The Manual of “all hazards”

Who has never hesitated about which measures to adopt regarding specific hazards? This is especially true for interdisciplinary scientific domains combining chemical manipulations, laser techniques, biological material, ionizing radiation and cryogenics as well as nanomaterials and high magnetic fields.

The Safety Manual aims to be a quick and simple answer to basic questions in relation with our research environment and its hazards. Throughout the 17 chapters and in a bilingual French-English mode, the reader will become acquainted with the safety organization of our school, the assistance he might receive and the specific hazards he might encounter. The first part of each chapter includes a brief summary of the specificity of the domain and of its legislation. The paragraph “What should I know?” is dedicated to those who will start an activity with a new specific hazard. Emphasis is put on prevention.

Those who are already active in a domain will have the opportunity to check if their organizational and technical measures are already settled and meet the expectations (What should I do?). The reader will also find references to specialists or to important directives for the implementation of a safety plan. The chapter ends with a reminder on how to behave in case of emergency.

Finally who has never been doubtful about the choice of the right gloves, the right mask or the right safety coverall? The safety manual includes a chapter focusing on Personal protective equipments (PPE) allowing one to select the adequate product, adequate not only by its compliance with Quality Standards but also by its ability to protect against an identified hazard.

Soon, your safety delegate will have distributed one Safety Manual in each research laboratory. We hope it will become a helpful element in contributing to a safe working place and environment.

We wish you a pleasant reading!

The CRPP (Plasma Physics Research Centre) was founded in 1961 and is now integrated in the School of Basic Sciences of the EPFL. At the EPFL site, its 130 collaborators work in the plasma domain but also in fields as diversified as theory and simulation, industrial applications (deposition of atomic layers) and the mastering of thermonuclear energy, fusion. More than 20 nationalities are represented in the laboratory which contributes to the understanding of the fourth state of matter, to the identification and improvement of innovative industrial processes, to the development of a new energy source, as well as in the training of young physicians. These domains of experimental research require a wide range of tools and technologies, each of them with their hazards. The hazards inherent to the nuclear fusion energy are less important than those present in today’s nuclear energy, the fission. The runaway of the fusion reaction is impossible and the necessary fuels (deuterium and tritium) do not produce radioactive wastes. However, tritium is radioactive with a half-life of 12 years.

At CRPP we are not concerned with nuclear hazards during the experiments as tritium is not used and we are not able to create, even accidentally, the necessary conditions to run a fusion reaction.

Nevertheless, our experiments require important magnetic fields (several Tesla), toxic and explosive gasses (diborane, hydrogen, and deuterium), cryogenics (helium and liquid nitrogen), lasers as diagnostic tool (class 4), microwaves with high power (4.5 MW, 83-118 GHz), particle accelerators, significant electrical power (220 MW) and very high voltage (100 kV). Last but not least, some of these experiments produce X-rays. Each of these hazards taken separately doesn’t reach superlative levels. Our challenge is the variety of dangers and the constant renewal of our co-workers (Master, PhD students and post-doc.). The adequate design of the research equipment already provides a high level of safety. But, a team of specialists in charge of safety in their domains and the awareness of safety aspects by all staff are the best guarantee for a safe and healthy working environment.

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