



Designation: F2348 – 04 (Reapproved 2010)

Standard Performance Specification for Privacy Padlocks¹

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1. Scope

1.1 This specification covers functional, operational, and security requirements for padlocks. Included are function descriptions, operational tests, forcing tests, and surreptitious entry tests.

1.2 This specification describes and grades various levels of performance to provide users of the specification with criteria upon which to select suitable padlocks.

1.3 Tests described are laboratory tests, and although they simulate field conditions as to attacks, they do not duplicate these conditions. Tests described are repeatable in the laboratory.

1.4 Some users of this specification may wish to use padlocks that have special attributes not related to security.

1.5 This specification describes and grades various levels of performance provided by limited dual custody operation.

1.6 The specific padlocks included have shackles of limited diameter, permitting attachment to existing zipper slides and zipper pulls and other devices provided for closure.

1.7 These padlocks are considered “privacy padlocks” offering limited protection to forced attack similar to that provided by tamper-indicative security seals. A successful forced attack would be indicated by the damage done to the padlock. For padlocks offering greater protection to forced attack, the user is directed to Performance Specification F883.

1.8 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are provided for information only.

1.9 The following precautionary caveat pertains only to the test method portions, Sections 8 – 11, of this specification: *This standard does not purport to address 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.*

¹ This specification is under the jurisdiction of ASTM Committee F12 on Security Systems and Equipment and is the direct responsibility of Subcommittee F12.50 on Locking Devices.

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2. Referenced Documents

2.1 *ASTM Standards*:²

F883 Performance Specification for Padlocks

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *acceptance testing*, *v*—to assure by documented testing that a padlock meets specific tests of Specification F2348 as agreed to by the buyer and seller.

3.1.2 *case*, *n*—housing or body of a lock or latch.

3.1.3 *certified*, *v*—to assure by documented testing that a padlock meets all test requirements appropriate to its grading.

3.1.4 *combination lock*, *n*—lock that is operated by local input of a specific series or sequence of numbers or letters

3.1.5 *cylinder*, *n*—complete operating unit which usually consists of the plug, shell, tumblers, springs, plug retainer, a cam/tailpiece or other actuating device, and all other necessary operating parts.

3.1.6 *cylinder biting*, *n*—group of numbers that represent the biting of a key or the tumblers, or both, of a lock or cylinder.

3.1.7 *decode*, *v*—to determine a key combination by physical measurement of a key or cylinder parts, or both.

3.1.8 *heel*, *n*—part of a padlock shackle that normally is retained in the case when in the unlocked position.

3.1.9 *independent dual custody*, *adj*—function of a mechanism that allows access by two different people with different credentials.

3.1.10 *keyway*, *n*—the opening in a lock or cylinder that is shaped to accept a key bit or blade of a proper configuration.

3.1.11 *manipulate*, *v*—dialing process typically used with combination locks to determine operational status of the lock, potential combinations, or attempt to free the mechanism.

3.1.12 *manipulation*, *n*—opening method for mechanical combination locks that uses the tolerances of that lock to determine an opening combination.

² 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.

3.1.13 *padlock*, *n*—detachable and portable lock with a shackle that locks into its case.

3.1.14 *pick*, *v*—to manipulate tumblers in a keyed lock mechanism through the keyway, without obvious damage, by means other than the specifically designed key.

3.1.15 *plug*, *n*—part of a cylinder that contains the keyway, with tumbler chambers usually corresponding to those in the cylinder shell.

3.1.16 *rap*, *v*—to unlock a padlock shackle from its case by striking the case to disengage the locking mechanism.

3.1.17 *removable cylinder*, *n*—cylinder that can be removed from a locking device by a key or tool, or both.

3.1.18 *shackle*, *n*—part of a padlock that passes through an opening in an object or fits around an object and is ultimately locked into the case.

3.1.19 *tamper-indicative device (tid)*, *n*—mechanical device whose physical change in state is an obvious indication of tamper

3.1.20 *toe*, *n*—part of a padlock shackle that is normally released from the case in the unlocked position.

3.1.21 *tumbler*, *n*—movable obstruction of varying size and configuration in a lock or cylinder that makes direct contact with the key or another tumbler and prevents an incorrect key or torquing device from activating the lock or other mechanism.

3.1.22 *zipper slide*, *n*—movable device that opens and closes a zipper.

3.1.23 *zipper pull*, *n*—element attached to a zipper slide to facilitate movement.

4. Classification of Functions

4.1 Types of Padlocks:

- 4.1.1 *Type P01*—Key operated.
- 4.1.2 *Type P02*—Combination operated.
- 4.1.3 *Type P03*—Frangible element operated.
- 4.1.4 *Type P04*—Replaceable frangible element operated.
- 4.1.5 *Type P05*—Independent custody operated.

4.2 *Grades*—Four levels of performance are described in this specification with Grade 0 the lowest and Grade 3 the highest.

4.3 Options:

- 4.3.1 *Option A*—Key is captive in cylinder when padlock is unlocked.
- 4.3.2 *Option B*—Not used in this specification.
- 4.3.3 *Option C*—Non-changeable combination.

4.3.4 *Option D*—Combination operated with key control.

5. General Requirements

5.1 *Inferences*—Cylinder picking, rapping, and decoding are described in this specification. Since the skill of the person doing the testing has a direct bearing on the results of the tests, one of each test shall be conducted by three different persons having experience of not less than one year of approximately the same skill level and the results averaged for determining relative levels of performance.

5.2 Tolerances:

5.2.1 *Fixture Tolerances*—All tolerances shall follow standard machining practices unless otherwise specified.

5.2.2 Test Setup Tolerances:

- 5.2.2.1 *Force*: 0.5 % of working range.
- 5.2.2.2 *Height*: ±3 mm (0.12 in.)
- 5.2.2.3 *Torque*: 4.0 % of reading.

5.3 *Temperature*—All tests shall be conducted between 16 and 27°C (61 and 81°F).

5.4 *Test Reports*—All test reports shall be dated.

6. Test Specimens

6.1 Select specimens for test at random from the manufacturers' finished stock of each size and model being certified by the manufacturer.

6.2 Padlocks may be used for multiple tests if previous tests would not influence subsequent test results.

6.3 Select four padlocks for the forcing tests. For surreptitious entry tests, select five padlocks for each test required. Select one padlock for the cycle test.

7. Preparation of Apparatus

7.1 *Tensile Loading Device*—Provide a tensile loading device having a load and force measuring capacity of 1142 to 2855 mm/N (200 to 500 in./lb).

8. Test Methods

8.1 Forcing Tests (see Table 1)

8.1.1 Tensile Test

8.1.1.1 *Scope*—The subject privacy class of padlock is not a security padlock. Any can be forced using simple well-known attack methods. It is important that any successful forcing attack leaves clear evidence of the event.

8.1.1.2 *Significance and Use*—The forcing tests to be performed establish grade levels for tensile (pulling the shackle

TABLE 1

Description	Units	Grade per ASTM F2348				
		0	P1	P2	P3	
Shackle Diameter	mm	<3.0	3.0	4.0	5.0	
TABLE 1 Forcing Tests Required Values						
Forcing tests	Forcing Tests Required Values	Units	0	F1	F2	F3
	Tensile Test	lb	<200	200	350	500
	Shackle Cutting Test	lb	<500	500	1000	2000
	Evidence of Forced Attack		no	yes	yes	yes
	Non-Functioning after Forced Attack		no	yes	yes	yes