

TO 200 OUTOKUMPU MANUAL FOR HOT WORK

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1 Obligation and purpose

In all hot work, as well as roofing and waterproofing industry hot work, Outokumpu Tornio mills and the Kemi mine comply with the company's own manual for hot work, which are permanent hot work instructions for the safe performing of the work. The manual for the hot work is based on the instructions of the Federation of Finnish Financial Services Fire Protection Jobs instructions in 2016, attached to the insurance contract, and the SFS 5900 Hot work safety standard (2016-02-19) and SFS 5991 Hot work safety standard for roofing and waterproofing industry (2016-02-19). These steps, as well as Outokumpu Tornio Mills' and the Kemi mine's additional requirements for the safe performing of hot work, are to be followed in all the hot work.

All Outokumpu employees, contractors and visitors will not carry out any hot work unless it is in a designated controlled area (a permanent site for hot work) or has a hot work permit. Hot work permit at temporary hot work site must be applied according to the hot work plan from the person in charge of the area. The issuer of a hot work permit must familiarize himself with the hot work site together with the persons performing the hot work before the hot work starts. Also required safety measures must be implemented according to the hot work plan before starting the hot work. This is the cardinal safety rule number 10.

Hot work training and hot work training for roofing and waterproofing industry have been combined 1.1.2016. Training performed before 2016 is valid until the date in the hot work card and it gives permit to do hot works only according the training.

The departments must ensure that the manual for the hot work and the contents of the SFS 5900 and SFS 5901 standard is known by all persons responsible for the hot works and performing the hot work. Purchasing and control personnel shall ensure that the manual is included in the contract containing hot work. Client of the work in the departments shall ensure that the contractors comply with the provisions of the manual.

Legislation for binding and the fostering of the safety of the hot work are, for example, the Rescue Act, Occupational Safety and Health Act, the criminal and the insurance contract act and the Tort Liability Act. The legislation requires the employer to organize the work so that the work can be performed safely, and to ensure that all employees know and are familiar with the safety instructions concerning risks associated with the work. The company's own personnel and service providers' personnel must comply with the laws, regulations and safety instructions and the various parties shall cooperate to maintain and improve occupational safety at the workplace.

2 Definition of the hot work

Hot work is work that generates sparks or requires an open flame or other heat source which can cause a fire hazard. Work defined as hot work includes gas, electricity and arc welding, flame and arc cutting, power tool cutting and metal grinding. Work that uses a propane burner, other open flame, gas soldering, using a heat gun or any other tool generating strong heat comparable to these is also counted as hot work.

Roofing and waterproofing industry hot work is waterproofing work where flame or other heat is used, which can cause a fire hazard. Welding and other hot work made on the roof requires a roof hot work permit and a roof hot work card. Roof and water insulation hot work includes, among others, drying the insulated medium with a flame or hot air, heating bitumen on the cauldron, attaching the water insulation using heat, as well as the necessary auxiliary work associated with these activities which generate sparks.

A hot work card is a temporary certificate of a satisfactorily completed safety qualification for hot work. The hot work certificate is valid for 5 years and it is granted by the Finnish National Rescue Association (SPEK). A valid hot work card received in other Nordic countries is also accepted at the Tornio mills and the Kemi mine. The performer of the hot work, the issuer of the hot work permit and the hot work guard of an external service provider (contractor) must have a valid hot work card. Also a hot work guard employed by Outokumpu must have a hot work card or he/she must have participated in the factory's internal training for hot work guard.

Last hot work cards issued according the old training can be valid until 12/2020 (blue card, picture 2).

Cards issued after 1.1.2016 (picture 3) contain all hot works including roofing and waterproofing hot works. New cards can also be mobile cards (QR code). For more details see www.spek.fi/mobiilikortti (in Finnish).

Hot work card for roof and water insulation work is a temporary certificate of a satisfactorily completed safety qualification for roof and water insulation hot work. The card is valid for 5 years and it is issued by the Finnish National Rescue Association (SPEK). Hot work card issued in other Nordic countries is valid in Finland. Last hot work cards issued according the old training can be valid until 12/2020 (black card, picture 1).



Picture 1: Hot work card for roof and water insulation work

Picture 2: Hot work card

Picture 3: New hot work card

The hot work permit is a written authorization that permits hot work being conducted on a temporary hot work site. Before granting a hot work permit, an analysis and evaluation of the dangers caused by the work must be completed, along with setting a definition of the required safety measures.

The issuer of the hot work permit is the shift foreman who works for Outokumpu in the departments or a specifically named supervisor. He is responsible that the hot work is done according to the hot work plan, the fire extinguisher device and substance are suitable and the required safety measures are implemented before starting the hot work. If the hot work continues over the shift change, the hot work permit must always be updated. The summer shift foremen should also have a hot work card if they're issuing hot work permits for their area. The issuer must check the hot work place with the hot work performer before issuing the permit.

The performer of the hot work is the person defined in the hot work permit who has a valid hot work card, sufficient competence for hot work, performing the work and who follows the instructions given. This applies to both the company's own staff and the service providers (contractors). The performer of the hot work is responsible for fulfilling the safety requirements and cleanliness of the area.

The hot work guard is the person who will ensure that fire safety is maintained in the workplace. The hot work guard cannot also be the person performing the hot work (SFS 5900 / 3.8 standard). In addition, the hot work guards should wear special vests that are reserved for hot work guards. A hot work guard employed by Outokumpu must have a hot work card or he/she must have participated in the factory's internal training for hot work guard. A hot work guard from an external service provider (contractor) must always have a valid hot work card. A hot work guard is tied to the work as long as the hot work permit defines, and he is responsible for the hot work to the authority which gave the permit.

The hot work plan is a written plan for safely performing the hot work and roof and water insulation hot work.

Hot work guard training is training that lasts at least two hours, during which the use of fire extinguishing equipment and the risks and practices of working on a hot work site are taught. The members of the extinguishing group must also have hot work guard training, if they work as hot work guards. Hot work guard training for members of the extinguishing group is held every three years in connection with the extinguishing training. For summer employees the hot work guard training is organized as required.

A permanent site for hot work is a specific fire-safe location or other restricted area reserved for hot work where hot work may be performed safely. Performing hot work on a permanent hot work site does not require a hot work permit. The locations of permanent hot work sites in the factory areas can be found in the safety databases of the departments. A person working on a permanent hot work site does not need a hot work card.

A temporary hot work site where no written hot work permit is required is a process site where flames or molten materials are present or the site is otherwise safe for hot work (for example the quarry of Kemi mine). Such sites are already well protected. When hot work is carried out at this kind of temporary hot work site, safety measures must be implemented according to the hot work plan and sufficient extinguishing equipment must be reserved to the site. This kind of sites are listed in section 10 of this instruction.

A temporary hot work site is a workplace which does not meet the requirements for a permanent hot work site, and where hot work may only be performed when it cannot be done on a permanent hot work site. For roof and water insulation hot work the location is always a temporary hot work site. A hot work permit and a hot work card is always required for a temporary hot work site.

A temporary hot work site may be valid for long period (several months) e.g. during maintenance shut down. In these cases the hot work permit does not need to be applied again. Temporary hot work site of this kind must be similar as permanent hot work site. When establishing temporary permanent hot work site it must be approved by Tornio mill services fire safety unit together with the production site responsible persons in a separate audition.

Hot work with minor fire hazard is electric soldering and the use of hot air. This work may be performed at the electrical workshop, where the hot work performer has estimated the risk for fire starting and spreading to be minor. When estimating the fire hazard, the work method, flammability of the work material, the combustible material in the surroundings and other factors related to the fire hazard should be considered. Soldering work on the lines requires a hot work permit.

3 Person responsible for hot work and the right to do hot work, give permits and supervise

No hot work may be started in any Outokumpu Tornio mills and the area of Kemi mine without prior preparations, assessment of hazards and protective measures. In addition, the temporary hot work site must have a hot work permit. At the Outokumpu Tornio mills and Kemi mine it is required that a person performing hot work at a temporary hot work area have a valid hot work card based on the SFS 5900 standard or the corresponding card issued in some other Nordic country. In addition, it is required that the issuer of the hot work permit and the hot work guard (excluding the hot work guards employed by the company, see item 2 "Hot work guard") have a valid hot work card.

A person performing roof and water insulation hot work must have a valid roof and water insulation hot work card. Hot work or roof and water insulation hot work performed at a temporary hot work place within the factory area always requires a written hot work permit.

The issuer of a hot work permit must familiarize himself with the hot work site together with the persons performing the hot work. Before starting work at a hot work site, a study and evaluation of the hazards caused by the hot work must be made. The issuer of the hot work permit ensures that the hot work is done and supervised according to the hot work plan. The issuer of the hot work permit determines the safety measures which he considers necessary based on the study and evaluation of hazards caused by the hot work. The hot work may be started no sooner than the performer of the hot work and the hot work guard have ensured that the required safety measures are implemented. The hot work permit must name the issuer of the permit, the employees performing the hot work and the hot work guards.

If there is a need to switch of the fire alarms or sprinkler system it must be done by area shift foreman (OKTO P3). In other areas it is done by the fire alarm system operator of the specific service provider. If the system shut down takes over 24 h it must be notified to Outokumpu personnel responsible for insurances.

The corporate and regional security group of the mill service is responsible for the hot work manual, the hot work permit system and directions of the Outokumpu Tornio mills. The Kemi mine health and safety manager is responsible for the hot work manual, the hot work permit system and directions of the Kemi mine.

4 Study and evaluation of the hazards caused by the hot work

The study and evaluation of the hazards caused by hot work means identifying and estimating by seriousness the hazards on the hot work site and its surroundings which are caused by the hot work. The evaluation and estimation of the hazards is made before issuing the hot work permit, and always when conditions change at the workplace. To avoid any damage caused by the hot work, the necessary safety measures are determined according to the study and evaluation of the hazards.

5 Work permits for the hot work

Hot work permits and the roof and water insulation hot work permits are recorded and saved in the form found on the Lotus Notes Workplace safety database. Four signed copies of the work permit are made: One for the issuer of the permit, one for the performer of the work, one for the hot work guard and one for the guard in charge during breaks, who may be the post-guard for the hot work if needed. The signatures will be given at the place of the hot work.

Permission for hot work may only be given for a limited time. The hot work permit is specific for a particular workplace, and only the hot work mentioned on the permit is allowed there. If, during the period of the hot work permit being valid, the conditions at the work site change, the issuer of the permit must update the permit to accommodate the new conditions. The daily acknowledgements on the permit are made by the issuer of the permit and the employee performing the hot work. Also at the event of shift changes the hot work permit must be updated to meet the current information of the shift foreman in charge, etc.

The issuer of a hot work permit must be an employee of Outokumpu. Within a production building the hot work permit is issued by the shift foreman of the area, an Outokumpu-employed foreman or



supervisor working mainly in the area or the projects. The issuer of the hot work permit should check the temporary hot work site together with the performers of the hot work and the hot work guards.

The issuer of a roof and water insulation hot work permit must have the hot work card for roof and water insulation hot work or a hot work card issued after 1.1.2016.

At the Kemi mine hot work permit is recorded on a specific template in the KATTI system. Hot work permit is issued only for the time of a certain shift. Permit is saved, printed and signed. The original signed permit is given to the performer of the hot work and copie(s) of the permit the hot work guard(s). Permit is stored in the KATTI system and can be seen from there.

6 Safety measures

6.1 Work equipment

The equipment of the persons participating in the work (for example, clothing and the hot work equipment) must meet the requirements of the SFS 5900 standard (annex SFS5900).

The work clothes for the employees performing hot work should meet the EN 11611:2007 standard. The requirements of the equipment for hot work are corresponding to the welding work. The requirements for the welding work are presented in the document "TO 113 Welding work".

6.2 Alternate work methods

Due to the fire hazard it is advisable to always try to find alternate working methods to hot work. These include, for example, machining methods and such fitting and cutting methods which are non-sparking and do not use an open flame, or the work is performed at a permanent hot work site. If alternative methods (e.g. knife cutting, flange connections, etc.) can be used, it is possible to avoid the hot work permit procedure.

6.3 Safety measures required before starting the work

- A written work permit and permit for hot work must be obtained.
- Filling the hot work permission form is made together with the workers performing the hot work. The main points are described to the workers so that the safety issues affecting the hot work are taken into account.
- The work site of the temporary hot work should be inspected by the issuer of the hot work permit and the performer of the hot work before writing the hot work permit and starting the hot work. Notifications must be made about potential hazardous items and their protection.
- Persons responsible for work-time guarding, break-time guarding and follow-up guarding should be named.
- It must be ensured that all persons working on the site are aware of the location of the nearest telephone, know the Tornio mill internal emergency number 2300, can make an emergency call and are able to use the fire extinguishers.
- The workplace and its surroundings must be cleaned and protected. Combustible material must be removed and combustible structures must be protected.
- If necessary, the surroundings of the hot work area should be sprinkled with water or film-foamed.
- Openings on the structures must be covered and the surrounding areas must be inspected.
- If necessary, hot work guarding must also be arranged in these areas.

- Non-flammable tarpaulins should be reserved to the workplace in order to prevent the spreading of sparks.
- The conduction of heat generated by the hot work to other premises via pipelines, ventilation ducts, etc. must be prevented.
- At the hot work site the fire extinguishing devices required by the hot work permit must be present. At minimum there should be two portable fire extinguisher corresponding to a 43A 183B C class extinguisher (2 x 6 kg).
- In addition to that, at the immediate vicinity of the hot work site, no further than 10 meters distance of pick-up there should exist another equivalent fire extinguisher or two extinguishers corresponding to a 27A 144B C class extinguisher (2 x 6 kg). One of these may be the extinguisher required for a gas bottle cart. Portable fire extinguishers can be replaced with an emergency hydrant in accordance with SFS - EN 671-1.
- If necessary, the gas concentration of the work space must be measured and the work space must be ventilated.
- Hot work may not be started until the safety measures required in the hot work permit are implemented.
- If the work site has an automatic fire alarm system, an Outokumpu-employed department shift foreman, a separately specified foreman, and the supervisor of the hot work at other locations may disconnect the system.
- Disconnecting and connecting should always be reported to the area control center, tel. 2298.
- It should be ensured that every person working in the workplace knows the location of the telephone and the emergency number, are able to make an emergency call and use the extinguishing equipment required by the hot work permit.

6.4 Safety measures during the work

- During the hot work it must be ensured that all work-time safety measures mentioned in the hot work permit are in force and that the fire hazards in the surroundings have not changed.
- It must ESPECIALLY be ensured that combustible material created during the work is collected and removed as it accumulates.
- Portable fire extinguishers, in accordance with the work permit, must always be present at the hot work site.
- The hot work guarding required in the hot work permit must be implemented during the whole duration of the work, including breaks. The performer of the hot work may not serve as a work-time hot work guard.
- When working in pairs, one of the members of the pair can operate as a hot work guard, and he/she must be named. "A Team" is not a name of a hot work guard.
- Please note! The organization performing the work is in charge of the hot work guarding, unless explicitly agreed otherwise in the hot work permit. For the hot work guard, specific persons named in the hot work permit in charge of hot work guarding must be arranged for breaks.
- The gas concentration of possible flammable gases is measured at the work place, and, if necessary, the work area is ventilated. Concentration indicators are available at the departments or regional conservation center (fire station).
- At the turn of the shifts care must be taken to keep the hot work permits up to date.

6.5 Safety measures after work

- After completing the hot work the hot work guarding must be continued for as long as specified in the hot work permit, but at least two hours. This requires a permanent presence of the hot work guard or continuous scrutiny of the site.



- The work permit may mandate a longer guarding time.
- The disconnected fire alarm system must be reconnected immediately after completing the work. Reconnecting should be reported to the area control center.
- Finishing the hot work is reported to the issuer of the hot work permit.

6.6 Considerations on hot work on the roofs

On roof hot work the water insulation must not be attached over cappings and metal structures so that the attachment point is heated.

- Open flame or hot air must not be used closer than 1.5 m of the ventilation openings and interfaces of the horizontal and vertical structures.
- A roof hot work place must have two 43A 183B C class fire extinguishers and a 2" pressurized fire hose, as well as clearing equipment so that in case of a fire an opening may be made to the roof for extinguishing.

6.7 ATEX areas

Explosive ATEX facilities include devices/areas which contain carbon monoxide, hydrogen, propane, LPG or oil. Only persons in charge of the ATEX area may issue a hot work permit for an ATEX area. In addition to this, the mill service fire safety group must check the area before starting the work. In exceptional situations, for example in a night shift, a hot work permit may be issued by a qualified person named in an explosion protection document (for example a trained shift foreman).

If non-EX-protected electrical equipment, tools or methods which may cause sparks are to be used in an EX area, a hot work permit is required.

The locations of the ATEX areas, hazardous substances and dusts, and the responsible persons can be found on the Lotus Notes TTT explosives protection database.

7 Implementing the monitoring of the hot work

At the Outokumpu Tornio mills, Kemi mines and in other facilities owned by the company (for example, Itäranta 10, Ysikuusi, etc.) all work related to hot work will be performed according to this hot work manual and the protection guidelines and annexes attached to it.

Observations tours can be made to the temporary hot work sites, for example SBO tours.

8 Different facilities where hot work is done

Below are listed protection measures for special temporary hot work places and things that must be especially taken into account at such locations.

Electrical facilities

The person must be instructed in how to perform safe electrical work. If necessary, the hot work must be monitored by a qualified electrician.

Production facilities

Hot work permits for the areas can only be issued by the shift foreman or a specifically named person.

Roofs (all buildings)

Both hot work and roof and water insulation hot work is performed on the roofs.

Outdoor areas

Roof and water insulation hot work permit (e.g. bitumen work), if required. Wildfire hazard in outdoor areas (the area is rich in gas and chemical pipelines).

ATEX areas

More information in chapter 6.7.

HVAC ducts and piping

Security measures shall in particular take into account factors such as the accumulation of dust and the conduction of heat along the pipelines.

Shutdown work areas

The hot work permits for shutdown areas are issued by the shift foreman or a specifically named person.

9 Checklist for participants of the hot work

A hot work permit is required for hot work. External service providers (contractors) must also have a work permit. The work permits are obtained from the Outokumpu work subscriber or a representative authorized by him/her. Hot work permits will be received from an Outokumpu-employed shift supervisor or a specifically defined person.

When planning how to perform hot work:

1. One should find out if there are alternate methods which could be used.
2. If it is necessary to perform hot work, contact the person responsible for the hot work permits in the area. In the production departments the permit is issued by the area shift foreman or a specified Outokumpu employee.
3. An evaluation and assessment of the workplace hazards is made with the hot work workers and guards in agreement with the hot work permit authority.
4. A review of the hot work site is held and the site is made fire safe (cleaning and protection).
5. A review of the devices and equipment required for the hot work and the extinguishing equipment required for fire protection.
6. Taking care, with the hot work permit issuing authority, of disconnecting the fire alarm devices in the area.
7. Writing and issuing a hot work permit (if necessary, continuing the hot work permit when the issuer of the permit changes on the shift change).
8. Safe performing of the hot work.
9. One should take care that no additional fire load is accumulated in the area.
10. Notification about ending the hot work is given to the instance who gave the permit for the hot work.
11. Follow-up guarding is carried out least two (2) hours after the end of the hot work.
12. Ensure, with the hot work permitting authority, that the fire alarm devices are activated.
13. The group performing hot works is responsible fulfilling the safety requirements and cleanliness of the area.

10 Locations of the permanent hot work sites

10.1 Tornio plant area

In the factory area of Tornio there are permanent hot work sites and sites where no written hot work permit is required.

Permanent hot work sites at the Ferrochrome plant:

- Electric arc furnace 1: electrode casing welding, 4th floor
- Electric arc furnace 2: electrode casing welding, 4th floor
- Electric arc furnace 3: permanent hot work site, 4th floor
- Electric arc furnace 3: electrode casing welding, 4th floor
- Sintering plant: ground level
- Repair shop: permanent hot work site of the repair shop, door 575
- Ladle maintenance area: door 511

Permanent hot work sites at Steel melting shop:

- Grinding shop HK6: Grinding stone installation area
- Continuous casting machine 2: hot work site of the maintenance facility
- Hot work site of the maintenance facility: door 122
- Bricklaying hall 1: door E151
- Bricklaying hall 2: door 159

Permanent hot work sites at Hot rolling mill

- Roll warehouse: door 209
- Roll preparing area: door 208
- Hot work sites of the maintenance facility 2 pcs, door 207
- Electricity repair shop: 2nd floor, door 220

Permanent hot work sites at Cold rolling mill:

- Cold rolling mill 1: Hot work site of the maintenance facility
- Cold rolling mill 1: Hot work site of the electricity repair shop
- Cold rolling mill 2: Hot work site of the repair shop

Permanent hot work sites at the general areas

- Vehicle service, maintenance hall, Caverion site
- Central workshop, welding area
- Workshop of the crane service
- Hot work site of the fire station
- Harbour, repair shop, Havator hall
- Research center: hot work sites 1 and 2 of the workshop
- Water treatment plant: hot work site of the repair shop

Hot work sites where no written hot work permit is required but safety measures must be implemented as in the temporary hot work sites:

- A conventional hot work site in a hot rolling mill, steel melting shop or temporary hot work site in outdoor area where is no flammable material and where the hot work carried out does not cause a risk of ignition to the surroundings.

10.2 Kemi mine

Permanent hot work sites at the Kemi mine:

- Sheet hall of the overground repair shop
- Wwelding work area in the 115 maintenance area
- Welding work area in the 350 maintenance area
- Sheet hall in the 500 maintenance area

Hot work sites where no written hot work permit is required but safety measures must be implemented as in the temporary hot work sites:

- A conventional hot work site in a quarry, drift mine or temporary hot work site in outdoor area where is no flammable material and where the hot work carried out does not cause a risk of ignition to the surroundings.

11 Actions in the event of an accident

In the event of an accident, the internal emergency instructions of the area are to be followed by making an emergency call for help from the firefighting and rescue teams in the area.

Additional information on measures in the event of an accident can be found from the database of the emergency plan.

More information can be requested from fire safety group of HSEQ and safety organization of the Kemi mine.