SUSPECT/COUNTERFEIT & DEFECTIVE FASTENER INSPECTION

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Contents

Purpose:

The purpose of this document is to provide clarification on the Department of Energy (DOE) legacy fastener headmark list and to aid those inspecting for suspect/counterfeit and defective indications in high strength fasteners within the DOE.

Background:

The Fastener Quality Act (FQA), Public Law (PL) 101-592, was signed by President George H. W. Bush on November 16, 1990. The Act protects public safety by: (1) requiring that certain fasteners, sold in commerce, conform to the specifications to which they are represented to be manufactured; (2) providing for accreditation of laboratories engaged in fastener testing; and (3) requiring inspection, testing and certification in accordance with standardized methods.

On March 7, 1996, President William J. Clinton signed the National Technology Transfer and Advancement Act of 1995, PL 104-113, which amended the FQA to further clarify and define the requirements of the original Act. Further amendments were announced on August 14, 1998 (reference PL 105-234), which exempted certain fasteners approved by the Federal Aviation Administration (FAA) from FQA coverage. Additional acts were released on June 8, 1999, which amended the FQA further (reference PL 106-34 and FQA Amendments Act of 1999). The amendments added clarification to "consensus standards" used for fasteners.

Requirements:

Fasteners shall be considered suspect/counterfeit or defective when they do not conform to nationally recognized consensus standards such as American Society for Testing Materials (ASTM), American Society of Mechanical Engineers (ASME), International Organization for Standardization (ISO), Society of Automotive Engineers (SAE), etc. This may include the failure to meet specific criteria such as marking (e.g., manufacturer identification), mechanical testing, or chemical composition requirements.

Fasteners that do not include a manufacturer mark but include a grade may be considered "suspect" and require further evaluation to determine if (1) the consensus standard requires a manufacturer marking; (2) the item meets the standard requirements; or (3) the item is defective, counterfeit, or fraudulent because it does not meet the consensus standard requirements (e.g., marking, mechanical, chemical requirements).

Additional Clarification:

Does a Manufacturer produced Fastener meet the Fastener Quality Act requirements?

1) Use resources such as US Patent and Trademark Office (USPTO) Fastener Quality Act reference site[1] and Department of Defense- DoD Specialty Metals Certification[2] website to identify the manufacturer from their insignia (if the item is marked);
2) Validate that the manufacturer is a registered fastener manufacturer by checking with the US Patent and Trademark Office (USPTO)- check fastener insignia here[3]. If they are not registered,

[1] USPTO Fastener Quality Act Reference Site is here: https://www.uspto.gov/trademarks/laws/fastener-quality-act-fqa/fastener-quality-act-fqa

[2] DoD Specialty Metals Certification website is here: https://www.indfast.org/info/specialty_metal_certifications.asp

[3] USPTO FQA Registry website is here: https://www.uspto.gov/sites/default/files/documents/FQA_Registry.pdf

then they must have a valid and current quality assurance management system from a Consensus Standard Organization- see #4 below FQA exclusions (e.g., ISO 9001);

3) Validate the fastener meets the grade requirements listed on the fastener such as marking, mechanical, and chemical (e.g., ASTM, ASME, ISO, SAE, etc.); and
4) Some fasteners fall under the **FQA exclusions** which means that they would not automatically be considered "fraudulent" or "suspect" if found to lack registration with the USPTO or meeting other FQA requirements. However, they may be considered suspect/counterfeit or defective if further evaluation such as chemical or mechanical testing concludes the item is substandard, or if the fastener is included on the "Legacy Fastener Headmark List" (see Attachment 1). NOTE: the fasteners in this attachment should be considered suspect/counterfeit and no further testing is required.

FQA exclusions include the following:

a. It is part of an assembly.
b. It is a spare or repair part and is packaged in quantities of 75 or less or that is a part contained in an assembly kit.
c. It is made according to ASTM A307 Grade A.
d. It is made to ASTM F432.
e. It is made under the oversight and/or requirements of the FAA.
f. It is manufactured in accordance with a Quality Management System from a Consensus Standard Organization (e.g., ISO).
g. It is a part made to a proprietary standard. A proprietary standard is a document or drawing provided by a fastener end user to describe a part. The document or print may make direct or indirect reference to a consensus standard and still is considered a proprietary standard.
h. It was manufactured before December 6, 1999 (per the Fastener Quality Act-FQA, Public Law-PL101-592).

Suspect/Counterfeit Indicators on Fasteners:

- Fastener is missing a manufacturer or grade mark (unless certified to a specification not requiring marking)
- Missing markings on nuts or washers packaged with labels indicating that they were manufactured to a consensus standard or military specification
- Head markings are marred, missing, or appear to have been altered
- Head markings are inconsistent with a heat and/or lot number or contain conflicting information
- Headmarks with raised marks and depressed marks on same fastener (not normal manufacturing process)
- Stamping contains metric and standard measurements or double stamping
- Evidence of machining marks
- Poor thread form, evidence of wear, or threads are not of uniform color or finish
- Coating/plating is incorrect or poor quality

Resources:

- Fastener Quality Act (FQA), Public Law (PL) 101-592
- National Technology Transfer and Advancement Act of 1995, (PL) 104-113
- (PL) 105-234, Fastener Quality Act Amendments Act of 1998
- (PL) 106-34, Fastener Quality Act Amendments Act of 1999
- US Patent and Trademark Office (USPTO)
- Suspect/Counterfeit Items Resource Handbook (DOE-HDBK-1221-2016)
- 15 USC Ch. 80: Fasteners
- S. 795 November 19, 1999, Senate Report 106-224
- DOE O 232.2A, Occurrence Reporting and Processing of Operations Information

Definitions & Acronyms:

Term	Definition	Reference
Counterfeit	Counterfeit Items that are intentionally manufactured, refurbished, or altered to imitate original product without authorization to be passed off as genuine.	DOE-HDBK-1221-2016, Suspect/Counterfeit Items Resource Handbook
Consensus Standard	A Consensus standard is a document that describes fastener characteristics published by a consensus standards organization, or a Federal Agency, and does not include a proprietary standard.	Fastener Quality Amendments Act of 1999
Consensus Standard Organization	Consensus standard organizations include: the American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI), the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers (SAE), the International Organization for Standardization (ISO), and any other organization identified as a United States consensus standards organization or a foreign and international consensus standards organization in the Federal Register (reference 61 Fed. Reg. 50582–83).	Fastener Quality Amendments Act of 1999
Defective	Any item or material that does not meet the commercial standard or procurement requirements as defined in such sources as catalogues, proposals, procurement specifications, design specifications, testing requirements, or contracts may be considered *defective*.	DOE O 232.2A, Occurrence Reporting and Processing of Operations Information
Fastener	Fasteners are a metallic screw, nut, bolt, or stud having internal or external threads, with a nominal diameter of 6 millimeters or greater, in the case of such items described in metric terms, or ¼ inch or greater, in the case of such items described in terms of the English system of measurement, or a load-indicating washer, that is through-hardened or represented as meeting a consensus standard that calls for through-hardening, and	15 USC Ch. 80: FASTENERS

Term	Definition	Reference
	that is grade identification marked or represented as meeting a consensus standard that requires grade identification marking. There are exceptions to this definition in accordance with the Fastener Quality Act.	
Fraudulent	Fraudulent items are those that are intentionally misrepresented with intent to deceive, including items provided with incorrect identification or falsified and/or inaccurate certification. They may also include items sold by entities that have acquired the legal right to manufacture a specified quantity of an item but produce a larger quantity than authorized and sell the excess a legitimate inventory.	DOE-HDBK-1221-2016, Suspect/Counterfeit Items Resource Handbook
Genuine	Genuine items are those that are produced and certified without the intent to deceive.	DOE-HDBK-1221-2016, Suspect/Counterfeit Items Resource Handbook
Head marking	Markings that are physically applied onto a fastener and may be used to provide traceability to the manufacturer, material/grade, and heat or lot numbers of the fastener. Markings may be required by the referenced material specification, standards, federal legal requirements, or procurement and contractual requirements.	New Definition
High-Strength	A fastener with a minimum tensile strength of 120,000 pounds per square inch (psi) or fasteners considered equivalent to a grade 5 would be considered *high-strength*.	FQA- Report Committee on Commerce, Science and Transportation S. 795 November 19, 1999, Senate Report 106-224
Manufacturer	A manufacturer is the person or source which fabricates the fasteners for sale in commerce.	15 USC Ch. 80: FASTENERS
Suspect	Suspect Items are where there is an indication or suspicion that they may not be genuine.	DOE-HDBK-1221-2016, Suspect/Counterfeit Items Resource Handbook

ATTACHMENT 1: LEGACY FASTENER HEADMARK LIST: MANUFACTURED PRIOR TO 1999

All fasteners listed below are identified as having been manufactured prior to 1999 and as a best practice should be considered suspect/counterfeit or defective and replaced without any further testing. Additional verification may be needed or conducted on fasteners prior to use. This may be especially true if a site is unsure if a fastener is considered a "legacy fastener" produced prior to 1999. Some of these listed fasteners may still be found in distributors' stock, inventories, or other points-of-sale and therefore may be provided in more recent procurements. It may be necessary to determine the date of manufacture, obtain certified material test reports (CMTRs), certificates of compliance (C of Cs), or other documentation of some of these fasteners to confirm they are not defective, suspect, counterfeit, or fraudulent. Additionally, if the fastener is determined to be one of these legacy fasteners and will be used, all of the following should be completed:

1) Validation or testing to ensure the fasteners meet requirements;
2) Marking or Tagging of the fasteners;
3) Documentation to demonstrate that testing/validation has occurred; and
4) Documentation maintained until the fasteners are removed from service.

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<tr><th>Grade A 325</th><th>Grade 5</th><th>Grade 8.2</th></tr>
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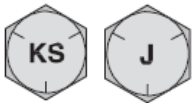
<td> 
</td>
<td> 
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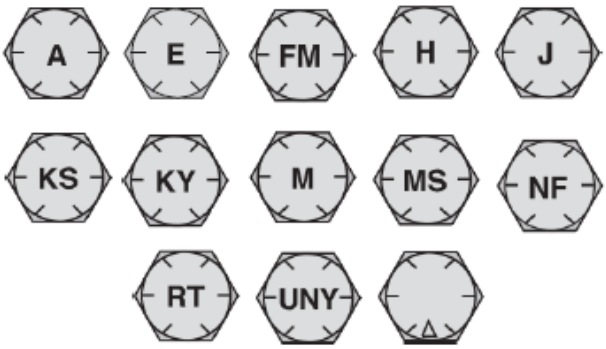
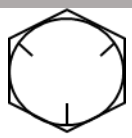
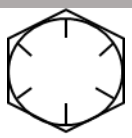
<td colspan="3"> 

Note: Hollow Triangle (Greater than 1/2-inch diameter)</td>
</tr>
</table>

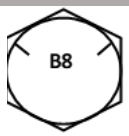
ATTACHMENT 2: EXAMPLES AND CASE STUDIES

Current Suspect Fastener Headmark Examples

High strength fasteners (e.g., tensile strength of grade 5 or around 120,000 psi or greater) that are missing manufacturer markings, such as those shown below, should be considered "suspect." Further evaluation should be conducted to conclude if they are substandard, defective, or counterfeit. NOTE: this is not a fully comprehensive list of "suspect" high-strength fasteners and are provided only as examples.

Grade 5	Grade 8
	
Metric 8.8	**Metric 10.9**
	

Fasteners that have dual non-compatible standards marked on the item should be treated as defective. See below for examples:

18-8 Stainless steel dual marked as "B8"	F593 marked as "B8"- there is no "B8" material type in this standard
	

Case Study #1

An 8.8 metric fastener ***without*** a manufacturer marking is identified on a ratchet strap. The fastener would be considered "suspect" until further analysis or testing could be conducted to prove that the item is defective or counterfeit. Testing on items such as bolts for ratchet straps may not be cost effective or feasible.

In this example, the 8.8 fastener is required, by ISO 898-1, *Mechanical Properties of Fasteners Made of Carbon Steel and Alloy Steel Part 1*, to have a manufacturer marking and would be considered nonconforming to that marking requirement. This can be determined visually and without testing. The fastener would require chemical and mechanical analysis to determine if the item is potentially counterfeit. A counterfeit fastener would likely mean that the material was misrepresented and that the item does not meet the specific standard (in this case ISO 898-1) and that the item is not capable of meeting its intended use. If the bolt were determined to not be counterfeit but was found to be defective, there is another quality issue that would impact the function or usability (e.g., shipping damage, improper installation, etc.). Both could pose a potential safety concern if the item were to continue to be used in a critical aspect, which is why fasteners that will continue to be used should be

evaluated, especially once other nonconformances are identified. Fasteners in assemblies are *excluded* under the Fastener Quality Act (FQA) from **automatic** determination as counterfeit and/ or fraudulent such as in the example of the ratchet strap, but items should still be evaluated to determine if they are adequate/safe for the intended use (i.e., use a graded approach).

Case Study #1 Reporting:

1) Report to the DOE Office of Inspector General (OIG) in accordance with DOE O 414.1(current), *Quality Assurance*. In case study #1, this item was found to be nonconforming and *suspect* due to the missing manufacturer marking. However, because the item is an assembly, further testing is required to confirm whether or not the item is substandard, counterfeit, or defective. Until further analysis is conducted (e.g., testing, documentation is obtained that indicate substandard material), the item is not required to be reported to the DOE OIG.

2) Report to the Occurrence Reporting and Processing System (ORPS) in accordance with DOE O 232.2(current), *Occurrence Reporting and Processing of Information*. Suspect/Counterfeit and Defective Items that meet the criteria of this order may be reportable to ORPS[4]. In the example of case study #1, if the ratchet strap was found in use, this is reportable to the ORPS system. If the ratchet strap was found in receipt inspection, then it would not be reportable to ORPS.

3) Report Operating Experience in accordance with DOE O 210.2(current), *DOE Corporate Operating Experience Program*. Suspect/Counterfeit and Defective Items operating experience such as best practices, lessons learned, or other information that may be valuable to the broader DOE enterprise may be reported using the DOE OPEXShare website at opexshare.doe.gov. Information regarding the ratchet strap and processes used to identify, remove, or any lessons gained may be shared with the broader DOE community.

4) Report to the Government-Industry Data Exchange Program (GIDEP)[5] in accordance with Federal Acquisition Regulation (FAR) 52.246-26, Reporting Nonconforming Items. If this FAR is included in a contract (e.g., contractor to DOE or subcontractor) then it would be a requirement to report certain nonconformances (major and critical) and report S/CI. The ratchet strap may be considered reportable depending on how the item is used (e.g., item failure could adversely affect the environment, safety, or health of the public or workers).

[4] https://www.energy.gov/ehss/occurrence-reporting-and-processing-system to learn more about the ORPS database.

[5] https://www.gidep.org/ to learn more about GIDEP.

Case Study #2

Surveillances and inspections of inventories and legacy equipment may aid in identifying suspect/counterfeit fasteners. In one such case, a DOE site was inspecting a legacy lift when they noticed that the lift had "KS" marked grade 5 bolts. These bolts are included on the legacy headmark list (Attachment 1). If these bolts were produced prior to 1999, they could be substandard. According to the Attachment 1, *Legacy Fastener Headmark List: Manufactured Prior to 1999*, items on this list should be removed from service. Testing may be conducted to determine safety/adequacy if items will continue to be used. Items produced after 1999 may also be tested to verify quality. Some of the manufacturers have improved the quality of their products since they were placed on the legacy headmark list. However, legacy materials that may be in stock or on older assembled components may have questionable quality.

In case study #2, this item is considered "suspect/counterfeit" per the Legacy Headmark List in Attachment 1.

Case Study #2 Reporting:

1) Report to the DOE OIG in accordance with DOE O 414.1(current). In case study #2, this item was found to be *suspect/counterfeit* due to the manufacturer marking being on the legacy headmark list (reference Attachment 1). If procurement / supplier information can be obtained or is known, then this item should be reported to the DOE OIG. If procurement information is unknown or information about potential suppliers is unknown, then item should not be reported to the DOE OIG. *Additional Legacy Fastener Reporting Example*: A legacy bolt was found in the back of closet, but no one knows when, where, or how it was procured or brought onto the DOE site, but it is suspect/counterfeit. This would *not* be reportable to the OIG since there is no information to investigate.

2) Report to ORPS in accordance with DOE O 232.2(current). Suspect/Counterfeit and Defective Items that meet the criteria of this order may be reportable to ORPS[6]. In the example of case study #2, the bolts were found on a legacy lift in which the item was in use and performed a function that could affect safety (i.e., lifting personnel or materials). This would be reportable to ORPS.

3) Report Operating Experience in accordance with DOE O 210.2(current). Information regarding the bolts and processes used to identify, remove, or any lessons gained may be shared with the broader DOE community.

[6] https://www.energy.gov/ehss/occurrence-reporting-and-processing-system to learn more about the ORPS database.

4) Report to GIDEP[7] in accordance with FAR 52.246-26, Reporting Nonconforming Items. The bolts should be considered for reporting to GIDEP since the item may adversely affect worker safety if it were to fail.

Case Study #3

A standard stainless-steel bolt sheared during a torquing operation causing concern that the bolt may be suspect/counterfeit. After verifying all the mechanical and chemical attributes of the bolt it was determined that the attributes were all in the ranges specified and there were not any other indications (other than the bolt shearing unexpectedly) that would cause suspicion that the item might be suspect/counterfeit. After further review it was found that the torquing operation was not conducted to manufacturers specifications which caused the bolt to shear. In this case the cause of the defect was of a controllable nature, therefore the item is ***not*** considered suspect or counterfeit. It is still a best practice to always review items for the potential of suspect or counterfeit when there is an unexpected failure, especially in systems where the item may be more critical.

Case Study #3 Reporting:

1) Report to the DOE OIG in accordance with DOE O 414.1(current). In case study #3, this would ***not*** be reportable to the DOE OIG.

2) Report to the Occurrence Reporting and Processing System (ORPS) in accordance with DOE O 232.2(current). Suspect/Counterfeit and Defective Items that meet the criteria of this order may be reportable to ORPS[8]. In the example of case study #3, this may be reportable to ORPS depending on the particular details surrounding the bolt shearing (e.g., did anyone get injured, was there a possibility of someone being injured, how was the overall end product going to be used and if the bolts sheared in use would this have injured anyone).

3) Report Operating Experience in accordance with DOE O 210.2(current). In this case, information may be shared with the broader DOE community.

4) Report to GIDEP[9] in accordance with FAR 52.246-26, Reporting Nonconforming Items. The bolts would not be reportable to GIDEP since the shearing was caused by an installation error and the manufacturers instructions were not followed.

If a suspect/counterfeit item is identified or if there are questions about potentially suspect/counterfeit fasteners, please contact counterfeit@hq.doe.gov.

[7] https://www.gidep.org/ to learn more about GIDEP.
[8] https://www.energy.gov/ehss/occurrence-reporting-and-processing-system to learn more about the ORPS database.
[9] https://www.gidep.org/ to learn more about GIDEP.