

Appendix A: Energy Forms, Energy Sources, and General Lockout Guidelines

Energy Form	Energy Source	General Lockout Guideline
Electrical Energy	• Power transmission lines • Machine power cords • Motors • Solenoids • Capacitors (stored electrical energy) <i>Examples: machines located in technical shops, electrical panels, stored electrical energy found in HVAC equipment.</i>	• Turn off power at machine first (i.e. at point at operation switch) and then at main disconnect switch for the machine • Lock and tag main disconnect switch (or remove fuses from box, and then lock and tag box) • Fully discharge all capacitive systems (e.g., cycle machine to drain power from capacitors) according to manufacturer's instructions
Hydraulic Energy	• Hydraulic systems (e.g., hydraulic presses, rams, cylinders, hammers) <i>Examples: elevators and other vertical lifts; auto hoists and engine cranes.</i>	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves • Bleed off and blank lines as necessary
Pneumatic Energy	• Pneumatic systems (e.g., lines, pressure reservoirs, accumulators, air surge tanks, rams, cylinders) <i>Examples: bearing press and tire machine found in auto shops</i>	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves • Bleed off excess air; if pressure cannot be relieved, block any possible movement of machinery

Kinetic Energy	• Blades • Flywheels • Materials in supply lines of bins or silos <i>Examples: rotating blades on exhaust fans, air handling unit supply and return fans.</i>	• Stop and block machine parts (e.g., stop flywheels and ensure they do not recycle) • Review entire cycle of mechanical motion, ensure that all motions are stopped • Block material from moving into area of work; blank as required
Potential Energy (stored energy that an object has the potential to release due to its position)	• Springs (e.g., in air brake cylinders) • Actuators • Counterweights • Raised loads • Top or moveable part of a press or lifting device <i>Examples: overhead “roll up” doors, loaded engine stand, pneumatic spring valves.</i>	• If possible, lower all suspended parts and loads to the lowest (rest) position • Block parts that might be moved by gravity • Release or block spring energy
Thermal Energy	• Supply lines • Storage tanks and vessels <i>Examples: water, steam and gas lines, boilers, hot water tanks</i>	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves • Bleed off excess liquids or gases; blank lines as necessary

Reference: Workplace Safety and Prevention Services, Lockout Information, February 2020