

Tornion Voima Oy safety material



TORNION VOIMA OY

1. General information about the training
2. Tornion Voima´s plants
3. Access control and traffic
4. Safety working practices
5. Tornion Voima´s specific hazards
6. Management of exceptional situations
7. Exam



1. General information about the training

General information about the training

- Completing the training and passing the exam are required to obtain an access permit for ToVo.
- The training is valid for 1 year.
- Everyone entering the area must also complete the safety trainings required by Outokumpu.
 - We follow all Outokumpu safety principles in our operations.
- Everyone coming to work must have a valid occupational safety card and a personal photo ID.





2. Tornion Voima's plants

Production:

- Process steam and district heating for Outokumpu
- District heating for Tornion Energia
- Electricity to the national grid

Fuels:

- Peat
- Biofuels (wood chips, sadust, etc.)
- Producer gas (CO)

Main design values of the power plant

- Boiler fuel power 145 MW
- Fresh steam
 - Temperature 540 °C
 - Pressure 130 bar
- Total steam and district power 90 MW
- Electrical power 40 MW

Other plants

Backup boilers

4 boilers, total 100 MW

Process steam and district heating

Fuels: natural gas / producer gas (CO)

Heat recovery and district cooling

Heat recovery boilers at the hot rolling mill and RAP5

Heat recovery accumulator at smelter

District cooling plant

Pirkkiö heating plant

Boilers 2 x 12 MW

District heating for Tornion Energia

Fuels peat, biofuels and light fuel oil

Kemi mine

District heating and process steam for Kemi mine.

Solid fuel boiler 2 MW

Natural gas boilers 1,5 MW, 1,4 MW ja 4 MW

LNG terminals 2 units

FAR heating

Electric boiler

Boiler 40 MW

Process steam and district heating

Gas engine plant

Electricity production 43 MW

Fuel natural gas

3. Access control and traffic

- The factory area is fenced and monitored by electronic security systems, including access control and recording camera systems.
- Access to Tornion Voima is via Kromitie through the freight terminal.
- Access and driving permits are applied for in the Zeroni access control system.
- Separate instructions for Zeroni are available on Tornion Voima's website.
- Visiting Outokumpu's cafeteria is possible via the main gate. Parking is allowed in visitor parking areas.
- Factory area guards have the right to inspect personal belongings and vehicle loads when leaving the factory area.

Pedestrian traffic in the factory area

- There is a lot of heavy traffic and large work machines in the area.
- **Movement in the fuel yard is prohibited due to fire risk, risk of fuel pile collapse, and wheel loader traffic.**
- When entering or exiting a hall, always use pedestrian doors when possible.
- Bicycle use in the factory area is subject to permission.
- Worksite cycling is allowed between the power plant and the freight terminal.

4. Safe working practices

- All work must be agreed upon with ToVo's supervisors before starting.
- Before entering the work site:
 - Agree on a work permit with the supervisor
 - Register at the control room
 - Make an entry on the registration board in the control room
 - Registration is not required during power plant overhaul
 - Ensure that work is safe to start/continue (safety isolations performed, etc.)
 - At the end of work or shift, sign out on the same registration board

All works requires at least verbal permission!

Prevention of Unexpected Start-up

1. Register

- Register at the control room
- Identify unexpected start-up hazards at the work site with ToVo's operating staff

2. Energy isolation

- ToVo's operator ensures energy isolations and isolation markings as needed in cooperation with the electrical department
- ToVo's operator turns safety switches to the off position and locks them with the operator's lock

3. Locks and marks

- ToVo verifies the success of safety isolation by testing and gives permission to perform the work
- Also note other machines and equipment operating in the area and other people working in the area

4. Installer locks

- The installer entering the work site locks the safety switch in the off position with their personal lock and attaches a start prohibition sign (date, installer's name, and phone number)

5. Confirm work safety

- The installer is not allowed to turn the safety switch on or off or operate valves
- Confirm with the supervisor that it is safe to start work (safety moment)
- Always check the lock when returning from breaks

6. End of work

- Personal lock can be removed after the work is completed. Notify the client and your supervisor when the work is finished
- Return borrowed locks to the control room

Respirators and Special Gas Cylinders

- Use respirators in dusty work sites
 - Compressed air network air must not be used as breathing air
- Bringing your own gas cylinders to the area is prohibited
 - Special gas cylinders may only be brought to the area in special cases
 - Bringing special gas cylinders must be approved by Tornion Voima's foreman

- Companies and employees performing electrical work must complete a separate Tornion Voima electrical safety instruction
- Suppliers must ensure that all tools, equipment, and devices meet the required electrical standards and are maintained in working order
- Contractors performing electrical work must have at least electrical contracting qualification 2 according to the Electrical Safety Act 410/96. Employees must have sufficient professional skills for the work in question
- Laypersons are not allowed to work in electrical rooms without separate guidance



Connecting computers, flash drives, phones or other devices to Tovo's systems is prohibited.



Suppliers and persons whose work is related to telecommunications, automation systems, electrical and automation equipment must undergo separate instructions Tornion Voima information security requirements.



In suspicious cases, events, or situations where a report of a security risk, hazard, etc. enters the system. You should contact Tovo's management immediately.



- ToVo has measuring devices based on radioactive sources
 - In fuel storage and feeding systems
 - In fuel systems feeding the boiler
- Additionally, there is an X-ray measuring device producing radioactive radiation on the fuel conveyor
 - Access to the danger zone is prevented by safety gates and warning lights
- Entry into the area of effect of measuring devices is prohibited!
 - **Always ensure the measuring device is switched off before working in its area of effect**

- Roof work is carried out in agreement with the client
- Hazards on roofs may include:
 - Various gas emissions (producer gas and natural gas)
 - Possible holes in the roof
- When going on roofs, a personal multi-gas meter must be carried

5. ToVo's specific hazards

- Producer gas (CO)
 - Colorless, odorless, tasteless → CANNOT BE SEEN, SMELLED, TASTED
 - Use: Fuel in power plant and backup boilers
 - Workplace HTP8h value 20 ppm, HTP15min value 75 ppm
 - Immediately life-threatening concentration over 1,000 ppm
 - Concentration monitored by both fixed and portable meters
 - Producer gas (CO) ignition range 12–75%
 - Slightly lighter than air
 - Effects on humans:
 - Headache, nausea, dizziness, blurred vision, unconsciousness, death



Huomiosana: VAARA

H220: Erittäin helposti syttyvä kaasu.

H331: Myrkyllistä hengitettynä.

H360D: Voi vaurioittaa sikiötä.

H372: Vahingoittaa elimiä pitkäaikaisessa tai toistuvassa altistumisessa

10 000 ppm = 1 %

- Natural gas

- Use: Fuel in backup boilers and at Kemi mine
- Extremely flammable gas
- Pressurized natural gas can explode when heated
- Lighter than air
- **Smoking prohibited**
- Effects on humans:
 - Drowsiness, headache, nausea/dizziness, suffocation, frostbite (rapid evaporation of pressurized natural gas)



Gases used at Tovo

- Liquefied gas (liquefied gas cylinder 2 x 33 kg)
 - Use: Ignition fuel in boilers
 - Extremely flammable, scented, liquefied gas
 - Suffocating in large concentrations
- Nitrogen (N₂)
 - Use: Flushing producer gas pipelines at the power plant and backup boilers
 - Gaseous nitrogen: colorless, odorless, tasteless, and slightly lighter than air
 - Suffocation hazard, breathing pure nitrogen causes unconsciousness, even death
 - In case of nitrogen leak, work can only be done using compressed air breathing apparatus



Boiler halls in different locations

- Producer gas (CO) and natural gas leaks
- Dust explosion hazard caused by solid fuel (also risk on conveyors and in receiving building)
- Steam and district heating leaks
- Hot surfaces

Turbine hall

- High-pressure oil leaks
- Steam and district heating leaks
- Chemical leaks
- Rotating turbine generator assembly
- Hot surfaces

LNG terminals in Kemi

- LNG leaks
- THT leaks
- Cold surfaces

Solid fuel storage and handling facilities

- hydrogen sulphide and carbon monoxide

Electrical rooms

Hydrogen sulfide H₂S

- Forms when organic matter decomposes in oxygen-free spaces, i.e. in practice, it can form in solid fuel handling and storage spaces.
- Colourless, highly toxic and flammable gas.
- The characteristic smell of rotten eggs (smell threshold 0.01-1.5 ppm) , but the substance quickly paralyzes the sense of smell.
- It's heavier than air.
- Levels known to be harmful
 - HTP 8h = 5 ppm (8-hour time-weighted average)
 - HTP 15min = 10 ppm (15-minute short-term exposure)

Carbon monoxide CO

- Formed in solid fuel storage (slow invisible combustion) The hazards are the same as for combustible CO gas.

Flue gas cleaning

- Sulfuric acid
- Lye



Boiler water chemicals

- Boilex 510
- Drewphos 3000 (phosphate)

District heating water chemical

- Amertrol AT3550

Flue gas cleaning (Nox emission control)

- Ammonia water < 25%

- Working in the LNG terminal areas at Kemi mine requires a permit
 - Permit is granted by ToVo
 - The area handles both liquid and gaseous natural gas
- The area is an Ex area
 - Open flames and smoking are prohibited
- Special properties of LNG:
 - In case of leak, LNG vaporizes rapidly
 - **LNG is extremely cold, about -165 °C, risk of frostbite**
 - LNG is odorless natural gas
 - Gaseous natural gas is scented

6. Management of exceptional situation

Emergency numbers and emergency notification

In Tornio:
CHP Power plant
Gas engine plant
Pirkkiö heating plant

- Emergency number 112

In Tornio:
In other Tornio factory area site, including
heat recovery sites, district cooling and
electric boiler

- Emergency number 016-452300

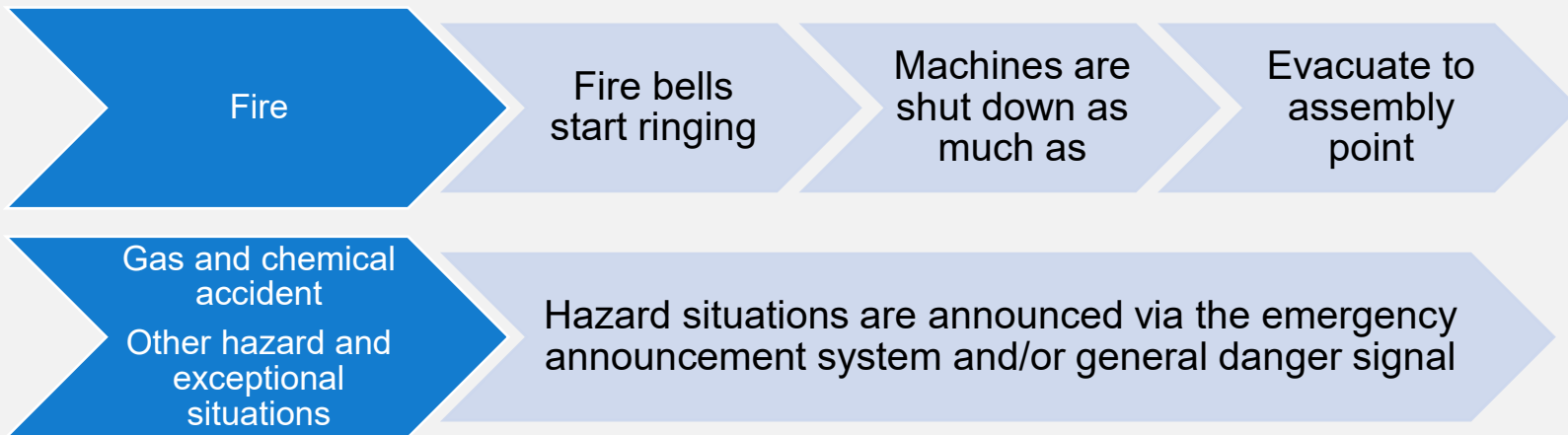
At Kemi mine

- Emergency number 016-45 3737
- In case of automatic fire alarms, the ToVo control room must contact the concentrator's shift master on 016-453538

- There are fixed producer gas and natural gas measurement points/alarms in boiler halls
- When moving in solid fuel handling and storage facilities, a personal multi-gas **detector** shall be used to measure hydrogen sulfide, oxygen and carbon monoxide concentrations.
- In case of a leak, a light flashes and an alarm sounds in the field
 - Leave the danger area immediately!
 - Report leaks immediately to the control room



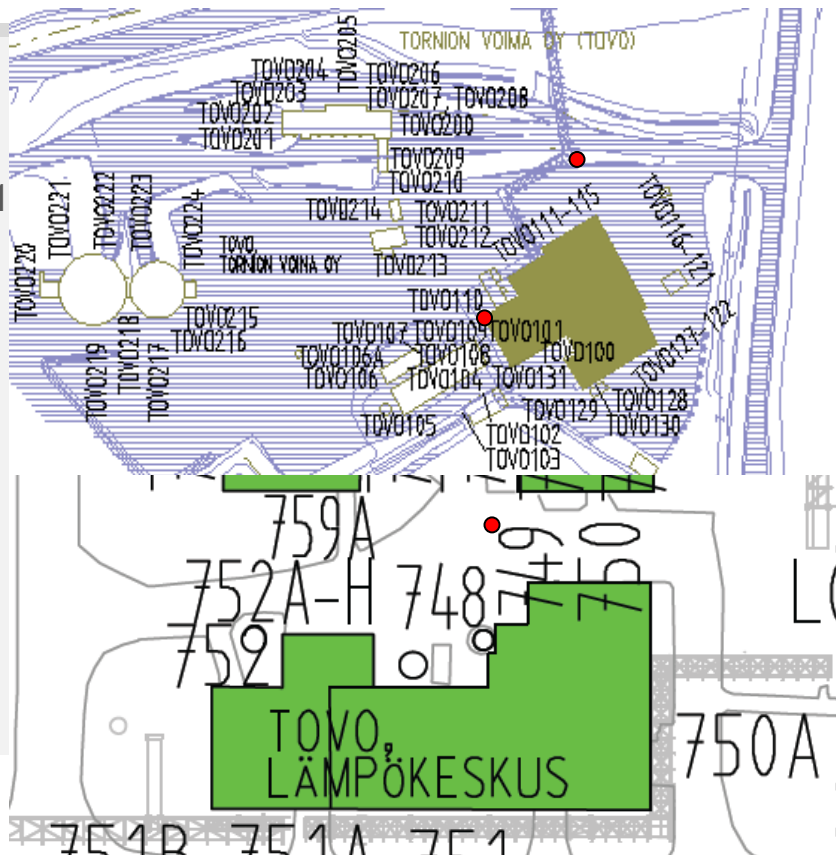
Alarm situations



- Must be reported immediately to your supervisor and ToVo's contact person in the area:
 - Occupational accidents
 - Safety observations and hazard situations
 - Fires
 - Property and environmental damage
 - Chemical and gas leaks

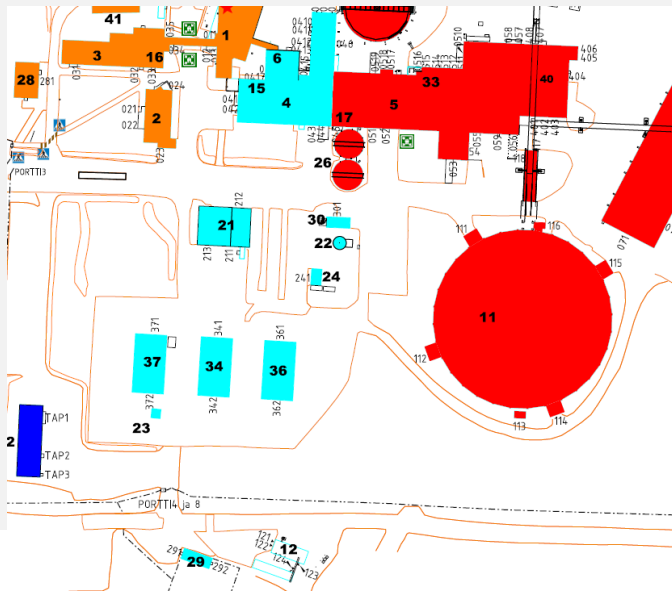
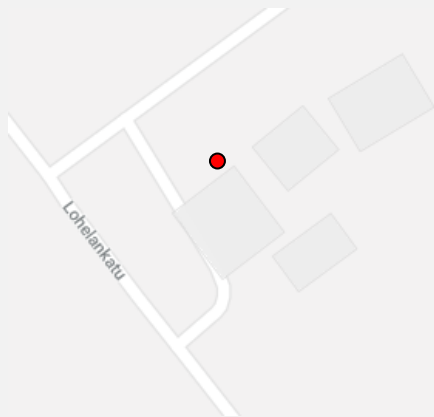
Assembly points and shelter

- Assembly points:
 - Power plant
 - In front of the workshop door TOVO131
 - North end of the turbine hall, lifting door TOVO 115
 - At backup boilers
 - Heating center door 749
- Shelter
 - On the 1st floor of the power plant, in connection with workshop facilities



Assembly points and shelter

- Assembly points:
 - Kemi mine
 - In front of the workshop door 052
 - Pirkkiö heating plant
 - In front of the boiler hall door



Report your safety observation via the link found in the QR code

QR codes can be found at every site



7. Exam

- The exam is conducted through a link found on Tovo's website
- The exam consists of 15 statements, each to be answered either true or false
- A passing score requires at least 12 correct answers
- Training material must not be present during the exam

Safe working days at ToVo!



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