# Aerospace Materials, Processes and Hardware Practice Exam (Sample)

## Study Guide


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# Questions

**1. What should be avoided to prevent damage when removing fasteners with a screw extractor?**

**A. Using moderate RPM**

**B. Applying excessive twisting force**

**C. Consistently checking the drill bit**

**D. Using a proper extraction tool**

**2. What hazard can occur if scribers are used for marking-out fold lines and rivet patterns?**

**A. It leads to material wastage**

**B. It produces stress raisers that lead to cracking**

**C. It causes inaccurate markings**

**D. It dulls the scribers**

**3. What benefit do Avdel skin pins provide during assembly?**

**A. Low clamping pressure**

**B. High clamping pressure to multiple skins**

**C. Simple installation without tools**

**D. Adjustable clamping force**

**4. What is the risk of drilling completely through a solid rivet during removal?**

**A. It can cause structural weaknesses**

**B. It can enlarge the hole**

**C. It can snap the rivet**

**D. It can create debris**

**5. How do you determine the correct rivet length to use when working with a cherry grip gauge?**

**A. By measuring the diameter of the hole**

**B. By reading from the gauge where the front side of the structure coincides with the numbers**

**C. By securing the structure with a bolt**

**D. By counting the number of fasteners available**

**6. What are two common types of anchor nuts?**

**A. Box nuts and face nuts**

**B. Plate nuts and channel nuts**

**C. Hex nuts and lock nuts**

**D. Wing nuts and T-nuts**

**7. What is a safe practice when operating machinery in aircraft structures environments?**

**A. Work alone to avoid confusion**

**B. Be familiar with on/off/emergency buttons**

**C. Ignore the machine capacity**

**D. Alter machine settings for better productivity**

**8. What is the function of an installation drawing?**

**A. To specify material types**

**B. To show the assembling of parts or subassemblies**

**C. To illustrate the design of a part**

**D. To detail manufacturing processes**

**9. Which of the following is a precaution for curving/slip form rollers?**

**A. Wearing loose clothing**

**B. Keeping fingers clear of rollers and gears**

**C. Utilizing steel hammer for adjustments**

**D. Placing heavy items on the rollers**

**10. What measurement is used to identify the length of a rivet in its part number?**

**A. Measured in eighths of an inch**

**B. Measured in sixteenths of an inch**

**C. Measured in quarters of an inch**

**D. Measured in simple inches**

# Answers

**1. B**
**2. B**
**3. B**
**4. B**
**5. B**
**6. B**
**7. B**
**8. B**
**9. B**
**10. B**

# Explanations

## 1. What should be avoided to prevent damage when removing fasteners with a screw extractor?

**A. Using moderate RPM**

**B. Applying excessive twisting force**

**C. Consistently checking the drill bit**

**D. Using a proper extraction tool**

**When removing fasteners with a screw extractor, applying excessive twisting force should be avoided as it can cause several issues. The screw extractor is designed to grip and remove broken or damaged screws by using a reverse thread to allow for easy extraction. However, if too much twisting force is applied, it can cause the extractor to break, potentially leading to further complications such as additional damage to the fastener, the tool itself, or the surrounding material. Excessive force may also lead to stripping the threads of the fastener, making it even harder to remove. Proper techniques involve a moderate twisting force to ensure that the extractor can do its job without causing damage to either the extractor or the surrounding components. Additionally, using the right extraction tool, checking the drill bit, and operating at moderate RPMs contributes to a safer and more effective extraction process, reducing the chances of damaging the equipment or components involved.**

## 2. What hazard can occur if scribers are used for marking-out fold lines and rivet patterns?

**A. It leads to material wastage**

**B. It produces stress raisers that lead to cracking**

**C. It causes inaccurate markings**

**D. It dulls the scribers**

**Using scribers for marking-out fold lines and rivet patterns can create stress raisers in the material, which can potentially lead to cracking. Stress raisers are small notches, indentations, or scratches introduced into a component's surface that can concentrate stress in those areas during service loading. When the material is later subjected to bending, tension, or other forms of mechanical stress, these imperfections can become points where cracks initiate and propagate. In aerospace applications, where materials are often under high-stress conditions, ensuring a smooth and consistent surface is essential for structural integrity. Thus, the use of scribers—which may leave behind small grooves or scratches—can compromise the strength of the material, making it more susceptible to failure under operational conditions. The other options do not fully encompass the impact of using scribers in this context, as they relate to different aspects that do not directly address the potential for creating critical flaws in the material.**

## 3. What benefit do Avdel skin pins provide during assembly?

**A. Low clamping pressure**

**B. High clamping pressure to multiple skins**

**C. Simple installation without tools**

**D. Adjustable clamping force**

**Avdel skin pins are designed primarily for applications where high clamping pressure is required to securely fasten multiple layers of skin, such as in aircraft assembly. The benefit of high clamping pressure allows for the effective joining of fuselage and wing skins, minimizing any gaps and ensuring structural integrity and aerodynamic performance. This capability is crucial in aerospace applications where strength and reliability are paramount. By providing consistent and high clamping force, Avdel skin pins contribute to a robust assembly that can withstand the challenging conditions of flight, including stress and vibration. This feature helps to enhance the overall durability of the structure, ensuring that various components remain tightly secured over their operational lifespan, which is a significant consideration in aerospace design.**

## 4. What is the risk of drilling completely through a solid rivet during removal?

**A. It can cause structural weaknesses**

**B. It can enlarge the hole**

**C. It can snap the rivet**

**D. It can create debris**

**Drilling completely through a solid rivet during removal primarily poses the risk of enlarging the hole. When a rivet is drilled out, the idea is to remove just enough material to allow the rivet to be extracted without damaging the surrounding structure. If the drilling is taken all the way through the rivet, there is a high likelihood that the drill bit will also drill into the structure itself, increasing the diameter of the hole and potentially compromising the integrity of the workpiece. This enlarged hole can present significant issues, especially in aerospace applications where precision and material integrity are critical. An oversized hole may lead to difficulties in re-riveting or installing new fasteners, and it can affect the load distribution and mechanical properties of the assembly. Maintaining the correct size of the hole is vital for ensuring that the new rivet or fastener fits properly and does not weaken the join. Additional risks, such as creating structural weaknesses and debris, may occur as consequences of improper drilling, but they are not the primary concern when it comes to the immediate act of drilling through the rivet itself.**

## 5. How do you determine the correct rivet length to use when working with a cherry grip gauge?

**A. By measuring the diameter of the hole**

**B. By reading from the gauge where the front side of the structure coincides with the numbers**

**C. By securing the structure with a bolt**

**D. By counting the number of fasteners available**

**The correct method for determining the appropriate rivet length when using a cherry grip gauge involves reading from the gauge where the front side of the structure meets the measurement markings. The cherry grip gauge is specifically designed to provide an accurate measurement of the total material thickness that the rivet will need to grip. This ensures that the selected rivet length will adequately secure the materials being joined, preventing issues such as insufficient grip or protrusion beyond the expected surface. When using the gauge, the operator places it against the structure so that the front edge aligns with the base of the materials being fastened. The reading at this point indicates the required rivet length, which ensures a proper fit for effective structural integrity. In contrast, measuring the diameter of the hole or securing the structure with a bolt does not provide the necessary information about the total thickness of the materials that will be joined by the rivet. Counting available fasteners is unrelated to determining the correct rivet length, as it does not take into account the specifics of material thickness that the rivet must accommodate. Thus, reading the gauge at the correct point is the most reliable and accurate approach.**

## 6. What are two common types of anchor nuts?

**A. Box nuts and face nuts**

**B. Plate nuts and channel nuts**

**C. Hex nuts and lock nuts**

**D. Wing nuts and T-nuts**

**Plate nuts and channel nuts are indeed two common types of anchor nuts used in various applications, particularly in aerospace and structural engineering. Plate nuts are designed with a wider base that allows for more surface area contact, providing stability when secured to a surface. They are often utilized in environments where strength and vibration resistance are necessary because they distribute load effectively. This feature makes them ideal for applications where structural integrity is critical. Channel nuts, on the other hand, are designed to fit into pre-formed channels and provide a secure fastening point. They can be easily adjusted and repositioned within their channel, offering flexibility in assembly and installation. This makes channel nuts particularly advantageous in modular construction or maintenance scenarios where modifications may be needed frequently. Both types of anchor nuts are extensively used in the aerospace industry due to their ability to secure components reliably under various conditions, making them essential for ensuring the overall safety and performance of aerospace structures. This understanding of the functionality and design of plate nuts and channel nuts highlights why they are common choices in applications requiring secure fastening solutions.**

## 7. What is a safe practice when operating machinery in aircraft structures environments?

**A. Work alone to avoid confusion**

**B. Be familiar with on/off/emergency buttons**

**C. Ignore the machine capacity**

**D. Alter machine settings for better productivity**

**Being familiar with on/off/emergency buttons is essential for safe operation in aircraft structures environments. Understanding these controls allows operators to quickly stop machinery in case of an emergency or malfunction, significantly reducing the risk of accidents and injuries. It enhances situational awareness and ensures that the operator can respond effectively to any unexpected issues that arise while the machinery is in use. In an aircraft manufacturing or maintenance setting, the continuous operation of machinery and tools can involve various hazards, making it crucial for operators to know how to quickly and safely control the equipment. This knowledge not only enhances personal safety but also contributes to the overall safety of the workplace, as machinery operating without oversight or rapid response capabilities can lead to severe accidents affecting multiple personnel. Prioritizing safety measures, such as familiarization with machinery controls, plays a fundamental role in maintaining a safe working environment, especially in industries that deal with complex structures and materials, such as aerospace.**

## 8. What is the function of an installation drawing?

**A. To specify material types**

**B. To show the assembling of parts or subassemblies**

**C. To illustrate the design of a part**

**D. To detail manufacturing processes**

**An installation drawing serves the primary function of illustrating how various parts or subassemblies fit together during the assembly process. It provides a clear visual representation for technicians and engineers, indicating the specific orientation, positioning, and connections of the components. This is particularly critical in aerospace work, where precise assembly is essential for safety and functionality. Installation drawings help ensure that all assembly procedures are followed correctly, helping personnel understand how each piece integrates into the larger system. They often include references to other technical documents and can provide notes on installation guidelines, torque specifications, and any special tools required. This level of detail supports effective communication among team members and assists in maintaining quality control during the assembly phase. While specifications on material types, part designs, or manufacturing processes are important in their own right, they do not encompass the primary purpose of installation drawings. Understanding how to assemble parts accurately is vital for successful project execution in aerospace applications.**

## 9. Which of the following is a precaution for curving/slip form rollers?

### A. Wearing loose clothing

### B. Keeping fingers clear of rollers and gears

### C. Utilizing steel hammer for adjustments

### D. Placing heavy items on the rollers

**Keeping fingers clear of rollers and gears is essential for safety when working with curving or slip form rollers. These machines contain moving parts that can cause severe injuries if body parts come into contact with them. The risk of entrapment or crushing is significant, especially in high-speed operations. By ensuring that fingers and other body parts are kept at a safe distance, operators minimize the risk of accidents and maintain a safer work environment. The other options present potential hazards or are not advisable practices when operating machinery. For instance, wearing loose clothing could lead to entanglement in the moving parts of the rollers. Utilizing steel hammers for adjustments carries risks of damaging equipment or causing injury if a hammer slips. Placing heavy items on the rollers could affect the machine's balance and lead to malfunctions or operator strain, compromising safety. Therefore, maintaining a clear distance from rollers and gears is the most prudent precaution.**

## 10. What measurement is used to identify the length of a rivet in its part number?

### A. Measured in eighths of an inch

### B. Measured in sixteenths of an inch

### C. Measured in quarters of an inch

### D. Measured in simple inches

**The length of a rivet in its part number is indeed measured in sixteenths of an inch. This measurement system allows for precise specifications in aerospace applications, where accurate fit and strength are critical. Rivets are often standardized in different lengths, and using sixteenths of an inch provides a greater degree of granularity, enabling engineers and manufacturers to select rivets that meet the exact requirements for a specific application. In aerospace engineering, where safety, performance, and compatibility with other materials are paramount, the ability to identify rivets down to the sixteenth of an inch ensures that all components can work together effectively without compromising structural integrity. This level of detail in length measurement is essential for manufacturing processes and ensures adherence to strict aerospace standards.**