



Eight

Advantages

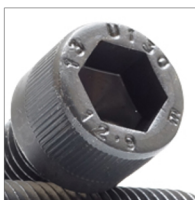
Unbrako has developed and maintained certain manufacturing advantages that continue to set us apart from all competition. The Unbrako unique features and benefits are as follows:

1 Higher Minimum Tensile Strengths



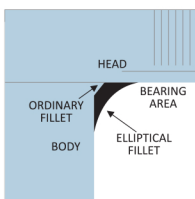
The ASTM A574 (inch and metric) specifications require minimum tensile strength of 180,000 psi through 1/2", and 170,000 psi for 5/8" sizes larger, and the appropriate metric equivalents as well as corresponding requirements for core hardness. Unbrako tensile specifications are 10,000 psi higher than standards - while maintaining the core hardness range. To exceed such standard, we had to exert extremely tight controls on our heat treatment process.

2 E-CODE™ Lot Code™ Head Markings



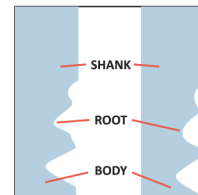
This patented alpha numeric head marking system allows each fastener to be traced to its original manufacturing lot, raw material chemistry, and performance test results. This marking system generates codes found on top of the heads of all inch and metric socket cap screws, 1/4" or 6mm and larger. It is the ultimate in product tracking.

3 Compound Fillet Radius



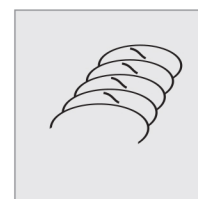
Each size of socket screw has a specially designed compound fillet radius that blends 2 different radii within the ASME B18.3 standard fillet "envelope". This design change alone is responsible for doubling tension-tension fatigue life, the most common loading in application.

4 Radiused Root Thread Runout



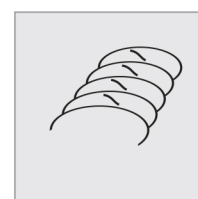
Thread specs MIL-S-8870 for aircraft fasteners state that the run-out threads must have root radii as large or larger than the normal root radius of the threads. The purpose was to strengthen the specific area where most fastener failures occurred. Though this type of requirement never became a commercial fastener standard, Unbrako saw the merits of this technological advancement & decided to make a standard feature on all its socket cap screws.

5 "WR" Thread Form



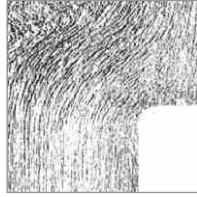
This is an exclusive Unbrako design. "WR" stands for WIDE ROOT. "WR" provides the strongest UNR thread form with the greatest opportunity to maximize fatigue resistance. It is achieved by first making the root of the thread as wide as the USTS permits, and then by restricting the tolerance of the root radius to the upper, largest 30% of the specification. Only by having our own thread roll die manufacturing plants can we implement such a design.

6 Etching for Thread Laps



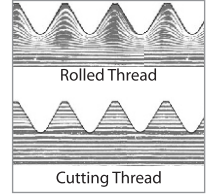
When threads are rolled onto our products, random samples are being etched in heated acid, & then examined under a stereo microscope to detect flaws such as thread laps. Tedious microscopic reviews are the best way to detect thread laps and their unwanted consequences: fatigue cracking which leads to fastener failures. Because of these efforts, we can certify to ASTM F788, Supplemental Requirement S1, for assemblies subject to severe dynamic stresses on all Unbrako socket cap screws.

7 Forged Heads & Hex Sockets



In all sizes, the ASTM A574 (inch and metric) specifications permit hex sockets to be forged or machined. All Unbrako socket cap screw heads and their hex sockets are forged, resulting in increased strength, better installation ability, and a longer product life.

8 Rolled Threads



Cut threads interrupt the grain flow of the material and result in weaker threads. Conversely, roll threads compresses the material's grain flow and enhances fatigue resistance. Because of that benefit, all Unbrako socket cap screws are roll threaded.

These EIGHT ADVANTAGES set Unbrako apart from any other socket cap screw manufacturer.

Additionally, we run in-process Statistical Process Control on selected, dynamic dimensional characteristics of our products. However, as a check-and-balance, we also perform a Final Inspection on random samples taken from each lot. We also perform a full compliment of laboratory tests, as required by ASTM specifications - including decarburization, hardness, and wedge tensile strength. We are very proud to be registered to the International Quality System, ISO 9001 since 1996.