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RESERVE BANK OF INDIA

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RBI/2022-23/79

DCM(NPD)No.S488/18.00.14/2022-23

July 1, 2022

The Chairman/ Managing Director/ Chief Executive Officers  
All Banks

Dear Sir/Madam

**Note Sorting Machines - Authentication and Fitness Sorting Parameters**

Please refer to our [circular DCM\(R&D\)No.G-26/18.00.14/2009-10 dated May 11, 2010](#) setting out "Note Authentication and Fitness Sorting Parameters" for the Note Sorting Machines installed in the banks.

2. In the backdrop of introduction of the new series banknotes, these parameters have been reviewed and a revised set of guidelines are [enclosed](#) for implementation.

3. The guidelines shall be implemented with immediate effect.

Yours faithfully

(Sanjeev Prakash)  
Chief General Manager

Encl : As above.

## **Guidelines on Note Authentication and Fitness Sorting Parameters**

### **1. Introduction**

A fit note is a note that is genuine, sufficiently clean to allow its denomination to be readily ascertained and thus suitable for recycling. An unfit note is a note that is not suitable for recycling because of its physical condition or belongs to a series that has been phased out by Reserve Bank of India. All the fitness parameters laid down in this document are to be evaluated individually. A note must pass all the fitness parameters to be considered fit for recycling.

These parameters provide the minimum standards for cash handling machines used by banks (hereinafter called 'the machines'). Notes can only be recycled / reissued if they are evaluated as genuine and fit according to these parameters. Authenticity check is a prerequisite for fitness sorting. Fitness sorting can be done only in case of genuine notes. The machines shall be able to identify and segregate suspected counterfeits and notes which are unfit for circulation in terms of these standards in a reliable and consistent manner.

The Reserve Bank of India phases out certain series of notes from circulation from time to time. These notes, though considered legal tender unless otherwise specified, are unfit for reissue. As and when the Reserve Bank of India decides to phase out a specific series of a specific denomination of notes, the machines shall sort all the phased out notes as unfit, irrespective of their physical condition.

### **2. Applicability**

These parameters are applicable to machines operated by banks, either directly by their staff or indirectly by their agents. These machines can be of any of the following:

- i. machines which check the authenticity and fitness of notes, i.e. note processing machines / note sorting machines, and
- ii. machines which check only the authenticity of notes, i.e. note authentication machines and classify the individual notes as either genuine or suspect.

### 3. Authenticity Check

The machines shall perform authenticity check with reference to the features of genuine notes as disclosed by the Reserve Bank of India from time to time on its website. Any note which is not found to be having all the features of a genuine note shall be classified by the machine as suspect/ reject.

### 4. Fitness Sorting

As a part of fitness sorting, notes with any visual or physical defects are to be sorted as unfit as per the criteria set out in **Table 1**.

| <b>Sl.No.</b> | <b>Feature</b> | <b>Criteria</b>  |
|---------------|----------------|--|
| 1             | Soiling        | General distribution of dirt across the entire note              |
| 2             | Limpness       | Structural deterioration resulting in a marked lack of stiffness |
| 3             | Dog-ears       | Corner folds   |
| 4             | Tears          | Lengthwise and crosswise cuts                                    |
| 5             | Holes          | Holes of a specific diameter                                     |
| 6             | Stains         | Localised concentration of dirt                                  |
| 7             | Graffiti       | Deliberate graphic alteration of the note                        |
| 8             | Crumples       | Multiple random folds  |
| 9             | Decolouration  | Lack of ink on part or whole of the note, e.g. a washed note     |
| 10            | Folds          | Folds reducing the length or width of the note                   |
| 11            | Repair         | Note repaired using adhesive tape/ paper/ glue                   |

#### (i) Soiling

Soiling refers to the general distribution of dirt across the entire note or in some patterns. It is a measure of the loss of reflectivity from the unprinted areas due to dirt, ageing (yellowing), wear and extraneous markings and includes decolouration due to ageing, excessive folding and other wearing. Soiling increases the optical density and decreases the reflectance of the notes. Notes exceeding the soiling levels set out

in **Table 2** shall be sorted as unfit. Both the obverse and the reverse of the note shall be checked for soiling.

| Sl. No. | Denomination | Maximum Density difference | Minimum Reflectance |
|---------|--------------|----------------------------|---------------------|
| 1       | ₹5           | 0.07                       | 85%                 |
| 2       | ₹10          | 0.07                       | 85%                 |
| 3       | ₹20          | 0.06                       | 87%                 |
| 4       | ₹50          | 0.06                       | 87%                 |
| 5       | ₹100         | 0.05                       | 90%                 |
| 6       | ₹200         | 0.05                       | 90%                 |
| 7       | ₹500         | 0.04                       | 93%                 |
| 8       | ₹2000        | 0.03                       | 95%                 |

### (ii) Limpness

Limpness relates to structural deterioration or wear resulting in a marked lack of stiffness in the note paper. Notes with very low stiffness of paper, i.e. with paper which is worn out in circulation or mechanically mutilated shall be sorted as unfit. Detectors for paper quality shall be adapted to the same level as for soiling.

### (iii) Dog-Ears

Banknotes with dog-ears with an area of more than 100 mm<sup>2</sup> and a minimum length of the smaller edge greater than 5 mm shall be sorted as unfit. Chipped notes shall also be sorted as unfit.

### (iv) Tears

Notes exhibiting at least one tear at the edge shall be classified as those having tears. Notes with tears larger than those indicated in **Table 3** shall be sorted as unfit.

| Sl.No. | Direction  | Width | Length |
|--------|------------|-------|--------|
| 1      | Vertical   | 4 mm  | 8 mm   |
| 2      | Horizontal | 4 mm  | 15 mm  |
| 3      | Diagonal * | 4 mm  | 18 mm  |

\* Measured by drawing a straight line from the peak of the tear to the edge of the note where the tear begins (rectangular projection), rather than measuring the length of the tear itself.

#### **(v) Holes**

This refers to notes with at least one visible hole. Notes with holes with area exceeding 8 mm<sup>2</sup> shall be sorted as unfit.

#### **(vi) Stains**

Stains are visible markings which are not part of the feature of a note. Notes shall be detected as unfit if localized - i.e. with limited extension – stain can be recognised on its surface. In case the total area covered by stains exceeds 500 mm<sup>2</sup>, the note shall be sorted as unfit. A note with a single stain covering an area of more than 200 mm<sup>2</sup> shall be sorted as unfit. Both the obverse and the reverse of the note shall be checked for stains.

#### **(vii) Graffiti**

Graffiti refers to deliberate graphic alteration of the note with for example, figures or letters. Fitness sorting criteria in case of graffiti shall be the same as those for stains. Both the obverse and the reverse of the note shall be checked for graffiti.

#### **(viii) Crumples/ Folds**

Crumpled / folded notes shall be sorted as unfit if the folds result in reduction of the original note in length or width greater than 5 mm.

#### **(ix) Decolouration**

Notes affected by decolouration shall be sorted as unfit if the ink is partially or wholly missing from its surface. Both the obverse and the reverse of the note shall be checked for decolouration.

#### **(x) Repair**

A repaired note is created by joining parts of the same note together, for example, by using extraneous matter such as tape, paper or glue. Notes with the following types of repairs shall be sorted as suspect/ reject:

- Repairs covering an area greater than 100 mm<sup>2</sup>; or

- Thickness of the extraneous matter 50 µm or more; or
- Width of the extraneous matter 10 mm or more; or
- Length of the extraneous matter 10 mm or more.

## **5. Mutilated, Imperfect, Mismatched Notes and Built-up Notes**

These notes, as defined in [NRR 2009](#) (amended in December 2018), shall be classified as suspect/ reject.

6. Suspect/ Reject notes shall be subjected to Manual Inspection for any wrongdoings.

## **7. Calibration and Periodic Testing of Machines**

Banks shall ensure that the Note Sorting machines are tested for accuracy and consistency on a quarterly basis and recalibrated, if required. A certificate (signed by Bank Officials) to this effect shall be maintained for records. A periodicity of quarterly testing as per the [Format attached](#), may be followed.

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### Quarterly Test Reporting Format

| Denomination | Category of Notes | No. of Notes | Processing result |       |         |        |       |
|--------------|-------------------|--------------|-------------------|-------|---------|--------|-------|
|              |                   |              | Fit               | Unfit | Suspect | Reject | Total |
| 100 (OLD)    | Soiled/ Reissue   |              |                   |       |         |        |       |
|              | Mutilated         |              |                   |       |         |        |       |
|              | Counterfeit       |              |                   |       |         |        |       |
| 100 (NEW)    | Soiled/ Reissue   |              |                   |       |         |        |       |
|              | Mutilated         |              |                   |       |         |        |       |
|              | Counterfeit       |              |                   |       |         |        |       |
| 200          | Soiled/ Reissue   |              |                   |       |         |        |       |
|              | Mutilated         |              |                   |       |         |        |       |
|              | Counterfeit       |              |                   |       |         |        |       |
| 500 (NEW)    | Soiled/ Reissue   |              |                   |       |         |        |       |
|              | Mutilated         |              |                   |       |         |        |       |
|              | Counterfeit       |              |                   |       |         |        |       |
| 2000         | Soiled/ Reissue   |              |                   |       |         |        |       |
|              | Mutilated         |              |                   |       |         |        |       |
|              | Counterfeit       |              |                   |       |         |        |       |

(Signature)  
Machine Supplier

(Signature)  
NSM Operator

(Signature)  
Bank Official

#### Testing Procedure

- A test deck of minimum 2000 pieces of soiled notes including mutilated notes, FICNs, Reissuables shall be prepared every quarter.
- These notes may be comprised of following denominations - Rs.100 - old series (20%), Rs. 100 - new series (20%), Rs. 200 (20%), Rs.500 (20%) and Rs. 2000 (20%), as per availability i.e. if notes in any denomination is not available, same may be replaced with other available denominations, and shall be run separately.
- In case of discrepancies, machine supplier shall be advised to re-calibrate the machines. The acceptable tolerance level for fitness checks is 5%, however, there is zero tolerance for FICNs.