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UNITED STATES GOVERNMENT MASTER SPECIFICATION FOR
RIBBONS FOR COMPUTING AND RECORDING MACHINES

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 169

This specification was officially promulgated by the Federal Specifications Board on June 30, 1924, for the use of the Departments and Independent Establishments of the Government in the purchase of ribbons for computing and recording machines.

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I. TYPES

The ribbons shall be of the following types: (a) Single color:
1. Record—Black, blue, purple, and red. 2. Copying—Black, blue, purple, and red. (b) Two color and three color: The proportionate parts of two or three of the following colors shall be specified in the order: Black, blue, purple, and red.

II. MATERIAL AND WORKMANSHIP

1. FABRIC

The cloth shall be made of cotton thoroughly cleaned, combed, and free from waste. It shall be evenly woven and free from an excessive number of avoidable imperfections of manufacture. The weave shall be plain and the yarn single ply.

The thread count shall be not less than 140 threads per inch in warp and filling and the thickness not more than 0.0057 inch. The difference between the warp and filling counts shall not exceed 10 threads.

The edges shall be either cut or selvage, according to the machine on which the ribbon is to be used. Cut edges shall be even and properly gummed to prevent fraying and shall be without tendency to waviness. The material shall have a breaking strength of not less than 40 pounds per inch of width.

2. INKING

Ribbons shall be evenly and heavily inked, but free from an excess of ink which would tend to fill the type. Ink other than black need not be of a permanent nature. The ribbons shall give clear impressions from the start.

III. GENERAL REQUIREMENTS

1. DIMENSIONS

Ribbons shall be furnished of the length and width required for the machine on which they are to be used.

IV. DETAIL REQUIREMENTS

Shall be as described above.

V. METHOD OF INSPECTION AND TESTS

1. METHOD OF TAKING SAMPLES

One ribbon shall be sent to the testing laboratory in an original unopened container bearing all of the manufacturer's marks.

2. TESTS

The fabric shall be examined according to the following methods: Visual examination shall be made of the sample to determine the nature of the edge and the character of the cloth in regard to its freedom from waste and avoidable imperfections of manufacture and to ascertain if the cotton had been combed.

The actual number of threads in 1 inch shall be counted in the warp and filling directions at three different places and the results averaged. If the ribbon is narrower than 1 inch, the total number of warp threads shall be counted and calculated to a basis of 1 inch. The width shall be determined by laying the material on a flat surface without tension, then measuring the distance perpendicular to the length between the edges. Three measurements shall be taken at different places in the sample and the results averaged.

The thickness of the deinked ribbon shall be measured at five different points by means of any suitable gauge and the results averaged.

Three test specimens approximately 6 inches long shall be cut, one from each of the ends and one from the middle of the ribbon. If the ribbon is wider than 1 inch, each specimen shall be raveled to exactly 1 inch in width by taking from each side approximately the same number of threads. If the ribbon is narrower than 1 inch, the results of the breaking tests shall be calculated to a basis of 1-inch width.

The testing machine used shall be of the inclination-balance type. The capacity of the machine shall be such that the arm will not go beyond a maximum angle of 45° in breaking the strips (machines of less capacity tend to give low results). The lower or pulling jaw shall travel at a uniform rate of 12 inches per minute under no load. The distance between the jaws shall be 3 inches at the start of the test. The width of the jaws shall be $1\frac{1}{2}$ inches or more. The jaws shall have a smooth and flat surface, with edges slightly rounded to prevent cutting.

The results of the breaking-strength tests shall be averaged. If a specimen slips in the jaws, breaks in the jaws, breaks at the edge of the jaw, or if for any reason due to faulty operation one of the results falls markedly below the general average, that result shall be disregarded, another specimen shall be taken from the adjacent part of the ribbon, and the result of this break shall be included in the average.

The ribbon as received shall be tested on the machine for which it is intended, on a typewriter, or on a suitable automatic testing machine. If the ribbon is on a spool that will not fit the machine used for testing, it shall be transferred to a suitable spool.

Place the ribbon in the machine and wind 2 yards of its free end upon the empty spool. This is done so that the ribbon will shift a definite distance while making the following tests: The figures 0 to 9 shall be written 50 times over the same length of ribbon. At the beginning of each line the ribbon shall be reeled back to the starting

point.¹ The first line shall be clear and clean, with no blurring of any of the letters. The last line of the 50 shall be distinct and easy to read. The ribbon shall be allowed to stand at rest for one hour after which another line shall be written. This line shall be as clear and distinct as the fifth line of the preceding 50.

The figure 8 shall be thoroughly cleaned and 200 impressions made with it with the normal feed of the ribbon. There shall be no evidence of filling the type.

In testing copying ribbons, in addition to the above tests, press copies shall be made in the usual way. The copies shall be of good color, sharp, and easily legible.

VI. PACKING AND MARKING

No requirements specified.

VII. ADDITIONAL INFORMATION

Only the black record ribbons, Type (a) 1 black, shall be used for writing permanent records.

VIII. GENERAL SPECIFICATIONS

No requirements specified.

¹ This is easily done by making a pencil mark across the ribbon at the point where it leaves the spool holder or at any other convenient fixed point on the machine. The test can not be made by reversing the direction of the ribbon feed at the end of each line, because the ribbon does not travel the same distance in both directions. With some machines it is possible to prevent travel of the ribbon by raising the ribbon-feed pawl. If this can be done, it is preferable to reeling back the ribbon each time.

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