

IBMIR
QUALITY ENGINEERING
LABORATORY BÖBLINGENTitle: CURL -- 7 AND 9 POINT CARD
STOCK1.0 INTRODUCTION1.1 SCOPE

- 1.1.1 This document establishes the method for determining curl of 7 and 9 point card stock.
- 1.1.2 The relative degree of flatness in data processing cards is termed curl. Curl in data processing cards may be either temporary or permanent.

1.2 REFERENCES1.2.1 Specifications

IBM-IRD 7-02-0101 -- Card Stock IBM Information Processing Cards

IBM-IRD 7-02-0201 -- 9 Point Data Processing

IBM 894502 -- Data Processing Card Stock 7 Point

IBM 894507 -- Data Processing Card Stock 9 Point

1.3 AUTHORIZATION

- 1.3.1 This document is authorized by the Manager of IRD Quality Assurance.

1.4 TEST EQUIPMENT/MATERIAL

- 1.4.1 The IBM curl stick (Part No. 422668) shall be used for the test. Refer to Figure 1.

- 1.4.1.1 The curl stick consists of a triangular piece of moderately rigid vinyl plastic material .007" thick. The base is approximately 8" in length with a center height of 3".

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1.4.1.2 A slide bar made of vinyl plastic is arranged to slide freely through two staple guides from the apex of the triangle and perpendicular to the base. The curl stick is graduated in tenths of an inch on the center face of the body. This is a light weight device as a heavy instrument would tend to flatten the curl in the specimen. The total weight of the curl stick shall be from 2.4 to 2.6 grams.

1.4.1.3 Testing shall be accomplished in controlled rooms or cabinets environments as follows:

- a. $20 \pm 2\%$ RH and $73 \pm 3.5^{\circ}\text{F}$.
- b. $75 \pm 2\%$ RH and $73 \pm 3.5^{\circ}\text{F}$

1.5 CALIBRATION

1.5.1 Place curl stick on a known flat surface and observe for proper alignment of the hair line on the sliding bar with the zero graduation scribed on the center face of the triangular shaped body. Bottom of slide bar must align with the base of the body when the curl stick is zeroed.

2.0 PROCEDURE

2.1 SAMPLE PREPARATION

2.1.1 The test specimen shall consist of four groups of 10 data processing cards. Two groups of cards with wire side up and two groups of cards with felt side up. Identify sample on the groups with felt side up.

2.1.2 The specimens must be free of roll curl and should be selected from the center of the test samples.

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3.0 TEST INSTRUCTIONS

NOTE: Refer to applicable specifications (Reference 1.2.1) for actual value(s) to be tested.

3.1 One ten-card group with wire side up and one group with felt side up shall be placed on shelves. This procedure shall be followed for both the 20% and 75% relative humidity areas.

3.2 The specimens shall remain for a period of twenty-four hours prior to testing to allow for complete conditioning of the entire test deck.

3.3 After through conditioning, the cards of each group shall be inspected for flatness or curl. If the cards are flat, the result is recorded and further testing is unnecessary. If the cards are found to be curled, further testing is required to determine the extent of curl.

3.4 Types of curl observed are classified in the following categories:

- a. Top to bottom (TB)
Cards tend to curl about a machine direction axis. Top of card tends to meet the bottom of the card.
- b. End to end (EE)
Cards tend to curl about a cross direction axis. The right (column 80) and left (column 1) ends of card tend to meet.
- c. Diagonal (D)
Cards tend to curl about a diagonal axis. Neither TB or EE.

Determine by observation which of the two groups of ten cards, at each humidity is the more severely curled. Confine the testing to these groups.

3.5 Arrange the group of cards so that the concave side of the curl is face up. Keep the group intact. Determine which side, felt or wire, is concave. If any or all of the top five cards show excessive curl, they should be removed and placed at the bottom of the deck.

Prepared by: *E. J. L.*
EJLApproved by: *EB*
EB9/24/70
Date

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- 3.6 Place curl stick across the two uppermost card edges of the top card or corners in case of diagonal type of curl. Let the slide bar drop perpendicularly to rest in the valley of the top card. The weight of the curl stick (2-1/2 grams) must rest on the cards.
- 3.7 Note on scale the distance the slide has dropped below base of the curl stick. The measurement (to the nearest .01 inches) represents the amount of curl. The reading should be made on the type of curl which is most significant.
- 3.8 In the event that an original value is out of specification (Reference 1.2.1) two additional sets shall be prepared for testing according to steps 3.1 to 3.7. The average of all three tests will determine if the card stock is rejectable.

4.0 REPORTING

- 4.1 Record the most significant amount of curl, type and concave side for each specimen. Information should be recorded with number identifying the roll from which the sample was acquired.

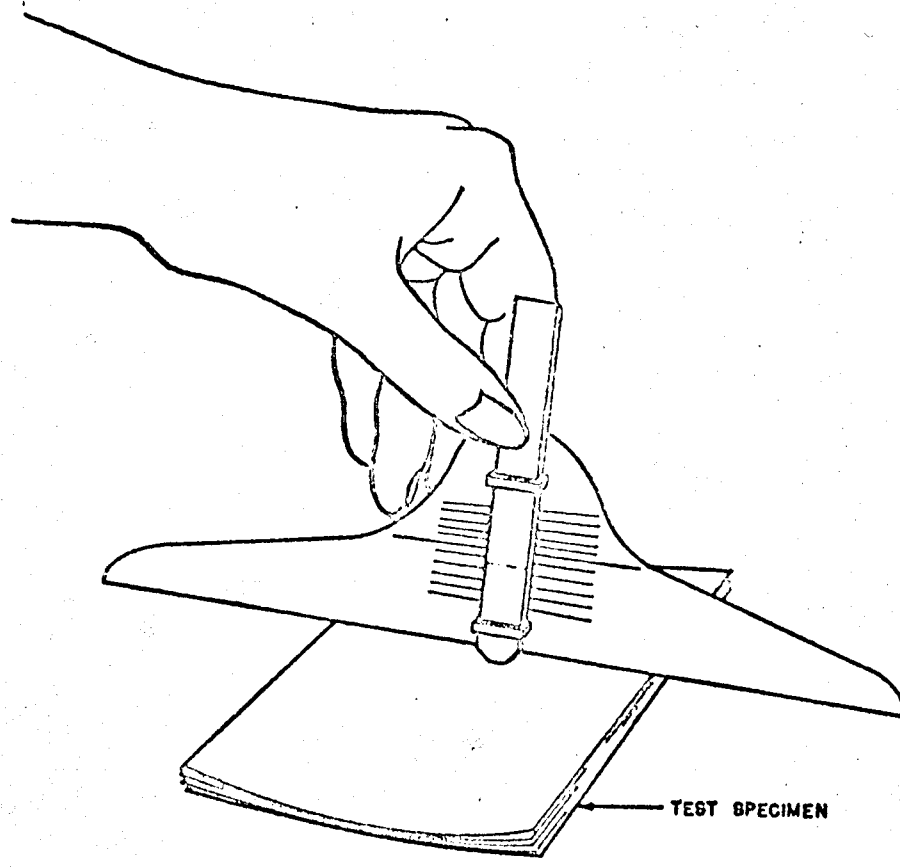
5.0 NOTES

- 5.1 Temporary curl develops whenever the moisture of paper is not in equilibrium with the surrounding atmosphere. However, when the paper is thoroughly reconditioned to the surrounding humidity, it should become flat again.
- 5.2 Inherent or permanent curl is originally in the paper and is only exaggerated by the temporarily induced curl due to a changing moisture content in the paper. The greater factor contributing to inherent curl is the formation or lay of the fibres. Other contributing factors are paper machine dryers of varying temperatures which may be too hot or too cold; paper with too much or too little moisture content sent improperly conditioned to the dryers; too much hydration of the paper stock. Inherent curl is under the direct control of the paper manufacturer.

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CARD STOCK



CURL STICK

REFERENCE:

Assembly Drawing #422668
Component Part Drawings - #422665, 422666 and 422667

Figure 1