restricted to the printing of the prescribed E-13B characters. **No informational printing shall appear anywhere in this area on the face of the document except the prescribed E-13B characters.** It is required the MICR band remain clear of background screening. Borders are not permitted within the .625 inches (1.59 cm) clear MICR band. No magnetic ink printing should appear on the reverse side of the document within the .625 inches (1.59 cm) area along the bottom of the document. For purposes of this Standard the right and left characters in any field are referred to as the opening and closing characters respectively.

After modification total MICR code line digit is reduced to 53 digits from previous 55 digits

MICR line

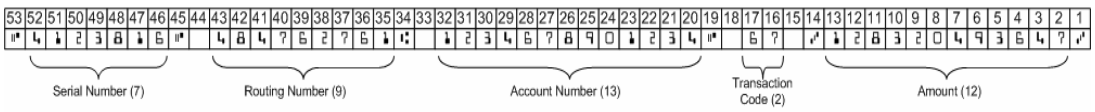


Figure 7: MICR Positions

Routing number in the MICR line is modified to replace region code by cheque digit (one digit). An example of Routing Number formation with detail explanation of cheque digit is given in the section 4.7.

Final MICR Codeline Format			
Field	**Characters**	**Position**	**Notes**
Amount Symbol	1	1	
Amount	12	2-13	12 Digit Amount: 10 digits for Taka and left 2 digits for paisa.
Amount Symbol	1	14	
Space	1	15	Needed between pre-encoded and post-encoded fields.
Transaction Code	2	16-17	
Space	1	18	
On-Us Symbol	1	19	
Account Number	13	20-32	13 Digit Account Number.
Space	1	33	
Transit Symbol	1	34	
Check Digit	1	35	Total 9 digits Routing Number.
Branch Code	3	36-38	
District code	2	39-40	
Bank Code	3	41-43	
Space	1	44	
On-Us Symbol	1	45	
Serial Number	7	46-52	7 Digit Serial Number.
On-Us Symbol	1	53	

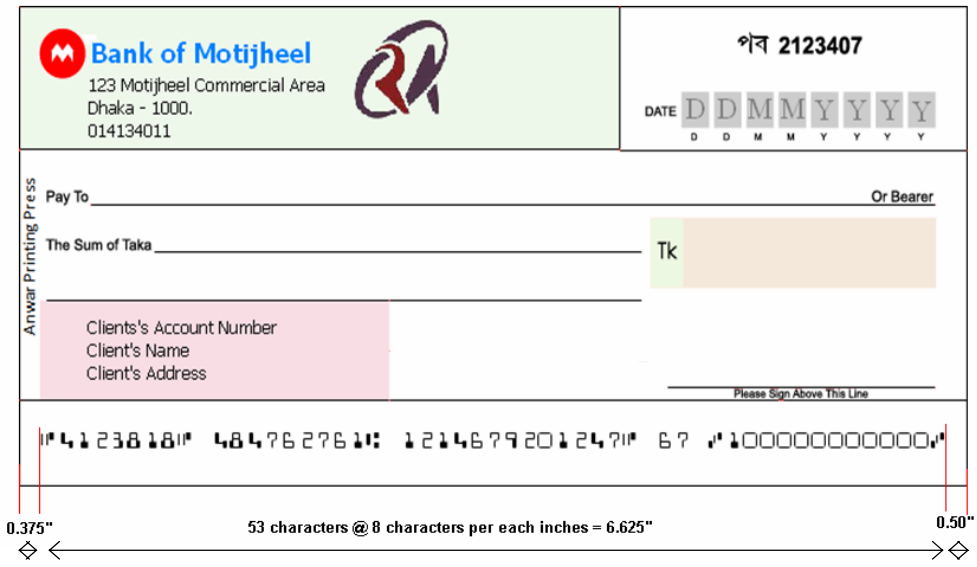


Figure 8: Detailed MICR Position Measurements

4.3.2 Reference Edges

All measurements for the positioning of any element or space in the .625 inches (1.59 cm) MICR encoding band must be taken from the right and bottom edge of the document. These edges are referred to as reference edges. These edges must form a

right angle and be true in every way. All horizontal dimensions are measured from the right edge, all vertical dimensions from the bottom edge.

Exception:

The left-most symbol of the left-most field must be .375 inch (.952cm) from the left-hand edge of the document.

4.3.3 Fields or Areas of the Encoding Line

The band reserved for MICR printing is the .625 inch (1.59 cm) area along the bottom edge of the document, and must not contain any other informational printing. The lower edge of the encoding line should be at least .1875 inch (.48 cm) above the bottom edge of the document and parallel to that edge. The next .25 inch (.64 cm) above provides the area where the encoding line appears. The remaining.1875 inch (.48 cm), making up the .625 inch (1.59 cm) MICR band, remains clear. Whenever adjacent fields are printed at different times or using different printing techniques, there must be a minimum of one blank space between those fields.

4.4. Amount Field

The amount field is a fourteen digit field composed of twelve digits (ten for Taka and two for Paisa) and two MICR Amount Symbols. The amount field begins and ends with the MICR Amount Symbol ( ).The MICR Amount symbols must be in positions 1 and 14.

4.5. Transaction Code Field

The transaction code field is used to define particular types of instruments or transaction types. It is also used to distinguish between debit and credit transactions or highlight instruments that require specialized processing. Transactions codes are required to be used by all participants. The chart below shows the different types of transaction codes

Transaction Code No.	Nature of Transaction/Instruments Represented by the Code
01-09	Codes reserved for clearing house control documents representing debit instruments.
10	Savings Bank Account Cheque
11	Current Account Cheque
12	Banker's Cheque
13	Cash Credit Account Cheque
14	Dividend Warrant
15	Demand Draft
16	Gift Cheque
17	Interest Warrant
18	Refund Warrant
19	Pay Order

Transaction Code No.	Nature of Transaction/Instruments Represented by the Code
20	Credit Card Cheque#
21-29	Reserved by Bangladesh Bank for Commercial Bank Debit Transactions
30	All Government Transactions
31-49	Reserved by Bangladesh Bank for Government Debit Transactions
50-99	Reserved by Bangladesh Bank for Definition of Credit Transactions

Figure 9: Transaction Codes

4.6. "On-Us" Field or Account Number Field

The Account Number field, sometimes referred to as the "On-Us" field refers to the unique identifier for the Account Title holder's account with the Payor institution. The Account Number must be preceded by the MICR "On-Us" (⑈) symbol.

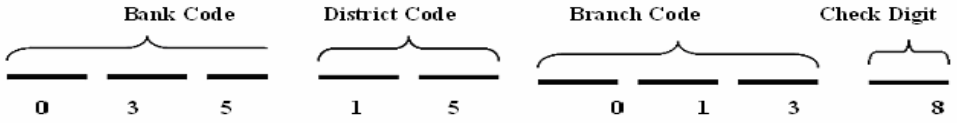
4.7. Routing Number or Transit Number Field

The routing number identifies the Bank that is the issuer of the cheque and the Bank upon which the funds are drawn. All Banks have routing numbers specific to the Bank and Branch assigned by Bangladesh Bank.

Routing Number Format:

Bank **:** Bangladesh Krishi Bank (035)
District **:** Chittagong (15)
Branch **:** Agrabad (013)
Check Digit **:** 8

(Bangladesh Krishi Bank)(Chittagong) (Agrabad) (Check Digit)→ 8



- Bank Code: Identifies the specific bank as a three digit numeric code. (e.g. Bangladesh Krishi Bank - 035)
- District Code: Indicates the district in which the branch is located as a two digit numeric code. (e.g. Chittagong-15)
- Branch Code: Identifies the Banks' Branch as a three digit numeric code. A Bank can have up to 999 branches per district. (e.g. Agrabad-013)
- Check Digit: Identifies the accuracy and validity of Routing Number by using modulus 10 algorithms. (e.g. 8)

Example:

The Routing Number of Bangladesh Krishi Bank, Agrabad branch: 035 15 013 8

4.8. Serial Number or Cheque Number Field

It is common practice in most countries to start at 000001 and go up to 999999 for each account. The combination of account number and cheque number will identify each cheque as being unique. The cheque number is repeated on the top right hand corner of the cheque. The reason being if the MICR line is destroyed the information in the MICR line is contained elsewhere on the cheque document.

4.9. Cheque Digit Field

The Cheque Digit field is used for the purpose of ensuring that no transcription errors have occurred in the routing numbers. This digit is now accommodated with the routing number.

4.10. Positioning

The minimum distances of .50 inch (1.27 cm) from the right edge of the document and .375 inch (.952 cm) from the left edge of the document are mandatory. Horizontal positioning is subject to plus or minus .0625 inches (.16 cm) either left or right of the field boundaries given.

4.10.1 Alignment

The alignment of the bottom edge of any two adjacent numerical MICR characters must not vary more than .007 inches (0.018 cm) except between fields.

4.10.2 Character and Line Skew

The maximum skew or tilt of any character or line cannot be more than 11/2 degrees off vertical using the bottom edge of the document as a horizontal reference.

4.10.3 Spacing Requirements

The distance between the right average edges of adjoining characters is .125 inches (.318 cm), plus or minus .010 inches (.025 cm) in the Transit Number and Amount Fields. In the On-Us and Serial Number Fields, and between adjoining fields, the distance between right average edges can never be less than .115 inches (.292 cm).

4.10.4 Character Specifications

Dimensions

The minimum width of a horizontal bar in any character is .011 inches (.028 cm).

Average Edge Tolerance

The contour of the character should reach no more than .0015 inches (.0038 cm) on either side beyond the average edge.

Edge Irregularity

The contour of 75% of the total edge of the character should not extend more than .0035 inches (.0089 cm) either way from the average edge.

Voids

In characters having bars less than two squares wide, voids must be contained within .008 inch x .008 inch (.020 cm x .020 cm) area. In characters having bars two or more squares wide, voids must be contained within a .010 inch x .010 inch (.025 cm x .025 cm) area. Needle voids are permissible in any length providing they are no wider between average edges than .002 inches (.005 cm). The total area of voids in any vertical or horizontal bar of a character must not exceed 20% of the bar area.

Uniformity of Ink Film

The ink is to be distributed within the outlines of each character.

4.10.5 Signal Level

The allowable signal level range is 80% - 200% of the nominal signal level established for each character (see Annex 3 from the CPA Standard 006).

4.10.6 Extraneous Magnetic Ink within the 1.59 cm (5/8") Band

The following are the tolerances:

(a) Spots up to .003 inches x .003 inches (.008 cm x .008 cm) are acceptable in any number. (This measurement is the width of the channels between squares on the grid.)
(b) Random spots up to .004 inches x .004 inches (.010 cm x .010 cm) are permissible if they are limited to one per character space and not more than five in any one field.
(c) On the back of the document within the .625 inches (1.59 cm) band across the bottom, individual spots up to .006 inches x .006 inches (.015 cm x 0.15 cm) are permissible in any number.

5. SPECIFICATIONS FOR IMAGE FRIENDLY MICR-ENCODED DOCUMENT DESIGN

(Canadian Payments Association, Standard - 006)

5.1. Background Screening

Printed background screening or designs anywhere on the front and back of MICR-encoded documents shall be of a color and a pattern which will not interfere with the legibility of any information, either printed or written, on the original document, or any reproduction of it through use of microfilm, imaging or photocopying equipment.

The minimum Print Contrast signal of pre-printed data on the front of a MICR-encoded document shall be 0.60 with respect to its immediate surrounding background. Printing of this data should be done with black or dark ink.

It is strongly recommended that pale or soft-hued colors or standard safety tints be used for background screening and that clay "inorganic" and highly reflective inks, heavy inking and dark colors be avoided. Printed information should appear in the standard locations, and the .625 inches (1.59 cm) band must be kept clear of any other informational printing and used only for E-13B characters. Borders are not permitted within the .625 inches (1.59 cm) clear MICR band.

Plain, safety tinted, and patterned documents all have backgrounds consisting of one color or may have a background design or pattern intended to protect against alteration. These documents are produced by a variety of methods using different ink colors, different screen values and/or ink colors to achieve a solid background color, design, or pattern. Scenic cheques have a background scene or picture with a pre-printed convenience amount rectangle. Different screen values and ink colors are used to achieve the background scene or picture. Most scenic designs are printed using three or four Color Separation processes at screening densities of 120 lines/inch (4.7 lines/mm) or greater.

If documents with screened backgrounds are desired, wide variances of ink colors and screen densities are available that could obtain the required Reflectance and PCS values. Screens in the area of 10%, 120 to 150 lines/inch (4.7 to 5.9 lines/mm) have been found to work successfully with some ink colors for the Convenience Amount Rectangle, the Convenience Amount Clear Area and the Date Field, while screens in the area of 20%, 120 to 150 lines/inch (4.7 to 5.9 lines/mm) have been used satisfactorily in the Convenience Amount Rectangle outline. The main concern for any combination of inks and screening is that the PCS for the final product shall not be exceeded while at the same time the minimum background Reflectance shall be exceeded. For scenic cheques, scenes should be muted with soft edges having gradual Reflectance changes where they intersect with Data Elements and their areas of interest. It has been found that PCS measurements are not adequate or appropriate to determine precisely what remains in a binary (black and white) image. PCS can predict scanner performance only in a very localized area with absolutely uniform background. Most documents, however, have a continuously varying background and require a more dynamic approach, such as used in industry reader sorter scanners. Furthermore, PCS will not predict to what degree Background Clutter in a Binary Image will constitute a threat to legibility of handwritten data. However, actual Binary Images, termed Dynamic Contrast Images in their generic form, can be used for this evaluation. Refer to the next section 6.3 (“Reflectance, Pixel Count and Print Contrast Signal (PCS) Specifications for Cheques”) reprinted from the Canadian Payments Association Standard 006 document for additional information on Dynamic Contrast Images.

5.2. Security

Any security features that are to be applied to the front of an imageable MICR-encoded cheque must not interfere with any of the following areas, prior to imaging or post-imaging: the .625 inches (1.59 cm) MICR clear band, the cheque number field, the date field, the payee name line, the amount in figures field, the amount in words field and address field or the signature line.

Any security features that are to be applied to the back of an imageable MICR-encoded cheque must not interfere with the following areas, prior to imaging or post-imaging: the Bank of First Deposit box, the endorsement area, or the 1 inch (2.54 cm) area from the aligning edge.

Pantographs, if used, must drop out and not be seen in the image captured from the original cheque.

5.3. Reflectance, Pixel Count and Print Contrast Signal (PCS) Specifications for Cheques (Canadian Payments Association Standard 006)

The Background Reflectance and PCS measurements for cheques must adhere to the specifications in Table 1, provided below.

Specification for Cheque Data Elements

Area on a Cheque	Reflectance	Max Pixel Count	PCS	Notes
Legal AOI	50% avg. min.	8	N/A	Within AOI
Payee AOI	50% avg. min.	8	N/A	Within AOI
Signature AOI	50% avg. min.	8	N/A	Within AOI
Date AOI	50% avg. min.	8	N/A	Within AOI
CA rectangle area	60% min		0.2	PCS w/n rectangle area
CA clear area	60% min		0.2	PCS w/n the clear area
CA rectangle outline	N/A		0.2 max	PCS wrt internal area
MICR Clear Band Area	60% min		0.2 max	PCS w/n MICR clear band background
MICR Characters	N/A		0.2 max	PCS wrt MICR clear band background
Date Field Guidance Boxes	N/A		0.2 max	PCS wrt background
Date Field Guidance Characters	N/A		0.2 max	PCS wrt to internal area of Date AOI
Date Field Indicators	N/A		0.2 max	PCS wrt background
Reverse Side of a Cheque – Informational Printing			0.2 max	

Abbreviations:
CA = Convenience Amount
AOI = Area of Interest
wrt = with respect to
w/n = within
N/A = Not Applicable

Table 1 - Specifications for Cheque Data Elements

6. CHEQUE PHYSICAL SECURITY STANDARDS

A cheque is a security document. It shall be designed and printed in such a way that attempts to alter, or to counterfeit any given cheque, shall be as difficult as possible. The materials used in the manufacture of a cheque shall be as specified in this standard and used in such a way that alteration and counterfeits are likely to be detected.

Imposing minimum standards on physical cheque security is important as increases in losses due to the fraudulent use of cheques has grown in Bangladesh. The guidelines in this document will reduce the possibility of cheque fraud through alteration or forgery. Although fraud losses have grown, most cheques pass through the payment system without incident or error. No other payment method is as flexible, functional, or as widespread. The purpose of this handbook is to provide those who participate in the cheque processing system, namely financial institutions, cheque vendors and merchants, with minimum standards required for physical cheque security. It is hoped that institutions will also use this as an opportunity to educate their employees and customers about fraud, and to identify and implement fraud prevention programs appropriate for their business at the time of introduction of the new cheques.

The standards chosen are minimum standards. Banks wishing to increase the physical security of their cheques will be asked to ensure that additional security measures do not interfere with any existing standards or inhibit the cheque imaging process. Guidance may be sought through Bangladesh Bank and reference to the X9 Committee document (X9/TG-8-2002) “Cheque Security Guideline”. The tables in the document indicate which items are “image friendly”, hence, will not negatively affect the quality of the cheque image.

The following physical security measures have been adopted for use in cheques. Some of the features are currently in use and others are new security measures that must be incorporated with the new cheques. Descriptions and illustrations are provided for each of the features that have been adopted for use in Bangladesh.

6.1. Watermark

The watermark is a feature currently used by many Banks in cheques. The watermark is a design formed among the fibers of a sheet during the papermaking process. This design can be a graphic image, text, or portrait. The paper becomes more or less translucent, in areas where the fibers are displaced or deposited during the formation of the wet paper web. Since other processes may be used in an attempt to simulate a genuine watermark, care should be taken when authenticating this feature on a document.

The Watermarked CBS1 paper is acceptable provided that the watermark is applied by the Fourdrinier process and consists of at least three levels, i.e. the base paper thickness, and thinner (lighter) and thicker (darker) parts in the design.

6.2. Microprint

Microprint is another physical security measure currently used in Bangladesh. Microprint is text set in very small letters (less than 0.010 of an inch tall) that can be easily read through a magnifying glass, but which appear to the unaided eye to be dashed or solid lines. Microprint provides protection against reproduction by scanners and office copiers because these cannot successfully print the tiny letters used. Microprint will be required on all lines on the face of the cheque.

The payee and legal amount area and signature areas will require microprint as illustrated in the diagram below.

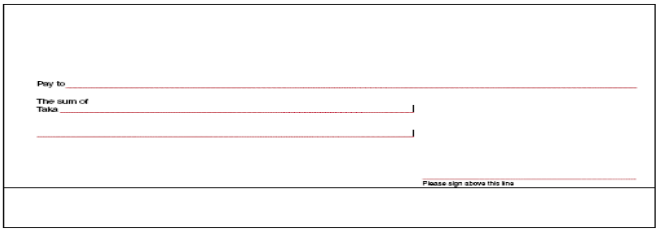


Figure 10 – Lines Requiring Microprinting

6.3. Magnetic Ink

Magnetic ink will be required for use in the MICR codeline. Magnetic ink is ink that contains an amount of iron sufficient enough to magnetize the print when exposed to a strong magnetic field. This is the principle used to support all high-speed cheque processing other than Image. Failure to detect magnetic ink in the MICR codeline may mean that the cheque is a counterfeit. Equipment for use at teller and other point-of-deposit stations is available to determine the presence of magnetic information in the MICR codeline. When used to print some graphic elements outside of the MICR code area, magnetic ink can be used as a covert validity-testing device. Magnetic inks are available in colors other than black. Legitimately applied magnetic ink may be either shiny or dull.

6.4. Erasable Inks (for Cheque Background)

A series of inks easily removed from the substrate through mechanical abrasion. Used as an authentication and verification feature on bank cheques, gift cheques or certificates, payment vouchers, and various value documents at risk of duplication and counterfeit. This is particularly effective against alteration and covers all areas of the cheque including the signature and date areas. This ink in combination with the covert erasable UV fluorescent ink described below presents a formidable protection against alteration which is a major concern in Bangladesh. Figure 11 shows the area of the cheque covered by the erasable ink. Please note that the erasable ink cannot cover any area of the MICR clear band.

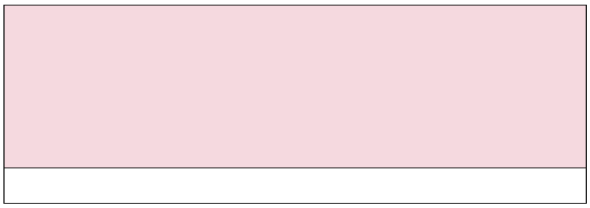


Figure 11 – Area utilizing Erasable Ink Background

6.5. Invisible UV Fluorescent

Invisible Fluorescent Ink is a colorless transparent ink system, which fluoresces under a UV light source (black light). Used as a covert authentication and verification feature on bank cheques, gift certificates, payment vouchers, and various value documents at risk of duplication and counterfeit. Photocopying cannot duplicate these inks. UV Fluorescent/Phosphorescent Inks can also be used in automated fraud detection systems. As is the case with the erasable background, the invisible fluorescent obviates attempts at mechanical erasure. The fluorescent substantially reduces the possibility of alteration on

the major areas of sensitivity specifically: Payee Name, Convenience Amount Box and the Amount in Words areas. UV Inks must be used in accordance with the following provisos:

- The UV ink must fluoresce with a color other than blue, preferably yellow.
- The ultra violet feature must be a separately designed feature that will fluoresce and be immediately visible under low ambient light levels when illuminated by a UV lamp.
- It must not be printed as a solid block.
- The invisible UV design must be made up of intricate fine line patterns.
- The fine lines must be sufficiently close together for any attack on the vulnerable areas on a cheque - even one of only a few millimeters - to cause damage to several lines of the UV printing.

Figure 12 below indicates the area for the printing of the UV florescence patterns as described above.

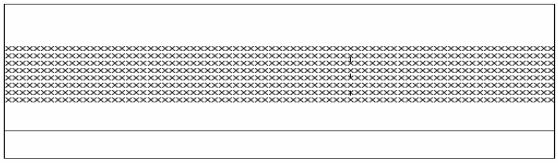


Figure 12 – Cheque Covert Invisible Fluorescent Area

6.6. Chemical Sensitivity

Application of chemical substances, such as might be used to remove writing from a cheque, causes a color change or a hidden message to appear. This protection is added at the paper mill when the paper is being made. Chemical sensitivity can be associated with one (single stain) or a number of (multistain) chemical solvents or eradicators. The most commonly used chemically sensitive papers are protected against bleach (ink eradicator) and sometimes other organic solvents such as strong acids and alkalis. The CBS1 has specific standards for chemical sensitivity.

7. CHEQUE DESIGN APPROVAL

All cheque issuers will be required to have their cheque designs approved by the BB prior to issuance. Samples will be required for review of the overall design and compliance with the standards. Compliance and acceptability in regard of watermarks, MICR encoding and quality of cheque image will be tested by the BB. The issuer of the cheque will ensure quality of the paper.

The area circled in the diagram below includes the Name of the Printer. The aforementioned information must be printed on the left most side of the cheque centered between the top and the bottom of the cheque in a legible font.

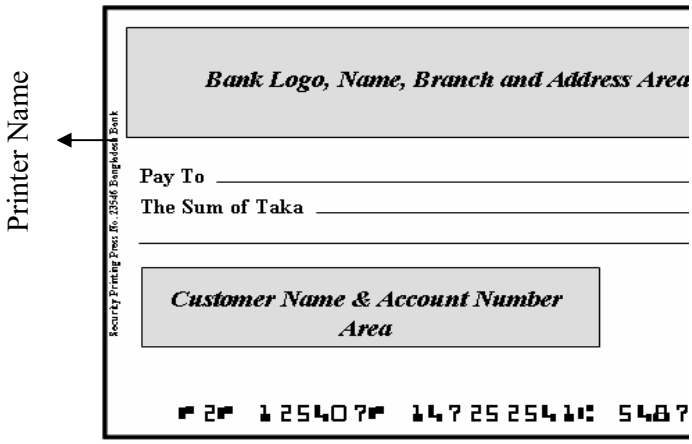


Figure 13 – Cheque Printer Name and Approval Number Printing

Banks who will use MICR encoded standardized cheques will remain responsible for ensuring safety and security of their respective cheques.