



Designation: D5230 – 12a

Standard Test Method for Carbon Black—Automated Individual Pellet Hardness¹

This standard is issued under the fixed designation D5230; 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.

1. Scope

1.1 This test method covers a procedure for measuring individual pellet hardness of carbon black by the automated pellet hardness tester.²

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

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:*³

[D1511 Test Method for Carbon Black—Pellet Size Distribution](#)

[D1799 Practice for Carbon Black—Sampling Packaged Shipments](#)

[D1900 Practice for Carbon Black—Sampling Bulk Shipments](#)

[D4483 Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries](#)

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

¹ This test method is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.51 on Carbon Black Pellet Properties.

Current edition approved Aug. 15, 2012. Published October 2012. Originally approved in 1992. Last previous edition approved in 2012 as D5230 – 12. DOI: 10.1520/D5230-12A.

² The sole source of supply of the Concarb Titan Automated Pellet Hardness Tester known to the committee at this time is Jaron Technologies LLC, 2338 Duncan, Pampa, TX 79065, E-mail: <http://www.jarontech.com>. The HITEC IPHT is available from HITEC Luxembourg, 5 rue de L' Eglise, L-1458, Luxembourg, E-mail: info@hitec.lu, <http://www.hitec.lu/>. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Summary of Test Method

3.1 A sample of carbon black is passed through two sieves to isolate a fraction of uniform size. The most spherical pellets from this portion are selected and placed into the tester. The individual pellets are pressed against a platen with a load cell for measuring force. As pressure is applied the pellet will either break with a rapid force reduction or the pellet will simply compress. The individual pellet hardness is the maximum force prior to a force reduction of at least 3 cN or the maximum force required to compress the pellet to 90 %, whichever comes first.

4. Significance and Use

4.1 Individual pellet hardness is related to several carbon black characteristics. Among these are mass strength and attrition. The subsequent level of dispersion obtained in some mixed compounds containing the carbon black may be affected by pellet hardness. Acceptable pellet hardness must be agreed to by the user and the producer.

5. Apparatus

5.1 *Automated Pellet Hardness Tester*,² capable of achieving an absolute measuring accuracy of ± 2 cN (2 gf) for the force measurement and ± 0.1 mm for the diameter measurement and a relative accuracy of ± 0.5 cN (0.5 gf) for the force measurement and 0.02 mm for the diameter measurement and consisting of the following major components and characteristics.

5.1.1 A means for automatic loading of a pellet on the transport platen for transporting the pellet so as to contact the second platen with a minimum force. Typically one platen contains a force measuring device. The required force to detect the contact shall not exceed 2 cN (2 gf),

5.1.2 A means for applying the force at a constant rate,

5.1.3 A means for transporting the pellet so to minimize its movement during the application of force.

5.1.4 A means for measuring the diameter of the individual pellet under test as measured along the axis of the application of force.

5.1.5 A control device for directing the instrument through the test cycle that includes crushing the pellet under controlled conditions, measuring and storing the results of the initial diameter and crush force determinations, cleaning the fragments from the platen surfaces, and starting the next cycle.