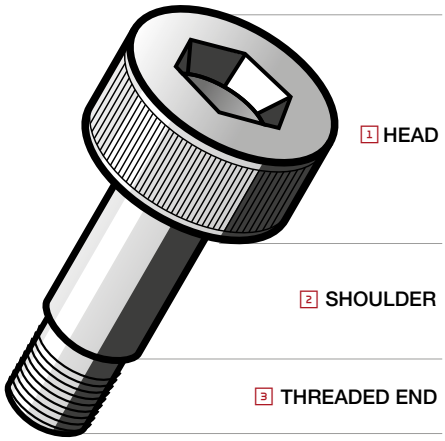
Socket Shoulder Screws –
Precision Fasteners with Mechanical Function

Socket shoulder screws (also called **shoulder bolts or stripper bolts**) are specialised precision fasteners that also function as mechanical components. The defining feature is a **smooth, unthreaded shoulder** between the head and the threaded portion. This shoulder provides a precision bearing surface, spacer, or alignment datum while the threaded portion secures components.



Key Structural Features

A typical shoulder screw consists of three main parts:

1. **Head.** Often **hex socket** (Allen) or **hex drive** for positive torque control and ease of installation.
2. **Shoulder.** A smooth, cylindrical section larger than the threaded portion; serves as a bearing surface or guide.
3. **Threaded Shank.** Secures the assembly; available in both **metric** and **imperial** sizes.

What Shoulder Screws Are Used For

Because the shoulder acts as both a guide and a bearing, shoulder screws are ideal in assemblies requiring **controlled movement, precise alignment, or repeatable positioning.**

Common Engineering Uses:

- **Pivots & Hinges.** Smooth rotation in linkages, robotic joints, and swing mechanisms.
- **Locating / Dowelling.** Repeatable alignment for modular or multi part assemblies.
- **Bushings & Bearing Surfaces.** Support sliding or rotating elements (shafts, wheels, cams).
- **Motion Control.** Accurate motion guidance in cams, sliders, or guides.
- **Punch & Die Sets / Tooling.** Maintain spacing and alignment under repeated loading.

Why Shoulder Screws Are Specified

Shoulder screws are not simply fasteners, they are **functional mechanical elements** integrated into assemblies.

- **Precision & Alignment.** The smooth shoulder provides consistent spacing and highly accurate positioning, critical in high tolerance designs.
- **Controlled Movement.** Unthreaded shoulder surfaces reduce friction for smoother rotation or sliding compared with threaded bolts.
- **Structural Strength.** When manufactured from high strength materials, they handle significant shear and bending loads.
- **Dual Function.** Combine fastening and mechanical guidance in one part — reducing parts count and simplifying assembly.

Materials & High Strength Options

Socket Shoulder Screws comes in a range of materials and strength grades suited to different environments and load conditions:

- **Alloy & Heat Treated Steel,** including **Class 12.9.** For high strength, heavy duty applications where shear and bending loads are significant.
- **Stainless Steel** (e.g. T304 & T316). Enhanced corrosion resistance; ideal for outdoor, coastal, or corrosive environments.
- **Other Alloys.** Specific materials may be sourced based on application requirements.

Class 12.9 options **within the Milsons range** provide **high tensile strength and hardness**, making them suitable for tooling, machinery linkages, and applications where strength cannot be compromised.

Metric and Imperial Availability

Milsons stocks shoulder screws in both metric and imperial formats, enabling compatibility with both international and legacy equipment standards:

- **Metric Diameters & Lengths.** Typically specified in M-series (e.g., M6, M8, M10) with matching shoulder and thread proportions.
- **Imperial Sizes.** Inch based formats for older machinery, tooling, or equipment with imperial specifications.

Both systems include matching **hex drive heads** (socket or hex) and thread classes suited to engineering applications.

Selection & Specification Guidance

When choosing a shoulder screw, consider:

- **Shoulder Diameter & Length.** Controls bearing surface and spacing requirement.
- **Thread Size & Pitch.** Ensures secure engagement without interference with moving surfaces.
- **Material & Finish.** Matches expected environmental conditions (e.g. corrosion resistance or high strength requirement).
- **Drive Style.** Hex or socket head contributes to ease of installation and torque control.

Engineering teams often specify tighter tolerances on shoulder diameter and concentricity when the shoulder functions as a shaft or bearing surface.

Conclusion

Socket shoulder screws are a versatile class of fasteners that also serve **mechanical functions** — providing precision alignment, motion control, and structural reliability. Milsons' range of **hex drive, Class 12.9 high strength, metric and imperial** shoulder screws supports robust design and dependable performance in engineering, tooling, robotics, machinery, and precision assemblies.

Explore Milsons' Socket Shoulder Screw range here:

https://milsons.co.nz/product-category/socket-head/socket-shoulder-screws/