



Designation: F3217 – 17

Standard Guide for Security Fasteners¹

This standard is issued under the fixed designation F3217; 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 The purpose of this guide is to provide technical information related to understanding the features, types of materials, and benefits of various types of security fasteners and provide guidance in the selection and application of security fasteners in detention and corrections facilities.

1.2 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASME Standard:*

[ASME B1.1 Unified Inch Screw Threads \(UN and UNR Thread Form\)](#)²

2.2 *British Standard:*

[BS 1580–1 Unified Screw Threads. Screw Threads with Diameters 1/4 in. and Larger. Requirements](#)³

3. Terminology

3.1 *Definitions:*

¹ This guide is under the jurisdiction of ASTM Committee F33 on Detention and Correctional Facilities and is the direct responsibility of Subcommittee F33.04 on Detention Hardware.

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² Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

³ Available from British Standards Institution (BSI), 389 Chiswick High Rd., London W4 4AL, U.K., <http://www.bsigroup.com>.

⁴ See thread terminology, types of bolt and screw heads, and types of screw points for visual reference.

3.1.1 *bearing surface, n*—area that carries load across the face of the material.

3.1.2 *blind fastener, n*—fastener that can be placed with access to only one side of an application (for example, cage nuts, pop rivet[®]).

3.1.3 *blind side, n*—side of the joint that cannot be accessed (for example, the inside surface of a tubular or box section).

3.1.4 *body, n*—in blind fasteners, the portion of the rivet that expands into the parent material and in threaded fasteners, the unthreaded portion of the fastener under the head.

3.1.5 *bolt, n*—externally threaded fastener that requires a nut to secure the fastened joint.

3.1.6 *break stem, n*—fastener that is installed by gripping and pulling the end of the mandrel/stem; see Fig. 1.

3.1.6.1 *Discussion*—As installation is completed, the end of the stem fractures at the breaker groove and is discarded, leaving the head of the stem in the fastener body.

3.1.7 *breaker groove, n*—weakened groove in the stem or pin of a fastener allowing breakage at a predetermined load and length; see Fig. 2.

3.1.8 *bulbing, v*—physical action of the fastener body swelling (expanding radially) against the rear face of the joint when placed.

3.1.8.1 *Discussion*—Generally found in break stem fasteners and threaded inserts.

3.1.9 *case hardened, adv*—heat-treated fastener in which the surface is harder than the core.

3.1.10 *chemical-set anchor, n*—anchor designed for blind-hole installations that use a two-component structural grade catalyzing resin (usually epoxy) to bind the bolt securely in the substrate material.

3.1.11 *drive-pin expansion anchor, n*—blind-hole expansion anchor usually manufactured from a relatively soft alloy metal or plastic, but can also be of steel; see Fig. 3.

3.1.11.1 *Discussion*—The anchor is expanded into the blind hole by hammering in a supplied pin or nail into the center of the anchor.

3.1.12 *drive type, n*—the features of a fastener head that allows the fastener to be driven (installed or removed).

3.1.12.1 *Allen head, n*—hexagonal hollow socket drive design.

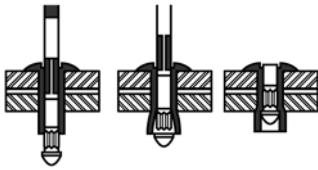


FIG. 1 Break Stem

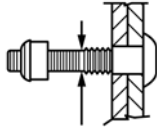


FIG. 2 Breaker Groove

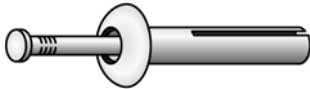


FIG. 3 Drive-pin Expansion Anchor

(1) Discussion—Security fastener versions have a center pin reject feature added.

3.1.12.2 *Key-Rex*[®], *n*—custom-registered computer-designed hollow socket head design requiring a matching tool drive to install or remove; see Fig. 4.⁵



FIG. 4 Key-Rex[®]

(1) Discussion—Generally considered a maximum security fastener.

3.1.12.3 *McGard Intimidator*[®], *n*—custom-registered computer-designed hollow socket drive design requiring a matching tool drive to install or remove; see Fig. 5.⁵



FIG. 5 McGard Intimidator[®]

(1) Discussion—Generally considered a maximum security fastener.

⁵ The sole source of supply of the apparatus known to the committee at this time is Bryce Fasteners, 1230 N. Mondel Dr., Gilbert, AZ 85233. 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.

3.1.12.4 *one-way drive, n*—drive design that allows for installation but not removal. This is usually a one-way slotted head in which the slot shoulders are removed in the counterclockwise direction.

(1) Discussion—This is not considered a security fastener with the possible exception of one-way slotted heads in which the slot shoulders are removed in the counterclockwise direction.

3.1.12.5 *Penta Nut*TM, *n*—tapered nut with a hollow five-point socket that is used to tighten the nut; see Fig. 6.⁵



FIG. 6 Penta NutTM

3.1.12.6 *Penta-plus*TM, *n*—five-sided hollow socket security fastener with center pin reject; see Fig. 7.⁵



FIG. 7 Penta-plusTM

3.1.12.7 *Phillips head, n*—for threaded fasteners, a traditional hollow socket head design characterized by a four-lobed shape; see Fig. 8.



FIG. 8 Phillips Head

(1) Discussion—This is not considered a security fastener.

3.1.12.8 *Raptor*TM, *n*—oversized head with anti-loosening serrations on the flat bearing surface, which increases the holding power of the fastener 20 % and eliminates the need for lock washers.⁵

(1) Discussion—This feature can be added to Key-Rex[®], Penta-plusTM, ZeroTM, or any style fastener.

3.1.12.9 *Robertson, n*—a square hollow socket drive often seen in woodworking fasteners.

3.1.12.10 *slotted head, n*—for threaded fasteners, a traditional head design characterized by a cross slot in the head face; see Fig. 9.



FIG. 9 Slotted Head

3.1.12.11 *spanner head, n*—for threaded fasteners, one with a head design characterized by horizontally opposed notches in the head circumference or round recesses within the head face; see Fig. 10.

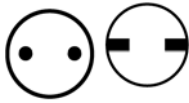


FIG. 10 Spanner Head

(1) *Discussion*—Such designs are not especially secure and tools for inserting or removing these types of fasteners are easily broken. They are often referred to as “snake eye” fasteners.

3.1.12.12 *Torx head, n*—multi-lobed hollow socket fastener bit design as patented and licensed by Camcar Textron and the design is characterized by a six-lobed shape with rounded lobes.⁶ The security version has an added center pin; see Fig. 11.



FIG. 11 Torx Head

3.1.12.13 *Torx plus head, n*—multi-lobed hollow socket fastener bit design characterized by a six-pointed shape as patented and licensed by Camcar Textron and the design characterized by a six-lobed shape with truncated lobes.⁶ The security version is a five-lobed version that has an added center pin; see Fig. 12.



FIG. 12 Torx Plus Head

(1) *Discussion*—This design has better mechanical properties than the standard Torx but is limited in available sizes.

3.1.12.14 *T-REVV[®], n*—multi-lobed hollow socket fastener characterized by a seven-point shape as patented and licensed by Bryce Fastener; see Fig. 13.⁷



FIG. 13 T-REVV[®]

3.1.13 *endurance limit/strength, n*—maximum alternative stress that a fastener can withstand for a specified number of stress cycles without failure. This is not normally an issue in correctional/detention projects.

3.1.13.1 *Discussion*—See *static breaking strengths* (in pounds).

3.1.14 *expansion anchor, n*—anchor designed for blind-hole installations that use a specially designed sleeve, wedge or other device that, as the fastener is tightened, the sleeve or wedge expands into the available space locking the fastener in place.

3.1.15 *hardening, v*—changing the strength or durability characteristics of a fastener through heat treatment or work hardening.

3.1.15.1 *Discussion*—See *case hardening, induction hardening, and through hardening*.

3.1.16 *head form/head style, n*—characteristics of the fastener head and head styles include button, pan, truss, hex, hex flange, socket head large flange, low profile, and countersunk.

3.1.16.1 *button head, n*—for threaded fasteners, one with a low, rounded top surface and a large, flat bearing surface; similar to a round head machine screw; see Fig. 14.



FIG. 14 Button Head

3.1.16.2 *countersunk head, n*—for threaded fasteners, one with a level surface and a conical bearing surface; available in various nominal head angles; see Fig. 15.

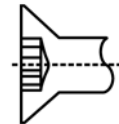


FIG. 15 Countersunk Head

(1) *Discussion*—See *flat head*.

3.1.16.3 *fillister head*—for threaded fasteners, one with a rounded top, cylindrical sides, and flat bearing surface; see Fig. 16.

3.1.16.4 *flat head, n*—for threaded fasteners, one with a level surface and a conical bearing surface; available in various nominal head angles; see Fig. 17.

(1) *Discussion*—See *countersunk head*.

⁶ The Torx head is covered by a patent. If you are aware of an alternative(s) to the patented item, please attach to your ballot return a description of the alternatives. All suggestions will be considered by the committee. If alternatives are identified, the committee shall reconsider whether the patented item is necessary. The committee, in making its decision, shall follow Regulation 15.

⁷ The T-REVV[®] is covered by a patent. If you are aware of an alternative(s) to the patented item, please attach to your ballot return a description of the alternatives. All suggestions will be considered by the committee. If alternatives are identified, the committee shall reconsider whether the patented item is necessary. The committee, in making its decision, shall follow Regulation 15.