



Energy Control Procedure

AIR COMPRESSORS

Department: Facilities and Services	
Prepared by: H2M	Date: 3/5/10
Approved by:	Date:
Purpose	
To provide correct procedure for lock out/tag out of machinery and equipment. This procedure shall protect employees from unexpected energizing or startup of the equipment, and/or the release of hazardous energy during service or maintenance of equipment.	
Scope	
This procedure shall be followed when performing service or maintenance on the following equipment.	
Building:	All
Location:	Various
Equipment:	Air Compressors (Air Cooled; Water Cooled; Direct Driven; Belt Driven)
Energy Sources/Hazards (Check all that apply and describe). Note: Energy Can Be Stored	
<input checked="" type="checkbox"/>	Electrical: 120/208 OR 480 Volts, Primary and/or Standby Sources
<input checked="" type="checkbox"/>	Mechanical: motor, pulley, belts, shaft
<input checked="" type="checkbox"/>	Pressurized (hydraulic, pneumatic, other): pneumatic
<input type="checkbox"/>	Chemical: N/A
<input type="checkbox"/>	Thermal: N/A
<input type="checkbox"/>	Radiation (ionizing, non-ionizing):
Authorized Employees (Title)	
The following employees are authorized to implement this procedure (add additional pages if needed).	
1.	5.
2.	6.
3.	7.
4.	8.
Lock out Tag out Steps	
<input type="checkbox"/>	<p>(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.</p> <ul style="list-style-type: none"> • Contact the Building Manager and issue a Service Interruption Notice for all other potential affected individuals who may be in the area. • If Air Compressor is serving equipment in areas with specific critical compressed air requirements, notify person in charge of area and require that person to secure any critical materials present. Area should be isolated and access restricted (e.g. room shall be closed and posted) during servicing or maintenance.
<input type="checkbox"/>	<p>(2) Review the type and magnitude of the energy sources involved with this machine or equipment with affected employees.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> • The Air Compressor shaft, pulley and/or belt may continue to spin from residual energy. • Ensure that any secondary equipment related to the equipment being shut down has been shut off or otherwise isolated. • Wear appropriate PPE as may be required for the hazard(s) encountered.
<input type="checkbox"/>	<p>(3) If the machine or equipment is operating, shut it down by normal stopping procedure.</p> <ul style="list-style-type: none"> • Identify the Air Compressor unit number located on the Air Compressor. • Locate the electrical disconnect switch if present. • Locate MCC panel or distribution panel.

	<ul style="list-style-type: none"> • Depress the stop button, if present. • Unplug from power receptacle, if present.
<input type="checkbox"/>	<p>(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source.</p> <ul style="list-style-type: none"> • Turn off power at MCC or distribution panel for corresponding Air Compressor. Place a lock and tag on shutdown device (eg. Circuit breaker; MCC switch, or Plug) • Open the disconnect switch for the corresponding Air Compressor, if present. Place a lock and tag on the disconnect switch.
<input type="checkbox"/>	<p>(5) Ensure that the equipment is disconnected from the energy source by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other operating control to make certain the equipment will not operate.</p> <ul style="list-style-type: none"> • Depress start button for Air Compressor, if present, to verify power is off. • When visual confirmation that the equipment has been de-energized is not possible, a qualified person (see note below) shall use appropriate meter to ensure that there is no voltage. If voltage is found on the motor, return to step #3 to locate the appropriate power source. • If start/stop buttons are present, after verifying power is off, depress off button again. <p>Note: A qualified person is a person designated by the employer as having the training, knowledge and experience for that job function.</p>
<input type="checkbox"/>	<p>(6) Ensure that all belts, motors, pulleys and shafts have come to a complete stop.</p>
<input type="checkbox"/>	<p>(7) Isolate Air Compressor from the system it serves.</p> <ul style="list-style-type: none"> • Close valve on compressed air supply side of Air Compressor (after compressed air storage tank, if present). Place a lock and tag on the closed valve. • Close valve on cooling water supply to Air Compressor, if present. Place a lock and tag on the closed valve. • Close valve on cooling water return from Air Compressor, if present. Place a lock and tag on the closed valve. • If Air Compressor cannot be isolated individually (where a valve on the supply side of the Air Compressor does not exist), trace supply lines to nearest isolation valves, close them, and place a lock and tag on the closed valves. Lock out and tag out all equipment on the system upstream of the isolation valves. • If there are no isolation valves on entire system, follow appropriate lock out tag out procedures for all equipment associated with the system. • The Air Compressor is now isolated.
<input type="checkbox"/>	<p>(8) Dissipate any residual hydraulic or pneumatic energy.</p> <ul style="list-style-type: none"> • Open bleed off valves, or find an alternate means of discharging compressed air from isolated portion of system (i.e. compressed air tank and piping back to Air Compressor). • Open drainage valves for cooling water, or find an alternate means of discharging fluid from isolated portion of system. Allow fluid to drain to floor drains, or find other appropriate means of removal (e.g. hoses attached to drain; buckets under drain). • Do not stand in front of bleed off valve or drain when opening as residual pressure in the system could result in the forceful ejection of air and/or liquid and particulates. • Once all air/ liquid has been bled off, place a lock and tag on the opened valve. • Should flow of air from bleed off valve or water drain fail to cease, Step (7) shall be repeated through valve exercising to properly isolate the Air Compressor. If flow from the bleed off valve or drain still fails to stop, consult with a supervisor to determine if valve replacement or other methods of isolation will be required.
<input type="checkbox"/>	<p>(9) Remove any guards necessary for maintenance or repairs.</p> <ul style="list-style-type: none"> • Lock and tag a securing device to the Air Compressor shaft as field conditions allow. The intent is to prevent the spinning of the shaft due to residual energy present in the system after turning off the motor (e.g. a chain or cable wrapped around the pulley and attached to a stationary object of sufficient size to prevent rotation of pulley). CAUTION: Release tension in pulley belts and avoid pinch points between the belt and pulley when removing and installing belts.

<input type="checkbox"/>	<p>(10) The machine or equipment is now locked out.</p>
<input type="checkbox"/>	<p>(11) In situations where the lock out or tag out devices must be temporarily removed from the energy isolating device and the machine/equipment energized to test or position the machine, equipment or component thereof, the employee must follow the following steps:</p> <ul style="list-style-type: none"> • Clear the machine of all tools and materials to ensure the machine is operationally in tact. • Remove all employees from the machine/equipment area. • Restore equipment to normal operating condition, with all normal safety precautions in place. • Remove the lock out or tag out devices. • Energize and proceed with testing or positioning. • Once completed with testing/positioning, install lock out and tag out devices.
<p>Procedure to Restore Equipment to Service</p>	
	<p>When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.</p>
<input type="checkbox"/>	<p>(1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.</p> <ul style="list-style-type: none"> • Restore equipment to normal operating condition, with all normal safety precautions in place.
<input type="checkbox"/>	<p>(2) Check the work area to ensure that all employees are safely positioned or removed from the area.</p>
<input type="checkbox"/>	<p>(3) Remove the lock out devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergizing of the machine or equipment before safe removal.</p>
<input type="checkbox"/>	<p>(4) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.</p>
<input type="checkbox"/>	<p>(5) The machine or equipment is now back in service.</p>