



Standard Test Methods for RUBBER PROPERTY—COMPRESSION SET INDUCED BY NUCLEAR RADIATION¹

This Standard is issued under the fixed designation D 2309; 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.

1. Scope

1.1 These methods cover the testing of vulcanized rubber parts that are to be assembled in such a manner that the rubber will remain subjected to compressive stresses or shear during continuous exposure to high energy radiation. They follow the general requirements and procedures of ASTM Methods D 395, Tests for Rubber Property—Compression Set.²

1.2 The types and dose rate of nuclear radiation included within the scope of these methods are described in 4.3.

1.3 Unless otherwise specified, the irradiation procedure will be as described in ASTM Recommended Practice D 1672, for Exposure of Polymeric Materials to High-Energy Radiation.³ In case of conflict between the provisions described herein and those of Recommended Practice D 1672, however, these methods shall take precedence.

NOTE: Caution—Since radiation sources can be dangerous if misused, test irradiations should be performed by qualified personnel only.

1.4 Exposure to high energy radiation frequently involves restrictions imposed by the irradiation facility. Two primary considerations of special importance originate from the fact that (1) space economy may limit the physical size of specimens and apparatus, and (2) a time lapse is likely to occur between assembly of specimens for exposure and the commencement of irradiation. These difficulties are intensified when the laboratory performing the measurements is remotely located with respect to the site of the irradiation facil-

ity. Some latitude in testing must be provided to cope with such situations.

1.5 In recognition of this general need for such allowances, provisions have been made for handling a time lapse of variable extent between application of the compressive load and the start of irradiation, and for the use of either macro- or microspecimens, alternative compression devices compatible with such specimens, and different modes of load application. Three methods are covered, as follows:

1.5.1 *Method A*—Compression Set Under Constant Load with Measurements Performed at or near the Site of Irradiation.

1.5.2 *Method B*—Compression Set Under Constant Deflection with Measurements Performed at or near the Site of Irradiation.

1.5.3 *Method C*—Compression Set Under Constant Deflection with Measurements Performed at a Site Remote from Irradiation Facility.

1.6 The choice of method is optional, but the criteria of selection should be based on the expected service conditions for which correlation of test results are sought. Notation shall be made in the test report of the method used. In case of uncertainty as to which method is more applicable, Methods B and C shall take preference.

¹ These methods are under the jurisdiction of ASTM Committee D-11 on Rubber and are the direct responsibility of Subcommittee D11.10 on Physical Testing.

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² *Annual Book of ASTM Standards*, Part 37.

³ *Annual Book of ASTM Standards*, Parts 37, 39, and 45.