

PRODUCT ENGINEERING BULLETIN

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Standard Inch Socket Head Cap Screws Are Not Grade 8 Fasteners

There is a common, yet reasonable, misconception that standard, inch, alloy steel socket head cap screws are “Grade 8”. This is not true. The misconception is reasonable because “Grade 8” is a term generally associated with “high strength” fasteners. A person desiring a “high strength” SHCS may request a “Grade 8 SHCS”. This is technically incorrect for standard SHCSs. The term Grade 8 defines specific fastener characteristics which must

be met to be called “Grade 8”. Three of the most important characteristics are not consistent with requirements for industry standard SHCSs: tensile strength, hardness, and head marking. Some basic differences between several fastener classifications are listed below. The list is not comprehensive but intended to provide a general understanding. SHCSs can be manufactured to meet Grade 8 requirements on a special order basis.

Fastener Designation	Grade 2	Grade 5	Grade 8	Industry SHCS	Unbrako SHCS
Applicable Standard	SAE J429	SAE J429	SAE J429	ASTM A574	ASTM A574 SPS-B-271
Strength Level, UTS KSI, min.	74 (1/4-3/4) 60 (7/8 - 1 1/2)	120 (1/4 - 1) 105 (1 1/8 - 1 1/2)	150 (1/4 - 11/2)	180 (≤1/2) 170 (> 1/2)	190 (≤ 1/2) 180 (> 1/2)
Hardness, Rockwell	B80-B100 B70-B100	C25-C34 C19-C30	C33-C39	C39-C45 C37-C45	C39-C43 C38-C43
General Material Type	Low or Medium Carbon Steel	Medium Carbon Steel	Medium Carbon Alloy Steel	Medium Carbon Alloy Steel	Medium Carbon Alloy Steel
Identification Requirement	None	Three Radial Lines	Six Radial Lines	SHCS Configuration	Mfr’s ID
Typical Fasteners	Bolts Screws Studs Hex Heads	Bolts Screws Studs Hex Heads	Bolts Screws Studs Hex Heads	Socket Head Cap Screws	Socket Head Cap Screws