

TO 001 Preventing unexpected start-up

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1 Definition

These instructions apply to the Kemi-Tornio mine/plant areas. The instructions shall be followed in all cleaning, service and maintenance tasks performed on machines and equipment. Working or moving in the danger zones of machines and equipment is prohibited until unexpected start-up has been prevented.

The instructions and operating method of preventing unexpected start-up (LOTOTO=Lock Out, Tag Out, Test Out) must be adhered to at all times throughout the day. Machines/equipment must be isolated from all sources of energy before service, maintenance, or cleaning. The requirements apply to all Outokumpu employees, contractors, and visitors.

The purpose of the instructions is to protect personnel from the unexpected start-up of a machine or equipment when working in the danger zone of the machine or equipment, or from the release of dangerous energy.

2 Unexpected start-up

Unexpected start-up refers to a start-up caused by the following, for example:

- malfunction of the control system
- returning supply of energy

- accidental start-up command (including the start-up of an adjacent machine)
- the release of a flowing agent (e.g. chemicals) into the work site
- a normal start-up of the automation system may also be unexpected from the point of view of the person present at the work site.

The work site should be rendered safe in a zero-energy state before starting work. Rendering the work site safe covers the entire working environment.

These instructions cover the key hazards related to unexpected start-ups, the prevention thereof, the related operating model and management of safety interlocks, as well as action in various exceptional situations.

3 Operating model and safety interlocks

Work order /work permit (a written or verbal work permit)

- The work site is defined verbally, in a work order, work instructions or a work permit.

Registering in accordance with the area's registration practice

- The **person performing the work** registers at the control room of the area. The person who performs the work must ensure that operational personnel are notified of the work performed in the area.
- **A personal registration** is entered in the control room logbook or other system, which can be accessed later for the verification of the information (name, telephone number, work site, date and time), if needed.
- Starting work is always agreed on with the area's responsible supervisor / work supervisor, as well.
- The site's / job's safety practices are reviewed in conjunction with the registration.

Rendering a work site safe

- Each person must have their own personal lock for all required lockout procedures, with the principle "one person, one lock."
- A qualified person is required for making the work site safe. (Rendering a work site safe = isolation and lockout of energy.) If necessary, ask for additional information from your supervisor, shift manager or shift maintenance technician.
 - A qualified person refers to a person who has the required skills and knowledge to render a work site safe.
 - Lockout cards, separate instructions or a KUTI work order should be used as support material when isolating energy.
 - Lockout of a single object: use a lock and safety fastener.
 - Lockout of multiple objects: use locks and a lock box.
- The person performing the work puts their personal lock (blue lock) into the work site / equipment and marks it with "a Do Not Switch On" -plate.
- The **production** operator records the energy isolation and lockouts of the work site in the lockout list.
- The person performing the work records the lockout carried out by them in the lockout list.
- Removing fuses is also recorded in a separate fuse list.

- When using the lock box, the lockouts are made using the control room locks (red lock). If the work lasts over a shift change, the lock box is transferred to the next shift.
- If the work site is in a fenced working area, the person performing the work will lock the safety area gate open. If necessary, ask for additional information from your supervisor, shift manager or shift maintenance technician.
 - The person performing the work puts their personal lock into the work site / equipment and marks it with “a Do Not Switch On” -plate.
- There must be no master key to the locks. If several control room locks are required for the lockout, no master key must be made for them.
- Locks of other colors must be replaced in 2023/as new ones are acquired.

Trial start-up

- After the isolation measures and lockouts have been carried out, the operator and the person performing the work should perform a trial start of the object whenever possible. The operator and the person performing the work should record the trial start-up in the lock list. The trial start-up attempt can be made with the person performing the work at the work site and in contact with the drive operator, who is in the control room. However, the person performing the work must never be in the danger zone during the trial start-up attempt!
- Note! The trial start-up is done only once, so that once it has been recorded as done, it does not need to be repeated if another working group arrives in the area later.

Performing work

- Work is performed in a safe manner in accordance with instructions. In problem situations, contact your supervisor or the area's responsible supervisor / work supervisor.

Stopping work and removing lockouts

- As a rule, a lockout may only be removed by the person who set it.
- If the line is about to be started and the line is locked, the person who set the lockout is contacted by phone. If the person who set the lockout cannot be reached by phone, it is checked whether they are at their work site. If the person cannot be reached at the work site either, it is checked from the control room (registration board) and access control (the main gate can assist) whether the person is still in the plant area. If the person is in the plant area, the lockout must not be removed until the person has been reached. If the person is not in the plant area, the person's supervisor is contacted. If the supervisor confirms that the person has left the area, the area's supervisor may remove the lockout and inform the person's supervisor of this by phone and/or via e-mail, for example.

Reporting to control room, returning lockout supplies

- Once the work is completed, you should report to the area control room and acknowledge your exit from the work site by entering it in the control room logbook or other system.
- Return the plates and lockout supplies. Work completion is also communicated to the person responsible for the area / the work supervisor.

4 Lockout supplies

The personal locks used by company personnel are blue, and shared locks are red. Contractors' locks are black. Locks of other colors that are still in use must be replaced in 2023 or as locks are renewed.

5 Exceptional situations

Exceptional situations are situations in which it is not possible to fully comply with these instructions. The most typical examples of such situations are troubleshooting and shutdowns.

5.1 Troubleshooting

A separate procedure is in place for troubleshooting activity in the danger zones protected by safety-related systems. It is described in its own guideline (TO 120 Troubleshooting in the danger zones protected by safety-related systems).

The main principles are:

- A person, such as the shift manager, is assigned in charge of the troubleshooting, and this person makes sure that the troubleshooting is carried out in accordance with Guideline TO 120.
- The managerial person or head of department responsible for the production or maintenance of the process area gives permission to the person responsible for troubleshooting.
- The person in charge is present throughout the troubleshooting and supervises the work personally.
- A risk assessment of the troubleshooting situation is made jointly by all those involved in the work. The risk assessment is made in writing, using the form template included in TO 120, which specifies the measures for the safe performance of the work.
- The person in charge of the troubleshooting must be in a place where they can see the area and, if necessary, they must be able to perform an emergency stop of the device.

5.2 Shutdowns

In shutdowns, separate shutdown-specific instructions can be followed (including a deviation from the reporting procedure). The instructions must result in at least the same level of safety as is provided by the operating model described in this (TO 001) instruction.

5.3 Situations in which complete isolation from energy is not possible

There are separate work instructions and related risk assessments that describe how to render safe the work performed by operators, condition monitoring personnel, and so on, which requires production to be on. These work instructions are reviewed by the production manager or maintenance manager and approved by the department director.

In other situations, in which the energy of machinery/equipment or installations cannot be completely isolated, a written work permit procedure is applied to ensure safety.

5.4 Temporary tests

Temporary testing refers to a situation in which the functioning of a device is tested before it is finally made available to operators. In these situations, work must be rendered safe, and lockouts must be carried out as outlined in this instruction. Testing may require additional safety measures and must always follow the device manufacturer's instructions.

6 Isolation principles for different forms of energy

6.1 Electrical energy

Instructions to prevent unexpected start-up of the most common electrical equipment.

An electrical device with a safety switch (isolation switch of the main circuit):

- Check the area of impact of the safety switch (visual connection, name of device or position)
- Switch the device off; if needed, place “a Do Not Use” -plate on the operating panel or in the control room
- Lock the safety switch in position 0 and tag it with a “DO NOT SWITCH ON” -plate; write your name and the isolation date on the plate
- Verify isolation with a trial start-up, if possible
- Determine other hazards related to the work and the work environment

An electrical device or a group of electrical devices with no isolation switches:

- Define the device carefully (e.g., the position) for isolation
- Switch the device off; lock the switch/connector and place a “Do not use” -plate on the operating panel or in the control room (if possible)
- Lock and tag the control current inhibitor switch in position 0 (if the device is equipped with one)
- An electrician removes the fuse or opens the safety coupling and places the ‘Do not use’ plate and, when exiting the electric equipment room, ensures that the door locks
- Verify isolation with a trial start-up, if possible
- Determine other hazards related to the work and the work environment

Electrical work performed by electricity sector professionals should comply with the electrical safety standard (SFS 6002), the safety instructions issued by Outokumpu Stainless, and the related legislation.

6.2 Flowing agent

Agents classified as flowing include gases, chemicals, liquids and vapors. These instructions describe rendering a work site safe in general terms. Also study the more detailed, task-specific or agent classification-based instructions.

Isolating a flowing agent from the work site:

- Determine if the work requires a special permit (e.g., tanks, chemical pipelines, carbon monoxide or natural gas lines)
- Switch off pumps and other equipment that generate pressure. Lock and tag them out.
- Depressurize the work site, and empty and clean (pressure rinse) it in an appropriate manner
- Close the isolating shut-off valve(s) with an appropriate locking device and tag it (them). Note! Having only one active shut-off valve while working is prohibited.
- If necessary, perform blinding and tag it. Blinding plate (a plastic one in stock MAKO: 674845)
- When opening a pipe/device, protect against potential bursting of an agent (PPEs, first opening the flange from the opposite side of the pipe)
- Determine other hazards related to the work and the work environment

6.3 Hydraulics and pneumatics

Rendering a work site safe during the maintenance of the hydraulics and pneumatics systems and while removing process disturbances (NOTE! Maintenance work related to hydraulic systems may only be performed by persons with adequate competence in hydraulic systems.)

- I. Reliably switch off the electricity from all actuators and motors, if possible. Lock and tag them out.
- II. Depressurize pressure accumulators, tanks or pipelines, or isolate them reliably and test/measure the success of isolation
- III. Lower the loads lifted with hydraulics only or support them in a reliable manner. Movements should be prevented by means of a fixed or temporary locking/support. Tag the locking with a plate.
- IV. Determine other hazards related to the work and the work environment

Rendering the area of impact of hydraulic or pneumatic devices safe:

- I. The movements of hydraulic or pneumatic devices are locked by means of fixed mechanical lock. Tag the lock
- II. Determine other hazards related to the work and the work environment

Rendering the area of impact of hydraulic or pneumatic devices safe if there is no fixed mechanical locking at the work site:

- I. Lower the loads lifted with hydraulics only or support them in a reliable manner
- II. Depressurize pressure accumulators, tanks or pipelines, or isolate them reliably and test/measure the success of isolation
- III. Close the shut-off valves at the work site (lock, if possible) and attach a "Do not open valve" plate equipped with the name of the person who shut them off
- IV. Determine other hazards related to the work and the work environment

Do not go under a load that remains raised on hydraulics alone in any situation!

6.4 Mechanical energy

Items containing mechanical energy include motors, conveyors, overhead doors, springs and cams, piled-up loads, feed screws, plungers, and tires of large vehicles. Isolating mechanical energy from the work site:

- I. Reliably switch off the electricity from all actuators and motors.
- II. Switch off the energy supply by removing belts/chains or by releasing the clutch
- III. Lock the machine component causing a potentially hazardous movement by means of a brake, latch, or mechanical locking pin (locking pins are yellow). Tag the locking.
- IV. Determine other hazards related to the work and the work environment

6.5 Measurement devices

Measurement devices causing hazards include laser sensors, radioactive radiation sources and X-ray devices. General instructions for rendering a measurement device safe (determine the device-specific instructions):

- I. Determine the danger zone of the device
- II. Render the measurement device safe in the way agreed for the device (device-specific instructions)
- III. Verify or otherwise determine the completion of rendering the measurement device safe (e.g., radiation measurement)
- IV. Determine other hazards related to the work and the work environment

7 Monitoring compliance with the operating model

Compliance with the operating model is monitored through the daily monitoring carried out by supervisors. In addition, SBO rounds are performed in the plant area to contribute to monitoring compliance with the operating model.

Key version changes

Item	Change
	The entire structure has been restructured.
3	Updates to the operating model: e.g., who performs the lockouts, qualifications, lock colors, lockout supplies...
5	Troubleshooting procedure explained, temporary testing instructions updated