

Set Screw Application Guide

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Common Set Screw Applications

Application	Typical Size	Point Style	Key Requirements
Shaft collars on steel shafts	#10 to 3/4"	Cup Point	Dimple acceptable, multiple screws for heavy loads
Pulleys and sprockets on power transmission	1/4" to 3/4"	Cone Point (pre-drilled)	High torque capacity, threadlocker essential
Gear mounting on shafts	1/4" to 1"	Dog Point (drilled hole)	Highest shear strength, precise positioning critical
Machine knobs and handles	#6 to 1/4"	Flat or Oval	Easy adjustment, minimal shaft marking
Linear bearing mounting	#8 to 3/8"	Cup Point	Proper alignment, multiple screws for stability
Aluminum or brass components	#6 to 3/8"	Oval or Nylon	Prevent deformation, reduced torque values

Project Example 1: Mounting Pulley on Motor Shaft

Objective: Securely mount V-belt pulley on 1/2" motor shaft for power transmission

Selected Hardware:

- Pulley with two 1/4"-20 tapped holes, 90° apart
- Two 1/4"-20 × 1/2" socket head set screws, cone point
- Medium-strength threadlocker (Loctite 243)

Preparation:

1. Pre-drill two cone point dimples in shaft at 90° spacing
2. Use 118° center drill, 0.375" deep
3. Clean shaft and dimples thoroughly
4. Degrease tapped holes in pulley hub

Installation:

1. Slide pulley onto shaft to desired position
2. Rotate pulley so set screw holes align with dimples
3. Apply small drop of threadlocker to each set screw
4. Thread set screws by hand into tapped holes
5. Tighten first screw to 50 in-lbs (partial torque)
6. Tighten second screw to 50 in-lbs
7. Final tighten first screw to 65 in-lbs (full torque)
8. Final tighten second screw to 65 in-lbs

Result: Secure pulley mounting capable of transmitting 5+ HP with no slippage under load

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Project Example 2: Adjustable Stop on Linear Guide Rail

Objective: Create adjustable mechanical stop on precision linear rail system

Selected Hardware:

- Aluminum stop collar with #10-24 tapped hole
- #10-24 × 3/8" socket head set screw, flat point
- No threadlocker (requires frequent adjustment)

Installation:

1. Slide stop collar onto rail to approximate position
2. Insert flat point set screw and snug by hand
3. Adjust collar to precise position with position gauge
4. Tighten set screw to 18 in-lbs (reduced for aluminum)
5. Test carriage stop function
6. Fine-tune position if needed by loosening and readjusting

Advantages of Flat Point:

- Allows repeated position changes without marking rail
- Easy loosening and repositioning
- Adequate holding for moderate forces
- Rail remains smooth for other applications

Note: For permanent installation, switch to cup point with higher torque

Multiple Set Screw Configurations

Number of Set Screws	Angular Spacing	Load Distribution	Best For
1	N/A	100% on single point	Light duty, temporary, adjustable applications
2	90° or 180° apart	50% each (opposing)	General purpose, moderate loads
3	120° apart	33% each (triangular)	Heavy loads, high torque, stability
4	90° apart	25% each (square)	Maximum security, critical applications

Tightening Pattern: Always tighten multiple set screws in a star/cross pattern to distribute clamping force evenly.

Threadlocker Usage Recommendations

Application Type	Threadlocker	Reason
Rotating machinery (pulleys, gears)	Required - Medium strength (243)	Prevent vibration loosening
High RPM applications	Required - Medium strength (243)	Centrifugal forces cause loosening
Static, non-vibration assemblies	Optional	Not usually necessary
Frequently adjusted positions	None	Prevents easy repositioning
Outdoor/weather exposure	Recommended - Medium strength	Prevents corrosion seizure
Temperature cycling applications	Required - High temp formula	Thermal expansion/contraction

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Application Best Practices

Shaft Material Considerations:

- **Steel shafts:** Cup or cone point standard choice, full torque values apply
- **Aluminum/brass:** Use oval or nylon point, reduce torque by 30-40%
- **Hardened steel:** Cone point may not bite well - consider dog point in drilled hole
- **Precision ground:** Nylon pellet or flat point to preserve finish

Load Type Optimization:

- **Pure torsion (torque):** Cone point in dimple or dog point in hole
- **Axial loads:** Multiple set screws, cone or dog point
- **Combined loads:** 3-4 set screws, cone or dog point, threadlocker
- **Light holding only:** Single cup or flat point adequate

Access and Adjustment:

- Consider hex key accessibility during assembly
- Ball-end hex keys help with angled access
- Plan for future disassembly requirements
- Mark positions if adjustment needed later
- Use flat point if frequent repositioning expected

Safety Factors:

- Set screws are NOT rated for overhead lifting - use properly rated hardware
- Never rely solely on friction - match point to material
- Inspect regularly in critical applications
- Replace if threads damaged or socket rounded
- Use safety wire in aerospace or high-consequence failures

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