



Designation: F 1520 – 94 (Reapproved 1999)

Standard Test Method for Determining the Drive Torque for Film and Fabric Ribbon Cartridges¹

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1. Scope

1.1 This test method describes a procedure for determining the drive torque of typewriter and printer cartridges using a handheld torque gage. This test method is applicable to cartridges that contain film or fabric inked ribbons.

1.2 A related standard, Test Method F 1050, covers the procedure for determining tension and torque using a test fixture platform with a torque measurement motor.

2. Referenced Documents

2.1 ASTM Standards:

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods²

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method²

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom³

F 1050 Test Method for Determining Winding Torque and Tension of Typewriter Ribbons³

3. Terminology

3.1 Definitions:

3.1.1 *initial, breaking torque*—the moment of a force necessary to begin rotation of the drive elements in a ribbon cartridge.

4. Summary of Test Method

4.1 Fully assembled cartridges containing either film or fabric inked ribbons are held in the same orientation as in the printer. (Refer to Terminology F 221). The appropriate measuring gage is engaged in the hub of the drive wheel of the cartridge and turned at a constant speed one complete revolution (one revolution requiring approximately 2 s being equivalent to 30 to 40 r/min). The process is repeated five times.

5. Significance and Use

5.1 This test method can be used to evaluate the drive torque for cartridges from one or more lots intended for a common

typewriter or printer. This test method may be used to indicate possible cartridge function problems in the end use equipment or as a means of manufacturing control or research.

6. Interferences

6.1 Before testing, cartridges should be thoroughly examined. Poor design or incorrect assembly can cause dragging of the ribbon during transport and affect the drive mechanism.

6.2 Drive torque measurements may vary widely as ribbon is exhausted or re-stuffed, depending on the type of cartridge.

6.3 Wide variations in environmental conditions (temperature and relative humidity) can affect cartridge torque. Comparisons should be made only between tests run under the same general environmental conditions.

6.4 Measurements can be distorted if the torque gage is turned with a sharp twist of the wrist. A slow, constant speed is required for accurate results.

7. Apparatus

7.1 *Torque Gage*⁴—Scaled in cN·cm, gf·cm or ozf. in. with a maximum reading needle. Gages scaled in the 0 to 600 cNg·cm range are suitable for most cartridge designs. Gages should be able to work vertically, as shown in Fig. 1.

7.2 *Bits*—Mount bits in the torque gage and interface with drive wheel hub.

8. Test Specimens

8.1 The test specimen shall be a complete ribbon cartridge that has not been disrupted since it was assembled.

8.2 The test specimen shall be identified as to source, type of ribbon, and date of manufacture.

9. Procedure

9.1 Position the maximum reading needle on the gage at zero so as to be readable in the drive direction.

9.2 Hold the cartridge flat and parallel to the floor, or as it would sit in the printer. If needed, the cartridge can be held by a holding device that simulates the position in the printer. The holding device must not compress the cartridge and cause test results to be altered.

¹ This test method is under the jurisdiction of ASTM Committee of F-5 on Business Imaging Products and is the direct responsibility of Subcommittee F05.02 on Inked Ribbons and Carbon Paper.

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² *Annual Book of ASTM Standards*, Vol 14.02.

³ *Annual Book of ASTM Standards*, Vol 15.09.

⁴ Several torque gages have been found to give satisfactory results. Both the TOHNICHI Manufacturing Co. and Waters Manufacturing Co., Wayland MA make applicable models.