



Mechanical Foundations Course Glossary

This glossary provides key terms and definitions used throughout the TC3 Mechanical Foundations course across all four modules. It is designed to support learners in understanding essential concepts and reinforce consistent terminology.

- **Bolt** - A threaded fastener used to join two or more parts together, typically with a nut or in a tapped hole.
 - **Torque-to-Yield (TTY) Bolt** - A bolt designed to stretch permanently during installation to produce a consistent clamping force and typically replaced after removal.
- **Bolt Grade** - A classification that indicates a bolt's strength and mechanical properties.
- **C-Clip (E-Clip)** - A retaining clip that fits into a groove on a shaft to keep components in place while allowing them to rotate or pivot.
- **Clamping Force** - The force that holds two or more components tightly together after a fastener is tightened.
- **Cotter Pin** - A bent metal pin inserted through a castellated nut and a drilled bolt or shaft to help prevent the nut from loosening.
- **Energy** - The ability to do work.
- **Fastener** - A category of hardware used to securely join or hold parts and components together.
- **Fastener Grade** - A designation that identifies the strength and load capacity of a fastener.
- **Flow** - The movement of fluid through a system.
- **Fluid** - A substance that flows when force is applied and takes the shape of its container.
- **Fluid Dynamics** - The study of fluids in motion.
- **Fluid Mechanics** - The study of fluids and how forces affect their behavior.
- **Fluid Power** - The use of pressurized fluids to transmit and control power.
- **Fluid Statics** - The study of fluids at rest.

- **Force** - A push or pull on an object, measured in newtons (N).
- **Friction** - A force created when two surfaces rub against each other. It can help or hinder movement.
- **Fulcrum** - The point where the lever pivots.
- **Galvanic Corrosion** - Corrosion that occurs when two dissimilar metals come into contact in the presence of an electrolyte.
- **Head** – The top portion of a screw or bolt.
- **Hydraulic Fluid** – A nearly incompressible liquid that transmits power while also helping lubricate and cool hydraulic system components.
- **Hydraulic System** – A fluid power system that uses pressurized liquid to transmit power and create mechanical motion.
- **Hydraulics** - The use of pressurized liquid to transmit power and create mechanical motion.
- **Input Force (Effort)** - The force applied to a lever to move or lift a load.
- **Kinetic Energy** - The energy of motion. Examples include a moving bus or a rotating wheel.
- **Lever** - A simple machine that helps lift or move a load by increasing the force you apply.
 - **First-Class Lever** - A lever in which the fulcrum is located between the effort and the load. Examples include a pry bar, crowbar, and scissors.
 - **Second-Class Lever** - A lever in which the load is located between the fulcrum and the effort. Examples include a wheelbarrow, bottle opener, and hand truck.
 - **Third-Class Lever** - A lever in which the effort is located between the fulcrum and the load. Examples include a shovel, broom, tweezers, and the human forearm.
- **Mechanical Advantage** - The ability of a simple machine to multiply the force you apply, making work easier and more efficient.
- **Motion** - A change in an object's position over time.
- **Newton's First Law (Law of Inertia)** - An object at rest stays at rest, and an object in motion stays in motion unless acted upon by an external force.
- **Newton's Second Law (Law of Force and Acceleration)** - The amount of force needed to move an object depends on its mass and acceleration.

- **Newton's Third Law (Law of Action and Reaction)** - For every action, there is an equal and opposite reaction.
- **Nut** - A fastener with internal threads that is used with a bolt to clamp components together.
 - **Castellated Nut** - A slotted nut used with a cotter pin to help prevent loosening in critical applications.
 - **Hex Nut** - A six-sided nut with internal threads that is used with a bolt to securely fasten components together.
 - **Lock Nut** - A nut designed to resist loosening caused by vibration, often by using a nylon insert or other locking feature.
 - **Wing Nut** - A nut with two wings that allows it to be tightened or loosened by hand without tools.
- **Output Force (Load)** - The force exerted by a lever on the object being moved or lifted.
- **Pascal's Law** – A principle stating that pressure applied to a confined liquid is transmitted equally in all directions.
- **Physics** - The study of matter, energy, motion, and the forces that affect how objects move and interact.
- **Pilot Hole** - A small hole drilled before installing certain screws to improve alignment and reduce material damage.
- **Pneumatic System** – A fluid power system that uses compressed air or gas to transmit power and create mechanical motion.
- **Pneumatics** - The use of compressed air or gas to transmit power and create mechanical motion.
- **Potential Energy** - Stored energy that is ready to do work. Examples include compressed air and a charged battery.
- **Power** - A measure of how quickly work is done.
- **Pressure** - Force applied over a given area.
- **Resistance** - Any force that opposes motion. Friction is one type of resistance.
- **Retaining Hardware** - Hardware used to hold components in place when threaded fasteners are not practical or when movement is required.
- **Safety Wire** - Wire threaded through drilled fasteners to help prevent them from loosening in safety-critical applications.

- **Screw** – A cylindrical fastener with threads used to secure objects together.
 - **Anti-tamper Screws** – Screws designed to help prevent unauthorized access to equipment, panels, or components.
 - **Hex Washer Screw** - A screw with a hexagonal head and an integrated washer that distributes clamping force.
 - **Machine Screw** - A threaded fastener commonly used in mechanical and electrical assemblies designed to be used with a tapped hole or a matching nut.
 - **Self-Drilling Screw** - A screw with a drill-bit-shaped tip that drills its own hole and forms threads during installation.
 - **Self-Tapping Screw** - A screw that cuts or forms its own mating threads as it is installed.
- **Shank** - The smooth portion of a bolt or screw between the head and the threaded section.
- **Snap Ring** - A retaining ring installed in a groove on a shaft or inside a housing to prevent components from moving out of position.
- **Spring Clip** - A bent metal fastener that uses spring tension to retain or position components.
- **Staple** - A U-shaped fastener commonly used to secure non-structural materials such as upholstery, insulation, or fabric.
- **Tapped Hole** - A hole with internal threads that accepts a bolt or machine screw.
- **Tensile Strength** - The maximum pulling force a material can withstand before breaking.
- **Thread** - The ridge on a bolt, screw, or nut that allows threaded fasteners to engage and clamp components together.
 - **Coarse Threads** - Threads with a larger pitch that are faster to install and less likely to cross-thread.
 - **Fine Threads** - Threads with a smaller pitch that provide greater clamping force and tensile strength.
- **Thread Locker** - A liquid adhesive applied to fastener threads to help resist loosening caused by vibration.
- **Thread Pitch** - The distance between adjacent threads on a fastener.
- **Torque** - A turning force applied to tighten or loosen a fastener.
- **Torque Specification** - The manufacturer's recommended amount of tightening torque for a fastener.

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- **Washer** - A thin disc placed under a bolt head or nut to distribute load, protect surfaces, or help resist loosening.
 - **Fender Washer** - A flat washer with a large outside diameter that distributes load over a wider surface area.
 - **Flat Washer** - A washer used to distribute clamping force over a larger surface area and help protect the material being fastened.
 - **Nord-Lock Washer** - A two-piece locking washer system that helps maintain bolt tension in high-vibration applications.
 - **Split Lock Washer** - A helical washer that helps maintain tension and resist fastener loosening caused by vibration.
 - **Star Washer** - A toothed washer that increases grip by biting into the mating surface to help resist loosening.

- **Work** - The transfer of energy that occurs when a force moves an object over a distance. $\text{Work} = \text{Force} \times \text{Distance}$.