

**ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH**

Laboratoire Européen pour la Physique des Particules
European Laboratory for Particle Physics

MEMORANDUM

FROM : J. Gulley (SC/GS)
TO : A. Fabich (AB/ATB)
CC : P. Cennini (AB/ATB); T. Otto (SC/RP); B. Pichler (SC/GS); R. Trant (SC/GS).

Subject : Proposed use of mercury at CERN in the Experiment TT2A

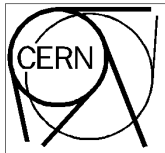
This memorandum outlines some guidelines and preliminary remarks with respect to the proposed use of mercury in the TT2A experiment at CERN.

- i.) The amount of mercury employed in the experiment should be kept to a minimum.
- ii.) On arrival at CERN the mercury will be stored in a dedicated place (e.g. the chemical laboratory 3/1-031).
- iii.) Use the type of container recommended by the manufacturer. Inspect containers for leaks before handling. Secondary protective containers must be used when this material is being carried. Label containers and keep them tightly closed when not in use. Use corrosion-resistant transfer equipment when dispensing.
- iv.) A safe means of filling the system should be proposed (e.g. by vacuum pump).
- v.) The leak-tightness of the closed system used for the experiment must be verified before operation and after any intervention on the system which risks to impair the leak-tightness.
- vi.) Mercury monitoring devices which continuously measure the concentration of mercury in the surrounding air are to be employed at strategic points (inside and outside of the containment that will enclose the apparatus) to give an early warning of a leak or loss of containment. All mercury monitors must be calibrated according to the manufacturer's instructions and give an alarm sufficiently below the exposure limits (i.e. $VME^1 = 0.05 \text{ mg/m}^3$, $VLE^2 = 0.4 \text{ mg/m}^3$). Any alarms generated must be promptly dealt with.
- vii.) Appropriate personal protective equipment, ppe (e.g. lab coat/coveralls, gloves, visor, safety goggles, boots, full-face respiratory equipment), must be made available for all persons who risk to come into contact with mercury during an intervention on the system or during an emergency. N.B. The minimum requirements for ppe must be defined based on the measured concentration and the activity in a similar way to the requirements laid down for the TTF Experiment. A portable mercury monitor is also deemed necessary. The type of gloves and the mercury vapour cartridge used in the respiratory protection must be specified. Cartridges and gloves must be kept outside of the immediate area where the mercury is used and must be changed on a regular basis. Respiratory protection is to be used only for work of short duration (e.g. filling, replacement of filters) or in case of an emergency³.

¹ VME = valeur (limite) moyenne d'exposition.

² VLE = valeur limite d'exposition **calculée sur une courte durée**,

³ Respiratory protection using cartridges is only suitable for protection up to the maximum concentration of mercury specified by the supplier of the cartridge and respirator. Based on the measured concentration the degree of protection will have to be increased with an intervention by the CERN Fire Brigade required above a defined threshold. Whenever the concentration of mercury is unknown an air-supplied respirator must be used.



ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

Laboratoire Européen pour la Physique des Particules
European Laboratory for Particle Physics

- viii.) All filters used in the process must be maintained/replaced on a regular basis such that they continue to fulfil their requirements.
- ix.) Procedures for handling, start-up, operation, shut-down, foreseeable interventions (e.g. filling, emptying, the replacement of filters used in the process) and what to do in an emergency (e.g. spill, first aid) to be drafted and posted at the workplace. The use of personal protective equipment (e.g. gloves, respiratory equipment) to be mentioned implicitly in the procedures where required.
- x.) The Material Safety Data Sheet (MSDS) from the supplier of the mercury must be available for consultation by all users and by emergency personnel in the event of an accident.
- xi.) Measures must be at-hand for immediate first aid in case of eye/skin contact with mercury (i.e. to flush with water).
- xii.) A permanent watch must be maintained during the initial cycle (i.e. during and after filling).
- xiii.) Suitable and sufficient warning panels to be put in place and be clearly visible (SCEM Nos. 50.55.89.560.7, 50.55.84.028.2 and 50.55.84.120.7).
- xiv.) The number of people which it is reasonably foreseeable might be exposed to mercury must be kept to an absolute minimum; all such persons must register with their Medical Service and be properly trained regarding the hazards and safe use of mercury and the actions to take in an emergency. Unprotected persons should avoid all contact. Pregnant women or women that are breastfeeding must not be allowed to work in an area where it is foreseeable that they might be exposed to mercury. No visitors to be allowed.
- xv.) Good personal hygiene measures should be adopted at the workplace (i.e. no eating/drinking/smoking. Washing facilities must be available for use by all persons working with mercury).
- xvi.) At the end-of-life of the experiment the mercury shall be emptied as much as possible from the system into suitable containers and shall then be transported back to Oak Ridge National Laboratory. The emptied system and any other empty containers that might contain residues of mercury shall be considered as hazardous waste and be disposed of according to CERN Rules.
- xvii.) Procedures and equipment must be in place to deal with a fire or a small spill/loss of containment of the mercury on the CERN site(s). Spills must be cleaned-up as thoroughly as possible (e.g. using vacuum spill clean-up equipment). The CERN Fire Brigade must be immediately alerted in case of a fire or a large spill/loss of containment.
- xviii.) In the event of a spill of mercury on the CERN site(s) all contaminated waste, including protective clothing, shall be disposed of according to the CERN Rules. Contact SC/GS-GC.
- xix.) The CERN Fire Brigade must be invited to visit the installation and must be informed when the mercury arrives at CERN.

For any questions or precision concerning the above remarks, please contact J. Gulley.

Attached: 'Fiche Toxicologique No. 55 – Mercure et composés minéraux' ; International Safety Card for Mercury.

=====