

Subject	2 – Purchasing Terms			
Specification	2.8 – Specification for LOTO plants			
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Purchaser in the document is Sør-Norge Aluminium AS

1 General

LOTO stands for Lockout Tagout disconnect (*hazardous energy*) with a padlock and marking. This shall be done with procedures for securing hazardous energy. These procedures shall ensure safe work performance in hazardous environments and prevent unintentional connection of energies that can lead to injuries and accidents.

2 Zones

The plant shall be divided into "green-zone" (safe zone according to the machine directive) and "red zone" (an area where there is a risk for injuries and accidents).

Work operations (both operational and maintenance) shall be limited to the green zone.

3 Disconnection of energy supply

Energy means electricity, hydraulics, pressurized air, gas, water, heat, gravitation, and stored energy.

All the closing points shall be easily accessible and be located close to the LOTO panel. This is also valid for unloading of accumulators. The placement shall be in the green zone and preferably by the entrance to the red zone. The placing shall be approved by the Purchaser's Executive Officer.

4 LOTO panel

The LOTO panel shall contain documentation, locking bars, padlocks with color coding according to the Purchaser's standard.

The design has 3 standard sizes – 5, 10 or 15 hooks according to how many locking points there are inside the installation.

5 hooks – assembly drawing:	<i>Purchasers drawing no.: 35225</i>
5 hooks – detail drawing:	<i>Purchasers drawing no.: 35226</i>
10 hooks – assembly drawing:	<i>Purchasers drawing no.: 35202</i>
10 hooks – detail drawing:	<i>Purchasers drawing no.: 35206</i>
15 hooks – assembly drawing:	<i>Purchasers drawing no.: 34070</i>
15 hooks – detail drawing:	<i>Purchasers drawing no.: 34069</i>

Other sizes according to agreement with the Purchaser's representative.

5 Padlocks

Padlocks shall be specially designed lockout padlocks (hoop diameter = 6.3 mm • inner hoop width = 20 mm and inner hoop height 38 mm) at Bsafe. The color code shall be as follows:

Energy type:	Padlock color:	Item no. at Bsafe:
<i>Electrical</i>	<i>Red</i>	<i>Item no. 10410RED</i>
<i>Pressured Air</i>	<i>Blue</i>	<i>Item no. 10410BLU</i>
<i>Gas</i>	<i>Yellow</i>	<i>Item no. 10410YLW</i>
<i>Hydraulic</i>	<i>Brown</i>	<i>No item no. at Bsafe</i>
<i>Mechanical Locking</i>	<i>Orange</i>	<i>Item no. 10410ORJ</i>
<i>Water/Steam</i>	<i>Green</i>	<i>Item no. 10410GRN</i>

6 Locking hoop

If there are shared locking points with other installations, a locking hoop shall be delivered. This shall be according to item no. 100420 from BSafe.

7 Safety switches

Safety switches shall be lockable. Design according to the Purchaser's 1.3 Electrotechnical Specifications.

8 Valves

All valves shall be lockable. Air valves shall also have breathers. The design shall be in accordance with Purchaser's 1.2 Specification for Machine Technical installations.

9 Main switches

The plant shall have main switches/valves that are located in the green zone for quick closing down of the whole plant. To be located together in the green zone according to agreement with the Purchaser's representative.
Design according to the Purchaser's 1.3 Electrotechnical Specifications.

10 Sectioning

The energy shall be sectioned in such a manner that the energy supply can be disconnected for engines and other working units and 24 V output without breaking the PLC and 24 V input.

This will facilitate troubleshooting photocells, initiators, etc. while the hazardous energy is disconnected.

11 Programming

The PLC shall be programmed for "access query" (closing down). At "access query", the installation shall stop in a position that makes start up after energy close down problem free.

12 Load circuit breaker

A load Circuit Breaker shall be installed when necessary. *Design according to the Purchaser's 1.3 Electrotechnical Specifications.*

13 Location

All valves and control cabinets shall be placed in the green zone. Lubrication and measuring points shall also be placed in the green zone.

14 Category

Photo barriers and shutdown according to category 4.

15 Securing hatches and doors

Hatches and doors shall be possible to secure with a lockable securing device if breakdown can represent danger (i.e., hanging hatch in open position).

16 Risk assessment

All operations that cannot be performed in the green zone must be risk assessed and 1 point lessons shall be made for these operations.