भारतीय मानक

Indian Standard

IS 18663 : 2024

बैंकनोट छँटाई मशीन — विशिष्टियाँ

Note Sorting Machines — Specifications

ICS 35.240.40

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

March 2024 **Price Group 26**

Computer Hardware, Peripherals, Office Equipment and User Interfaces Sectional Committee, LITD 36

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Computer Hardware, Peripherals, Office Equipment and User Interfaces Sectional Committee had been approved by the Electronics and Information Technology Division Council.

There is no ISO/IEC standard on this subject.

This standard has been formulated in response to the requirement received from The Reserve Bank of India (RBI). RBI is the sole note issuing authority in the country. It is entrusted with the task of ensuring adequate supply of clean and genuine banknotes. It has mandated the banks handling currency to undertake sorting of banknotes to segregate them into reissuable and soiled banknotes as well as detect counterfeit notes to prevent their circulation in the system.

The Reserve Bank of India has issued the note authentication and fitness sorting guidelines for the note sorting machines which specify the detailed criteria for sorting of banknotes. As per the RBI guidelines, the cash handling machines used by the banks can be categorized as-

a) Note processing/sorting machines which check the authenticity and fitness of banknotes; and
b) Note authentication machines which only check the authenticity of banknotes and classify them as either genuine or suspect.

The criteria specified in the guidelines have to be evaluated individually. A banknote shall pass all the fitness criteria and can be recycled/reissued only if they are found fit according to the specified criteria.

The note sorting machines are used for counting, sorting and bundling of banknotes. These are primarily used in banks handling currency. They sort banknotes according to various parameters such as fitness for use, issuable, non-issuable etc, split them into groups and identify counterfeit banknotes. Therefore, these machines play a crucial role in ensuring supply of fit and genuine banknotes.

The note sorting machines have to be adaptable to ensure that they are capable of detecting new counterfeits reliably. Moreover, they have to be adaptable for testing the banknotes as per the required fitness sorting parameters, as specified in the guidelines issued by RBI from time to time.

This standard lays down the minimum functional performance and safety requirements of the note sorting machines which have been derived from the guidelines issued by RBI. It will also facilitate testing and compliance of these machines for the benefit of all stakeholders. Apart from banks, this standard can be referred by all other organizations for example, companies, organizations handling cash, religious institutions etc.

The composition of the Committee and Panel 3 responsible for the formulation of this standard is given in Annex L.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’ The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard. For the purpose of abbreviations Annex A shall be referred.

Indian Standard

NOTE SORTING MACHINES PERFORMANCE — SPECIFICATION

1 SCOPE

This standard specifies the performance and safety requirements of the note sorting machines to ascertain the authenticity and fitness of the banknotes processed. These requirements include the criteria specified in the guidelines issued by RBI from time to time that is soiling, limpness, dog-ears, tears, holes, stains, folds etc, which these machines must be able to detect adequately while processing the banknotes.

2 REFERENCES

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of this standard:

IS No.	*Title*
IS/IEC 62368-1 : 2018	Audio/video, information and communication technology equipment: Part 1 Safety requirements (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply:

3.1 Acceptance — Process of treatment of banknotes identified as fit and/or genuine by the Note sorting machine.

3.2 Banknote — Bank note means a bank note issued by the Reserve Bank of India or the currency notes of the Government of India, whether in physical or digital form, under section 22 of the *Reserve Bank of India Act*, 1934.

3.3 Batching — The capability of the note sorting machine to change the batch size.

3.4 Batch Size — The number of banknotes that can be processed by the note sorting nachine at a time.

3.5 Counterfeit Banknote — A banknote which is not genuine.

3.6 Current Series of Banknote — Latest series of banknote issued by RBI.

3.7 Guideline — The latest version of the guidelines issued by RBI related to authentication and sorting of banknotes using note sorting machines. Currently, the circular no. RBI/2022-23/79 DCM (NPD) S488/18.00.14/2022-23 dated 01 July 2022 issued by RBI titled "note sorting machines-authentication and fitness sorting parameters" is in vogue.

3.8 Fit and Unfit Banknote — As per the Reserve Bank of India Guidelines on note authentication and fitness sorting parameters.

3.9 Manufacturer — An organization or individual involved in manufacturing or supplying note sorting machines.

3.10 Mode — A way of functioning of the note sorting machine while processing the banknotes. The various modes in which the note sorting machines operate are as follows:

a) Single mode — In this mode, banknotes of only one type of denomination can be processed;

b) Mixed mode — In this mode, banknotes of multiple denominations mixed can be processed simultaneously;

c) Fitness mode — In this mode, the banknotes are sorted in accordance with their fitness; and

d) Counting mode — In this mode, the note sorting machine counts the number of objects processed by it and calculates the value of the banknotes.

3.11 *n* + 1 Machine (n = 1, 2, 3, 4, 8 etc) — A note sorting machine having one reject/suspect stacker and *n* configurable stackers.

3.12 Orientation —The manner in which the objects or the banknotes are placed in the note sorting machine for processing.

3.13 Reissuable Banknote — A banknote which is fit and can be recirculated for use.

3.14 Rejection — Process of treatment of objects not recognized as banknotes and banknotes identified as unfit or suspect by the note sorting machine.

3.15 Reject/Suspect Stacker — The stacker where the banknotes rejected or identified as suspect by the note sorting machine are deposited by it after processing.

3.16 Stacker — A designated place in the note sorting machine either in the form of a tray or bin where the banknotes are deposited by it after processing.

3.17 Suspect Banknote — A banknote whose authenticity or fitness is doubtful and can be ascertained after further examination.

3.18 User — An organization for example, bank, laboratory etc, or an individual who has procured and installed a note sorting machine for using or testing it.

4 REQUIREMENTS

4.1 Performance Requirement

A machine shall be capable of processing banknotes, classifying the individual banknotes and segregating them according to their classifications without the intervention of a machine operator. The machine shall have the required number of dedicated output stackers and/or other means to ensure effective segregation of the banknotes processed. It shall operate in single, mixed or fitness mode and process the banknotes in batches.

The banknotes have to be classified and treated by the machine as per guidelines in accordance to the details mentioned in Table 1.

The authenticity and fitness of the banknotes shall be determined in accordance with the criteria specified in the RBI guidelines. The performance requirements of the machine shall be as mentioned in Table 2.

4.2 Safety Requirement

The machines shall conform to IS/IEC 62368-1 Audio/video, information and communication technology equipment: Part 1 Safety requirements (*first revision*).

4.3 Performance Requirement (Desirable)

In addition to the requirements mentioned in **4.1** and **4.2**, it is desirable that the machines perform the functions as listed in Table 3.

5 MARKING

5.1 Every note sorting machine shall be legibly and indelibly marked with at least the following information:

a) Manufacturer’s name or trade mark (if any);

b) Model designation and serial number;

c) Country of manufacture;

d) Input supply voltage and frequency (If an external power adapter is provided, DC input voltage, polarity and wattage shall be marked on the NSM and AC input voltage, frequency and wattage shall be marked on the power adapter); and

e) Power consumption.

5.2 BIS Certification Marking

The machine may be marked with the BIS Standard Mark.

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulation made there under. Details of the conditions for granting a license for the use of Standard Mark to manufacturers may be obtained from Bureau of Indian Standards.

6 TESTS

6.1 Safety Tests

The safety tests shall be carried out as per IS/IEC 62368-1 Audio/Video, information and communication technology equipment: Part 1 Safety requirements (*first revision*). The safety tests to be carried out have been listed in Table 4.

Table 1 Classification and Treatment of Banknotes

(*Clauses* 4.1 *and* 6.2)

Sl No.	Category	Properties	Treatment
(1)	(2)	(3)	(4)
i)	Objects not recognized as banknotes	Not recognized as banknotes because of any of the following: a) banknotes not supported by the machine; b) non-Indian currency; c) banknote-like objects; d) wrong image; and e) feeding or transportation error of the machine.	Objects given in serial no. (i) to (iv) cannot be dispensed to customers and shall be deposited by the machine in the reject stacker. Object listed at serial no. v has to be reprocessed.
ii)	Suspect/counterfeit banknotes	Image and format recognized, but one or more authentication feature checked by the machine not detected or clearly out of tolerance.	Cannot be dispensed to customers and shall be rejected by the machine and deposited in its reject stacker. To be reprocessed and checked by the bank for authentication.
iii)	Banknotes that are not clearly authenticated	Image and format recognized, but not all authentication features checked by the machine are recognized because of quality and/or tolerance deviations.	Cannot be dispensed to customers and shall be rejected by the machine/deposited in its reject stacker. To be reprocessed and checked by the bank for authentication.
iv)	a) Banknotes that are identified as genuine and fit	All authenticity and fitness checks carried out by the machine give positive results.	Can be dispensed to customers and shall be accepted by the machine.
	b) Banknotes that are identified as genuine and unfit	All authenticity checks carried out by the machine give positive results but don’t meet the fitness criteria as per guidelines.	Cannot be dispensed to customers and shall be rejected by the machine and deposited in its reject stacker for remitting to RBI.

Table 2 Performance Requirements

(*Clause* 4.1)

Sl No.	Parameter	Test Method	Requirement
(1)	(2)	(3)	(4)
i)	Piece counting	Count the number of bank notes processed by the machine at a time at the required speed.	The machine shall display the number of banknotes processed.
ii)	Value counting	Identify and count the number of banknotes of a particular denomination in an entire batch fed to the machine at the required speed.	The machine shall: a) Display the number of banknotes processed by the machine; b) Display the number of genuine banknotes of a particular denomination processed by the machine, their denomination and value; and c) Detect reject or suspect banknotes.
iii)	Authenticity determination	a) Authentication of banknotes. b) Detection and separation of banknotes suspected to be counterfeit; and c) Detection of objects that do not qualify as banknotes, identified as suspect counterfeit banknotes and of banknotes that are not clearly authenticated, if applicable.	The machine shall: a) Identify genuine banknotes; b) Identify and separate suspect counterfeit banknotes; and c) Identify and segregate objects other than banknotes, suspect counterfeit banknotes.
iv)	Fitness determination	Detection of banknotes processed by the machine as fit or unfit as per guidelines.	The machine shall: a) Separate fit and unfit banknotes and display the count of such banknotes; and b) Identify reject or suspect banknotes.
v)	Sorting of banknotes	Classification and physical sorting of banknotes as mentioned in Table 1. The banknotes shall be sorted without requiring any manual intervention.	The machine shall segregate the banknotes in designated stackers.

Table 3 Performance Requirements (Desirable)

(*Clause* 4.3)

Sl No.	Parameter	Test Method	Requirement
(1)	(2)	(3)	(4)
i)	Serial number recognition	Recognition and capturing of the serial number of the banknotes processed by the machine. The machine shall store the serial numbers of the banknotes processed for a period as specified by the user. It shall identify incorrect serial numbers.	The machine shall: a) Store and print the serial number of the banknotes processed by it; b) Identify and segregate banknotes having incorrect serial numbers; and c) Identify and segregate banknotes having no serial number.
ii)	Data storage and reproduction	The machine shall capture the data related to various operations carried out by it and store it for a period as specified by the user.	The machine shall store the data for the specified period and be able to produce it on demand.

Table 4 Safety Tests

(*Clause* 6.1)

Sl No.	Test Parameter	Requirement
(1)	(2)	(3)
i)	Marking and instructions	**4.1.15** of IS/IEC 62368-1
ii)	Protection against access to live parts	**5.3** of IS/IEC 62368-1
iii)	Power input and current	**6.3.2** and Annex B.2 of IS/IEC 62368-1
iv)	Heating	**9** of IS/IEC 62368-1
v)	Creepage clearance and solid insulation	**5.4.1** to **5.4.4** of IS/IEC 62368-1
vi)	Humidity conditioning	**5.4.8** of IS/IEC 62368-1
vii)	Leakage current and electric strength at operating temperature	The prospective touch current and protective conductor current test shall be carried out in accordance with **5.7** of IS/IEC 62368-1. The electric strength test shall be carried out in accordance with **5.4.9** of IS/IEC 62368-1.
viii)	Provision for earthing	The resistance of protective bonding system shall be tested in accordance with **5.6.6** of IS/IEC 62368-1.

6.2 Performance Tests

For performance testing of the machines, test packs comprising adequate number of objects mentioned in Table 1 and banknotes have to be prepared which shall be used wherever required.

6.2.1 *Speed Test*

The purpose of this test is to evaluate the average speed of the machine while counting the banknotes.

6.2.1.1 *Composition of test pack*

2 000 fit banknotes each of denomination of Rs 100 and above.

6.2.1.2 *Procedure*

The speed test shall be carried out for denominations of fit banknotes of 100 and above. 2 000 pieces of fit banknotes of the aforementioned denomination are to be taken. Bundle consisting of 2 000 pieces of banknotes of one denomination is to be loaded. The machine shall be set in the counting mode and the process shall be started. Time in seconds required by the machine to process this bundle is to be recorded. In case, the machine stops while counting the banknotes, the process may be restarted. The time recorded shall exclude the time for interruptions, stoppages (excluding batching) etc, while counting the banknotes. Similarly, the time required to process 2 000 bank notes of every denomination is to be recorded and the average speed of the machine shall be calculated. The results shall be recorded in the format as given in Annex B.

6.2.1.3 *Requirement*

The machine shall record a speed of minimum of 25 000 per hour to pass this test.

6.2.2 *Authenticity Test*

The purpose of this test is to evaluate capability of the machine to identify counterfeit banknotes. The machines shall be able to verify the authenticity of every banknote processed by it as per guidelines.

6.2.2.1 *Composition of test pack*

2 000 fit banknotes each of denomination of Rs 100 and above and at least 10 FICN of any denomination.

6.2.2.2 *Procedure*

2 000 fit banknotes of any denomination of Rs 100 and above shall be taken and mixed with at least 10 FICN. The mixed banknotes shall be loaded in the machine and processed in fitness sorting mode. The machine shall be able to identify all the FICN and put them in reject/suspect stacker. The test shall be performed for at least three denominations and the results shall be recorded in the format given in Annex C.

6.2.2.3 *Requirement*

All the FICN shall be identified by the machine and placed in the reject/suspect stacker. The machine shall pass this test only if all the FICN fed into it are identified.

6.2.3 *Fitness Test*

The purpose of this test is to assess the performance of the machine in identifying banknotes which are unfit as per guidelines.

6.2.3.1 *Composition of test pack*

The test pack shall have at least 200 banknotes comprising of denomination of Rs 10 and above and have at least 10 banknotes for each criteria that is mutilated, limp, torn, soiled etc.

6.2.3.2 *Procedure*

The test shall be carried out with banknotes prepared in accordance with the fitness criteria specified in the guidelines. The serial number of the banknotes shall be noted in the format given in Annex D. The machine shall be set in the fitness sorting mode and the processing of banknotes shall be started. The banknotes deposited in the reject/suspect stacker shall be reprocessed thrice. The results shall be recorded in the format given in Annex E. In case all the unfit banknotes are not detected by the machine, it may be realigned. The machine can be realigned at most three times.

6.2.3.3 *Requirements*

The unfit banknotes shall be identified by the machine and placed in the unfit or reject/suspect stacker to pass this test.

6.2.4 *Repeatability Test*

The repeatability test is performed to assess the reliability of the machine while sorting the banknotes.

6.2.4.1 *Composition of test pack*

For performing the test, test packs shall be prepared comprising at least 5 000 banknotes of a single denomination of denomination of Rs 100 and above.

6.2.4.2 *Procedure*

The test shall be carried out with the banknotes of denomination of Rs 100 and above. The test banknotes shall be processed in same directions. The test pack comprising of same set of banknotes shall be used for each iteration:

a) The number of banknotes in the test pack shall be counted and the data shall be recorded in the format given in the Table 5;

b) The machine shall be set in fitness sorting mode. The batch size shall be at least 100;

c) Fit banknotes shall be processed;

d) The banknotes deposited in the reject/suspect stacker shall be reprocessed thrice;

e) At the end of the process, the cumulative number of banknotes of the entire test pack identified as fit, unfit or suspect by the machine shall be counted and the data shall be recorded in the format given in Table 6;

f) The banknotes processed by the machine shall be combined and reprocessed;

g) The banknotes deposited in the reject/suspect stacker shall be reprocessed thrice;

h) At the end of the process, the cumulative number of banknotes of the entire test pack identified as fit, unfit or suspect by the machine shall be counted and the data shall be recorded in the format given in Table 7;

j) The unfit banknotes of the test pack shall be processed;

k) The banknotes deposited in the reject/suspect stacker shall be reprocessed thrice;

m) At the end of the process, the cumulative number of banknotes of the entire test pack identified as fit, unfit or suspect by the machine shall be counted and the data shall be recorded in the format given in Table 8;

n) The banknotes processed by the machine shall be recombined and reprocessed;

p) The banknotes deposited in the reject/ suspect stacker shall be reprocessed thrice;

q) At the end of the process, the cumulative number of banknotes of the entire test pack identified as fit, unfit or suspect by the machine shall be counted and the data shall be recorded in the format given in Table 9;

r) These steps shall be repeated for all the denominations of banknotes; and

s) The percentage variation and average percentage variation of the machine for every category shall be calculated and recorded in the format given in Annex F.

6.2.4.3 *Requirement*

The average variation shall be counted only for the fit and unfit banknotes. The average variation in every step shall not exceed 10 percent for each denomination. For all the denominations of banknotes, the total variation shall not exceed 5 percent to pass this test.

Table 5 Repeatability Test (Initial Iteration)

(*Clause* 6.2.4.2)

Sl No.	**Denomination**	**Rs**	
	Category	Designation	Number of Banknotes
(1)	(2)	(3)	(4)
i)	Fit	F	–
ii)	Unfit	UF	–
iii)	Suspect	S	–

Table 6 Repeatability Test (First Cycle)

(*Clause* 6.2.4.2)

Sl No.	Denomination	Rs	
	Category	Designation	Number of Banknotes
(1)	(2)	(3)	(4)
i)	Fit	F (1)	–
ii)	Unfit	UF (1)	–
iii)	Suspect	S (1)	–

Table 7 Repeatability Test (Second Cycle)

(*Clause* 6.2.4.2)

Sl No.	Denomination	Rs	
	Category	Designation	Number of Banknotes
(1)	(2)	(3)	(4)
i)	Fit	F (2)	–
ii)	Unfit	UF (2)	–
iii)	Suspect	S (3)	–

Table 8 Repeatability Test (Third Cycle)

(*Clause* 6.2.4.2)

Sl No.	Denomination	Rs	
	Category	Designation	Number of Banknotes
(1)	(2)	(3)	(4)
i)	Fit	F (3)	–
ii)	Unfit	UF (3)	–
iii)	Suspect	S (3)	–

Table 9 Repeatability Test (Fourth Cycle)

(*Clause* 6.2.4.2)

Sl No.	Denomination	Rs	
	Category	Designation	Number of Banknotes
(1)	(2)	(3)	(4)
i)	Fit	F (4)	–
ii)	Unfit	UF (4)	–
iii)	Suspect	S (4)	–

6.2.5 *Stress Test*

The purpose of this test is to assess the suitabilty of the machine to work continuously for long hours while processing the banknotes.

6.2.5.1 *Composition of test pack*

Adequate banknotes required for continuous operation of the machine.

6.2.5.2 *Procedure*

The machine shall be set in fitness sorting mode and the process shall be started. Adequate banknotes of any denomination shall be fed in the machine for sorting them according to their fitness. The 1 + 1 (one normal pocket + one reject pocket), 2 + 1 (two normal pocket + one reject pocket), 3 + 1 (three normal pocket + one reject pocket) machines shall be made to work continuously for 30 min followed by a break of 10 min (maximum) for eight hours in a day for two consecutive days. The 4 + 1, 8 + 1 machines shall be made to work continuously for 60 minutes followed by a break of 10 minutes (maximum) for eight hours in a day for four consecutive days. The machine shall work uninterruptedly during every period of continuous operation.

Abnormal behavior or any major breakdown which require more than thirty minutes to restart the machine shall not occur during the stress test. The details of temporary breakdown/stoppages, the number of such occurrences and the time taken to restart the machine along with the cause for the breakdown/stoppages shall be recorded. The breakdown/stoppages occurring due to external factors for example, power outages, improper orientation of objects being processed by the machines, presence of foreign elements in the objects being processed that is objects not listed in Table 1 etc, shall not be taken into account for deciding the result. The results shall be recorded in the format given in Annex G. In case the machine fails in the first instance, it may be recalibrated once and the test may be conducted again and the results shall be recorded in the aforementioned format.

6.2.5.3 *Requirement*

The machine shall fulfill the requirements mentioned in the procedure to pass this test.

6.2.6 *Piece Counting Test*

The purpose of this is test is to evaluate the performance of the machine while counting banknotes.

6.2.6.1 *Composition of Test Pack*

2 000 fit and non-sticky banknotes of any denomination.

6.2.6.2 *Procedure*

The piece counting test shall be carried out with fit and non-sticky genuine banknotes of any denomination and objects given in Table 1. The machine shall be set in the counting mode. At least 2 000 pieces of banknotes/objects shall be processed by the machine. They can be faced or be oriented in any direction. The process shall be repeated with separate bundles of 2 000 objects/ banknotes. The machine shall count the number of the objects banknotes processed. The results shall be recorded in the format as given in Annex H.

6.2.6.3 *Requirement*

While counting, all the objects fed in the machine shall be counted including those not recognized as banknotes. The machine may not identify counterfeit or unfit banknotes but shall count them. The machine shall not calculate the value of the banknotes processed. The machine shall only display the count of the objects processed. The objects shall be counted at least at the speed specified in speed test. The number of objects counted by the machine shall match with that processed by it. The difference between these two figures shall not exceed 1 percent to pass this test.

6.2.7 *Values Counting Test*

The purpose of this test is to evaluate the performance of the machine while calculating the value of the banknotes processed.

6.2.7.1 *Composition of test pack*

Test pack for value counting test shall comprise of the following:

a) 2 000 objects consisting of banknotes of every denomination comprising fit, unfit, reject or suspect banknotes and objects listed in Table 1 which are not recognized as banknotes;

b) At least 100 banknotes of each denomination; and

c) At least 100 objects not recognized as banknotes.

6.2.7.2 *Procedure*

The machine shall be set in the fitness sorting mode for processing the test pack. The objects can be faced

or oriented in any direction. During value counting, the machine shall:

a) Identify and reject objects that don't qualify as banknotes and put them in the reject stacker;

b) Identify and reject counterfeit banknotes and put them in the reject stacker;

c) Identify unfit banknotes and put them in the appropriate stacker that is reject/suspect stacker in case of 1 + 1 machines or unfit stacker in case of bigger machines; and

d) Identify genuine and fit banknotes and calculate their value.

The results shall be recorded in the format as given in Annex J.

6.2.7.3 *Requirement*

The machine shall display:

a) The count of the objects processed;
b) The count of the objects rejected;
c) The count of banknotes identified as counterfeit;
d) The count of banknotes identified as unfit;
e) The value of the genuine banknotes processed; and
f) The exact value of the banknotes deposited in the output stackers except the reject/suspect stacker after processing.

The objects shall be counted at least at the speed specified in **6.2.1**. The difference between the number of objects fed and that counted by the machine shall not exceed 2 percent to pass this test.

6.3 Calibration and Periodic Testing

The machines shall be tested for accuracy and consistency periodically and recalibrated, if required. A test pack of at least 2 000 soiled banknotes including mutilated notes, FICN and, reissuables shall be prepared. The test pack may contain the following denomination of banknotes:

a) Rs 100–old series banknotes (20 percent);
b) Rs 100–current series banknotes (20 percent);
c) Rs 200 (20 percent);
d) Rs 500 (20 percent); and
e) Rs 2 000 (20 percent).

If banknotes of any denomination are not available, they may be replaced with other available denominations and shall be run separately. In case there is any discrepancy in the result, the machine may be recalibrated. The acceptable tolerance level for fitness checks is 5 percent and that for FICN is zero.

The results shall be recorded in the format given in Annex K.

ANNEX A
(*Foreword*)
LIST OF ABBREVIATIONS

Fit banknote	F
Forged Indian currency note	FICN
Note sorting machine	Machine
Reject/Suspect banknote	RS
Reserve Bank of India	RBI
Suspect banknote	S
Unfit banknote	UF

ANNEX B
(*Clause* 6.2.1.2)
SPEED TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serail No.:

Date and time:

Sl No.	*Denomination*	*Time Taken (in seconds) to Process (T)*	*Speed of the Note Sorting/Authentication Machine Speed of the NSM per hour = (2 000 × 3 600)/T*	*Remarks*
(1)	(2)	(3)	(4)	(5)
i)	D1			
ii)	D2			
iii)	D3			
iv)	D4			
v)	Average speed in notes/hour :			

NOTE — Test pack to comprise of denomination of Rs 100 and above.

ANNEX C

(*Clause* 6.2.2.2)

AUTHENTICITY TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*Denomination*	*Number on FICN Mixed with* 2 000 *Banknotes*	*All FICN Detected?* (*Yes/No*)	*Result* (*Pass/Fail*)
(1)	(2)	(3)	(4)	(5)
i)	D1			
ii)	D2			
iii)	D3			
iv)	D4			

NOTE — Test pack to comprise of denomination of Rs 100 and above.

ANNEX D

(*Clause* 6.2.3.2)

FITNESS TEST REPORT (A)

Sl No.	*Feature*	*Criteria*	*Banknote Number*	*Detected/Not Detected*
(1)	(2)	(3)	(4)	(5)
i)	Soiling	General distribution of dirt across the entire banknote		
ii)	Limpness	Structural deterioration resulting in a marked lack of stiffness		

Sl No.	*Feature*	*Criteria*	*Banknote Number*	*Detected/Not Detected*
(1)	(2)	(3)	(4)	(5)
iii)	Dog - Ears	Corner folds:		
		More than 130 sq mm (11.4 mm × 11.4 mm)		
		Minimum length of the smaller edge-10 mm		
iv)	Tears	Lengthwise and crosswise cuts		
		W × L in mm		
		Vertical 4 × 8		
		Horizontal 4 × 15		
		Diagonal 4 × 18		
v)	Holes	Holes of a specific diameter		
		notes with holes with areas exceeding 10 sq mm		
		r-1.78, d-3.56 mm		
vi)	Stains	Localized concentration of dirt		
		multiple stains: 500 sq mm		
		Single stain: 200 sq mm		
vii)	Graffiti	Deliberate graphic alteration of the banknote		
		(Figures or letters)		
		Criteria same as stains		

Sl No.	*Feature*	*Criteria*	*Banknote Number*	*Detected/Not Detected*
(1)	(2)	(3)	(4)	(5)
viii)	Crumples	Multiple random folds (folds result in reduction of the original banknote in length or width greater than 5 mm)		
ix)	Discoloration	Lack of ink in part or whole of the banknote for example, washed banknote		
x)	Folds	Folds reducing the length or width of the banknote		
xi)	Repair	Banknote repaired using adhesive tap/paper/glue more than 100 sq mm Thickness of extraneous matter 50 micro meter Width of EM-10 mm Length of EM-10 mm		
xii)	Mutilated banknote	A portion is missing or which is composed of more than two pieces.		
xiii)	Imperfect banknote	Wholly or partially, obliterated, shrunk, washed, altered or indecipherable but does not include a mutilated banknote		

Sl No.	*Feature*	*Criteria*	*Banknote Number*	*Detected/Not Detected*
(1)	(2)	(3)	(4)	(5)
xiv)	Mismatched banknote	Banknote formed by joining half of one banknote to another half note of a different banknote		
xv)	Old series banknotes	Legal tender not belonging to the current series of banknote.		
	Number of banknotes prepared			
	Number of banknotes not detected			
	percent of banknotes not detected			

NOTE — Results shall be recorded in separate tables for every denomination of banknote. Test pack to comprise of denomination of Rs 100 and above.

ANNEX E

(*Clause* 6.2.3.2)

FITNESS TEST REPORT (B)

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*Number of Unfit Banknotes Prepared*							*Number of Banknotes Not Detected*							Type(s) *of Banknotes Not Detected*	*Result* (*Pass/Fail*)
	D1	D2	D3	D4	D5	D6	D7	D1	D2	D3	D4	D5	D6	D7		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)

NOTE — Test pack to comprise of denomination of Rs 10 and above.

ANNEX F

(*Clause* 6.2.4.2)

REPEATABILITY TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*Category of the Banknotes*	*Formula to Estimate Percent Variation*	*Denomination* (*Rs*) *and Percent Variation*				*Denomination (Rs) and Average Variation for example,* [A= (A1) + (A2)/2]				*Total Variation for example,* (A+ B)/2			
			D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
i)	Fit	A1= [UF(1)+S(1)]/F × 100												
ii)		A2= [UF(2)+S(2)]/ F × 100												
iii)	Unfit	B1= [F(3)+S(3)]/U F × 100												
iv)		B2= [F(4)+S(4)]/U F × 100												
Result (Pass/Fail)														

NOTE — Test pack to comprise of denomination of Rs 100 and above.

ANNEX G

(*Clause* 6.2.5.2)

STRESS TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*Day*	*Cycle*	*Stress Test*		*Test Duration* (*in minutes*)-[1]	*Rest Duration* (*in minutes*)-[2]	*Stoppage/ Breakdown Duration* (*in minutes*)	*Any Major Breakdown or Abnormal Behavior Noted?* (*Y/N*)	*Details of Breakdown/ Stoppages/ Major Breakdown or Abnormal Behavior*	*Time Taken to Restart on Account of Breakdown-* (*in minutes*)-[3]	*Number of Bank Notes Processed*	Any Other Remarks	Result (Pass/Fail)
			Start Time (*HH : MM*)	*End Time* (*HH : MM*)									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
i)	1	1											
ii)		2											
iii)		3											
iv)		4											
v)		5											

Sl No.	*Day*	*Cycle*	*Stress Test*		*Test Duration* (*in minutes*)-[1]	*Rest Duration* (*in minutes*)-[2]	*Stoppage/ Breakdown Duration* (*in minutes*)	*Any Major Breakdown or Abnormal Behavior Noted?* (*Y/N*)	*Details of Breakdown/ Stoppages/ Major Breakdown or Abnormal Behavior*	*Time Taken to Restart on Account of Breakdown-(in minutes)-*[3]	*Number of Bank Notes Processed*	*Any Other Remarks*	*Result (Pass/Fail)*
			Start Time (*HH : MM*)	*End Time* (*HH : MM*)									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
vi)		6											
vii)		7											
viii)		8											
		. . .											
	Total number of banknotes processed												
	Total duration of the test (in hours and minutes)												
	Total duration of stoppages/ breakdown (in minutes)												

NOTE — Separate tables have to be created for each day.

ANNEX H

(*Clause* 6.2.6.2)

PIECE COUNTING TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*No. of Objects Fed into the Machine* (C)	*No. of Objects Actually Counted by the Machine* (N1)	*The Count of the Objects Displayed by the Machine* (N2)	*Difference in the Number of Objects Actually Counted and Displayed by the Machine* D = [(N1-N2)/N1] × 100	*Result* (*Pass/Fail*)
(1)	(2)	(3)	(4)	(5)	(6)

ANNEX J

(*Clause* 6.2.7.2)

VALUE COUNTING TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

Sl No.	*Type of Object Fed into the Machine*	*No. of Objects Fed into the Machine* (C)	*No. of Objects Counted by the Machine*	*Value of The Fit Banknotes Counted by the Machine* (V1)	*Value of the fit Banknotes Displayed by the Machine* (V2)	*Value of the Unfit Banknotes Counted by the Machine* (V3) (*Not applicable for* 1 + 1 *Machines*)	*Value of the Unfit Banknotes Displayed by the Machine* (V4) (*Not Applicable for* 1 + 1 *Machines*)	*Result* (V1 = V2) *Yes/No*	*Result* (V3 = V4) *Yes/No*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	Objects not identified as banknotes								
ii)	Counterfeit banknotes								
iii)	Unfit banknotes								
iv)	Genuine and fit banknotes								

ANNEX K

(*Clause* 6.3)

CALIBRATION AND PERIODIC TEST REPORT

Sample ID number:

Model number:

Number of stackers:

Machine ID/Serial No.:

Date and time:

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						
2 000	Soiled/Reissue						
	Mutilated						
	Counterfeit						

ANNEX L

(*Foreword*)

COMMITTEE COMPOSITION

Computer hardware, Peripherals, Office equipment and User Interfaces Sectional Committee, LITD 36

Organizations	*Representative(s)*
Department of Commerce, New Delhi	Shri Ajay Kr Rai **(*Chairperson*)**
Canon India Private Limited, Gurugram	Shri Ashish Khanna
Computers and Media Dealer's Association, New Delhi	Shri Puneet Singhal Shri Manoj Khanna (*Alternate* I) Shri Pramod Rajpal (*Alternate* II)
Dell Technologies, Gurugram	Shri Rajender Saini Shri Prem Ananth (*Alternate*)
HP India Sales Private Limited, Bengaluru	Ms Mayuri Simaria Jain
Hewlett Packard India Sales Private Limited, Gurugram	Ms Manjeeri Gopal
Infineon Technologies India Private Limited, Noida	Shri Madhusudhanan Sampath Shri Ajay Hanyalu (*Alternate*)
Manufacturers Association for Information Technology, New Delhi	Col Suhail Zaidi Lt Col Harsh Vardhan Srivastava (*Alternate*)
Ministry of Electronics and Information Technology, New Delhi	Shri Mukul Kumar Yadav Ms Asha Nangia (*Alternate* I) Shri Naveen Kumar (*Alternate* II)
National Informatics Centre, New Delhi	Shri Rajdeep Choudhury
Standardization Testing and Quality Certification (STQC) New Delhi	Shri Atul Gupta Ms Raveena Gupta (*Alternate* I) Shri Abhijit Dasgupta (*Alternate* II)
The Institution of Electronics and Telecommunication Engineers, New Delhi	Prof Nilesh N. Kasat Dr Jyotsna Kumar Mandal (*Alternate*)
UL India Private Limited, Bengaluru	Shri V. Manjunath Shri Ashish Mathur (*Alternate*)
BIS Director General	Shrimati Reena Garg, Scientist 'G'/Senior Director and Head (Electronics and Information Technology) [Representing Director General (*Ex-officio*)]

LITD 36 : PANEL 3 COMPOSITION

Note Sorting Machines (NSMs) Panel

Organization	*Representative(s)*
Godrej & Boyce Manufacturing Company Limited, Mumbai	SHRI SHRIKANT KARVE
National Test House, Kolkata	SHRI JEYRAJ. K
Punjab National Bank, New Delhi	SHRI SATYAWAN OHLAN
Reserve Bank of India, Mumbai	SHRI NAVEEN CHAUDHARY SHRI RAVI GUPTA (*Alternate*)
Standardization Testing and Quality Certification (STQC) New Delhi	SHRI ATUL GUPTA MS SADHANA VERMA (*Alternate*)
State Bank of India, Mumbai	SHRI RAJENDRA SINGH CHAUHAN SHRI VIJAY BADGE (*Alternate*)
UL India Private Limited, Bengaluru	SHRI V. MANJUNATH SHRI ASHISH MATHUR (*Alternate*)

Member Secretary
MS ANKITA SRIVASTAVA
SCIENTIST 'D'/DEPUTY DIRECTOR
(ELECRTONICS AND INFORTION TECHNOLOGY), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: LITD 36 (22283).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi