



Designation: D 6284 – 98

Standard Test Method for Rubber Property—Effect of Aqueous Solutions with Available Chlorine and Chloramine¹

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1. Scope

1.1 This test method covers procedures for evaluating the ability of rubber and rubber-like materials to withstand the effects of aqueous solutions with available chlorine and chloramine. It is intended to compare the effects of chlorine compounds, present in potable water due to disinfection procedures, on rubber articles.

1.2 Test solutions are designed to contain chlorine compounds, including hypochlorous acid (HOCl), hypochlorite ions (OCI), and monochloramine (NH₂Cl).

1.3 *This standard does not purport to address all of the safety concerns, if any, 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 471 Test Method for Rubber Property—Effects of Liquids²
- D 1193 Specification for Reagent Water³
- D 1253 Test Methods for Residual Chlorine in Water³
- D 1889 Test Method for Turbidity of Water³
- D 2240 Test Method for Rubber Property—Durometer Hardness²
- D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets²
- D 3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products²

3. Terminology

3.1 The terminology of chlorine compounds used in this test method is in accordance with Test Methods D 1253, Section 3.

3.2 *combined residual chlorine*—residual consisting of chlorine combined with ammonia nitrogen and nitrogenous compounds.

3.3 *free available chlorine residual*—residual consisting of hypochlorite ions (OCI) or hydrochlorous acid (HOCl), or both.

3.4 *total residual chlorine (chlorine residual)*—the amount of available chlorine-induced oxidants present in water at any specified period, subsequent to the addition of chlorine.

4. Summary of Test Method

4.1 This test method provides procedures for exposing test pieces to aqueous available chlorine and chloramine solutions under defined conditions of temperature and time.

4.2 This test method includes the following procedures:

Change in mass after immersion	Section 10
Change in volume after immersion	Section 11
Change in hardness after immersion	Section 12
Visual and turbidity rating after immersion	Section 13

4.3 The resulting deterioration is measured by changes in mass, volume, hardness, and appearance of the test piece surfaces and test liquid after immersion.

4.4 This test method also describes the preparation of the immersion liquids.

5. Significance and Use

5.1 Rubber articles, such as seals, gaskets, and membranes, may be exposed in service to chlorine compounds used in potable water as disinfectants. The exposure may be intermittent or continuous and can occur at various temperatures.

5.2 Properties of rubber articles can deteriorate as a result of exposure to water containing these chlorine compounds, affecting their performance for the intended use.

5.3 This test method attempts to simulate service conditions through controlled accelerated testing, but may not give a direct correlation with part performance under actual service conditions. It yields comparative data on which to base judgement on expected service quality.

5.4 This test method is suitable for compliance testing, quality control, and research and development work.

6. Test Conditions

6.1 *Temperature*— Unless otherwise specified between the producer and the purchaser, the preferred test temperature shall be 70 $\pm$ 2°C (158 $\pm$ 4°F).

6.1.1 If the temperature of the testing room is other than the standard 23 $\pm$ 2°C (73 $\pm$ 4°F), the actual room temperature

¹ This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.40 on Consumer Rubber Products.

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

³ *Annual Book of ASTM Standards*, Vol 11.01.