



# Standard Guide for Inspection and Evaluation of Tampering of Security Seals<sup>1</sup>

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## 1. Scope

1.1 This guide covers procedures for the inspection and evaluation of tampering of security seals.

1.2 A security seal is a device intended to detect tampering or entry. Evaluate only single use locking devices under this guide. The following procedures shall serve as guidelines for detecting attempts at defeat and reapplication of a security seal.

1.3 This guide is not intended to be fully comprehensive; certain types of security seals, such as labels, have not been addressed to date. Further, it is the responsibility of users of this guide to interpret their specific security needs concerning the use of seals, and to determine the grade of seal appropriate for their particular application. ASTM assumes no responsibility for losses occurring as a result of a defeated seal.

## 2. Referenced Documents

### 2.1 ASTM Standards:

F 832 Classification for Security Seals<sup>2</sup>

F 883 Performance Specification for Padlocks<sup>2</sup>

F 946 Guide for Establishing Security Seal Control and Accountability Procedures<sup>2</sup>

## 3. Terminology

### 3.1 Definition:

3.1.1 *seal*—a passive, one-time locking device used to detect tampering or entry, afford limited resistance (to entry) or provide a combination of both functional aspects.

## 4. Significance and Use

4.1 If a seal can be opened by any means and successfully reapplied without exhibiting signs indicative of prior attack, the integral quality of the seal is in serious question. This guide allows that any particular method of attempted defeat can be employed to defeat a seal, and concentrates not on the effectiveness of the seal to resist that attack, but rather on the nature of the individual seal to inhibit reapplication.

4.2 This standard presents guidelines for inspection to assist in determining whether an attempt to defeat a security seal, and

to possibly reapply the seal, has been made. In all cases, the guidelines are meant to focus attention on signs of attack and reapplication.

## 5. Seal Classification

5.1 *General*—For the purpose of comparing seal physical properties, seal classes are grouped according to the following description of applicable seals:

### 5.2 Groups:

5.2.1 *Group 1*—Flexible cable and wire seals.

5.2.2 *Group 2*—Strap, cinch seals.

5.2.3 *Group 3*—Rigid bolt and rod seals, including heavy duty metal padlock type.

5.2.4 *Group 4*—Twisted rod or wire seals (pigtail).

5.2.5 *Group 5*—Padlock type seals, scored seals, metal, or plastic base.

5.2.6 *Group 6*—Fiber optic seals.

## 6. Guidelines for Inspection and Evaluation of Tampering

6.1 *Group 1 Seals (Cable and Wire Seals)*—Inspect for a frayed appearance at the point where the main length of cable or wire meets the locking portion of the seal. Usually under compression, if this region of the seal has been twisted free of its retaining junction at the locking point, it may provide visual indication that the uniform pattern of material has been disturbed. The attempt at reinsertion of the cable into the locking mechanism, if successful, may also be detected by easy withdrawal of the cable by hand at time of inspection.

6.2 *Group 2 Seals (Strap, Cinch, or Non-scored Seals)*—Inspect to reveal scratches or nicks adjacent to the locking mechanism of the seal. Deformation of the locking mechanism by forcible expansion of the lock point will be readily visible if the attack involved such manipulation. As with the Group 1 seals, pulling on the seal by hand may be sufficient to indicate if reapplication into the damaged locking mechanism has been affected. In the case of attack through methods of fatiguing (cyclic loading), plastic seals can reveal a bank of discoloration or lightening at the point of attack.

6.3 *Group 3 Seals (Bolt, Rod Seals, and Steel Padlock Types)*—Inspect for evidence of scratches or nicks on the body of the seal to indicate that prying or picking of the locking mechanism has taken place. Deformation of the body due to impact loads may also serve to indicate that tampering has occurred. Pulling the seal by hand or adding a turning motion

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.07.

may allow for easy removal, or indicate that possible defeat and reapplication has taken place.

6.4 *Group 4 Seals (Twisted Rod or Wire Seals)*—Inspect for unusual deformation patterns that may appear if the seal has been unwound and reapplied. Brittleness induced by such work-hardening may also be indicated by a cracked or wavy appearance of the surface of the seal.

6.5 *Group 5 Seals (Padlock Type Seals, Metal or Plastic Base)*—Inspect for nicks or scratches that may appear near one or both of the shackle legs of the seal or on body if attempted defeat has occurred. Pulling the seal by hand or adding a

turning motion may allow for easy removal, or indicate that possible defeat and reapplication has taken place.

6.6 *Group 6 Seals (Fiber Optic Seals, Glass or Plastic Fiber with Plastic Sealing Body)*—Inspect optical fiber jacket for cuts or tears and discoloration. Seals using bundled fibers may indicate tampering by an uneven length at the cleaved surface. Inspect the seal body for nicks, scratches, internal crazing or clouding. Inspect the surface of the body for traces of adhesive. Inspect for gross dimensional changes that may have occurred if the seal body was heated. Verify that the fiber is securely restrained in the seal body tugging on the fibers.

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