



Designation: F 1035 – 91 (Reapproved 1997)^{ε1}

Standard Practice for Use of Rubber-Cord Pie Disk to Demonstrate the Discernment Capability of a Tire X-ray Imaging System¹

This standard is issued under the fixed designation F 1035; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Section 3 and footnote 4 were modified editorially in March 1998.

1. Scope

1.1 This practice describes the construction and use of a rubber-cord pie-shaped standard disk for demonstrating the discernment capability of an X-ray imaging system.

1.2 This practice is applicable to direct viewing (fluoroscopic) X-ray imaging systems and film, plate or paper (radiographic) X-ray imaging systems that are used for checking the construction consistency of pneumatic tires.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *This standard does not purport to address the safety concerns associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1349 Practice for Rubber—Standard Temperatures for Testing²

D 3186 Test Methods for Rubber—Evaluation of SBR (Styrene-Butadiene Rubber) Mixed With Carbon Black or Carbon Black and Oil²

F 538 Terminology Relating to the Characteristics and Performance of Tires³

3. Terminology

3.1 Definitions:

3.1.1 *pie disk, rubber-cord, n— in tire X-ray testing, a circular disk of a specified diameter having six pie-shaped sections, each containing cord of different materials; it is used for demonstrating the discernment capability of an X-ray*

imaging system. (F 538)

3.1.2 *X-ray image plane, n— in tire testing, a surface located at a specified distance from the X-ray tube “focal spot.”*

3.1.2.1 *Discussion—*The centerline of the cone of radiation from the X-ray tube is normal to the image plane. (F 538)

3.1.3 *X-ray imaging system, n— in tire testing, a collection of the components and subsystems needed to produce a fluoroscopic or radiographic image of the tire.*

3.1.3.1 *Discussion—*The collection includes the X-ray high voltage generator, X-ray tube, and X-ray screen or radiograph. (F 538)

3.1.4 *X-ray radiograph, n—*an X-ray film, plate, or paper that is placed at the image plane and is used for recording an X-ray image of the object being examined. (F 538)

3.1.5 *X-ray screen, n—*a fluorescent screen, placed at the image plane, that produces an X-ray image of the object being examined.

3.1.5.1 *Discussion—*This visible light may be photographed or input to a television system. (F 538)

4. Summary of Practice

4.1 The pie disk is a rubber-cord composite that is used as the subject in an X-ray imaging system. Each of the six sections of the disk has a different cord material which, together, represent the cords commonly used in vehicle tires. The X-ray absorption of these cords range from very nearly the same as that of the rubber matrix to quite different from it.

4.2 The rubber-cord pie disk shall be placed between the X-ray tube and the X-ray image plane at a specified distance from the image plane (see Fig. 1). The ambient conditions are controlled or monitored, and recorded.

4.3 The image of the disk on a fluorescent screen or photograph can be studied for clarity of detail for each cord material. The voltage and current of the X-ray high voltage generator shall be adjusted for optimum detail and contrast sensitivity to view all cord materials simultaneously.

¹ This practice is under the jurisdiction of ASTM Committee F-9 on Tires and is the direct responsibility of Subcommittee F09.10 on Equipment, Facilities, and Calibration.

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² *Annual Book of ASTM Standards*, Vol 09.01.

³ *Annual Book of ASTM Standards*, Vol 09.02.