ISIEC – INITIAL SAFETY INFORMATION ON EXPERIMENTS AT CERN

PURPOSE OF THIS TEMPLATE

This document shall be completed by the GLIMOS of an experimental collaboration, whenever it intends to bring new experimental apparatus, new test beams or make major modifications to experimental apparatus already operating at CERN.

The purpose of this document is to provide a summary description of the equipment that is to be brought to CERN and the activities that are to be carried out. This document will then allow the PH Safety Office (PH-SO) to perform an initial safety assessment; i.e. identification of the applicable safety requirements, control measures, etc.

This ISIEC document will serve as a basis for the safety information on an experiment. Further documentation may be requested to improve the understanding of safety hazards.

For each experimental apparatus, the following procedure applies:

1- The GLIMOS shall fill in chapters 1 to 4.

2- The GLIMOS shall submit this document (ISIEC form) to the PH Unit sps.coordinator@cern.ch and dso-ph@cern.ch

3- Recommendations and procedures will follow after the provision of this document. Note that if the experiment is considered to have major safety implications then the CERN HSE unit will become involved and their safety procedures will then be followed.

4- A Launch Safety Discussion may be called for by the PH-SO. This will take place on site with representatives of the experiment, PH-SO, the HSE Unit and other CERN Departments.

5- A formal 'Safety Clearance' of the experiment must be given prior to the experiment being allowed to start operating (for example to receive beam).

Please note that this form must be completed and sent to CERN prior to the arrival of the planned experiment. Work will not be allowed to start until this form, and any requested complementary information on safety hazards, has been completed and handed over as explained above.

Please complete the following:

NAME OF THE EXPERIMENT: COMPASS/NA58

Filled out by: Gerhard Mallot

Date: 31.07.2014

1 INTRODUCTION

The purpose of this document is to provide a description of the experimental program/test beam to be carried out at CERN; i.e.:

- to identify the equipment brought to CERN;
- to identify activities to be carried out at CERN;
- to identify hazards associated to the equipment and activities and the measures to be implemented in order to eliminate, control or mitigate them.

Please enter the information in the empty cells of the tables below:

1.1 Organization of the Collaboration

Role	Name	Phone/e-mail
Spokesperson	Fabienne Kunne	16-9025, fabienne.kunne@cern.ch
	Andrea Bressan	16-9015, andrea.bressan@cern.ch
Technical coordinator	Johannes Bernhard	16-4896, johannes.bernhard@cern.ch
Run Coordinator	Oleg Denisov	16-0810, oleg.denisov@cern.ch
GLIMOS	Gerhard Mallot	16-3425, gerhard.mallot@cern.ch
SPS Coordinator	Henric Wilkens	16-3845, spsco@cern.ch
DSO-PH	Mark Hatch	dso-ph@cern.ch
Liaison Physicist	Lau Gatignon	16-3554, lau.gatignon@cern.ch
TSO	Victor de Jesus	16-3551, vitorino.de.Jesus@cern.ch

1.2 Schedule and location of the experimental apparatus or test beam

Start date:	06.10.2014
Completion date:	14.12.2014
Building/experimental area	888
Beam line/PPE door	M2/PPE221
Lab/Counting room/Phone	888/892-R-D10 / 76 78058

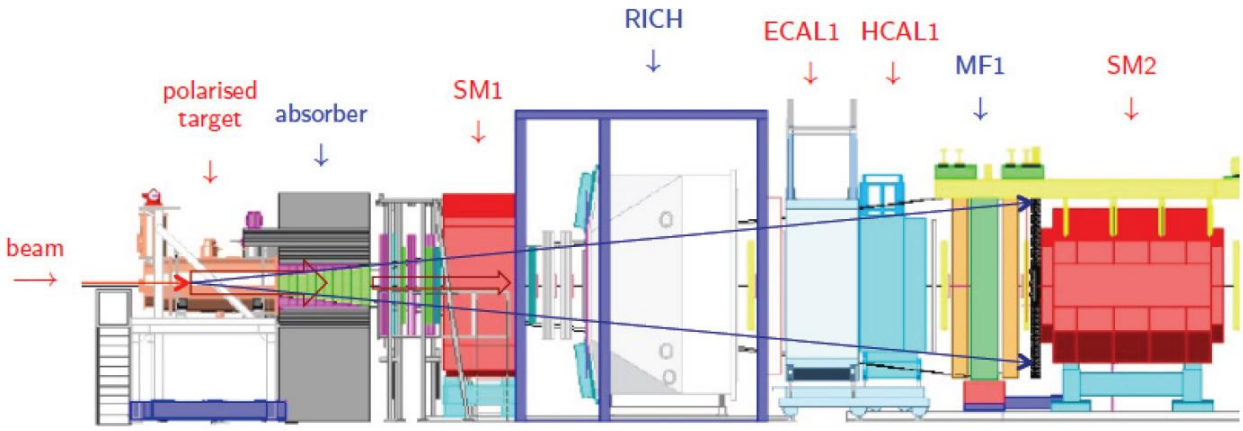
2 DESCRIPTION OF THE EXPERIMENTAL APPARATUS/TEST BEAM

2.1 General description of the experimental apparatus/test beam

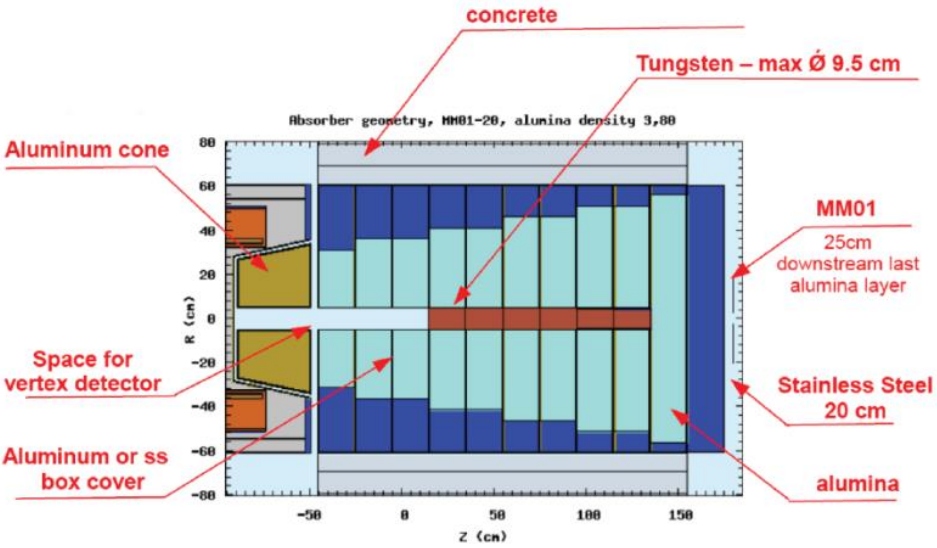
Please type a description of the experimental apparatus/test beam and the associated equipment. In order to enable an understanding the layout, add pictures and diagrams whenever possible:

About 60 m long, 2-stage magnetic forward spectrometer using a polarised target with a variety of tracking detectors, calorimeters and a RICH detector and about 250000 readout channels. Along the beam the elements are: beam detection, polarised target, hadron absorber, tracking, SM1 dipole magnet, tracking, RICH detector, tracking, ECAL1, HCAL1, tracking, muonfilter 1, SM2 dipole magnet, tracking, ECAL2, HCAL2, muonfilter 2, tracking. Trigger hodoscopes are interspersed in the spectrometer downstream of SM1. A description of a previous setup (very similar apart from the hadron absorber) can be found at NIM A577 (2007) 455-518.

The upstream part of the spectrometer up to SM2 is shown below in a side view. Everything downstream of the absorber is essentially unchanged wrt previous runs.



The inner part of the hadron absorber shown below consists of a tungsten rod surrounded by alumina and stainless steel. The outer part is made by concrete blocks. The whole design is checked in numerous simulations with RP.



2.2 Description of the installation

Complete the cells below and double click on the boxes and check as appropriate.

Equipment	Availability	Design and manufacturing
beam Cedars	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
beam detection: scifis	☒ Existing	☒ To be used without any modification ☐ To be modified
	☒ New	☐ Standard equipment supplied by a manufacturer ☒ CERN/collaboration responsible for the design and/or manufacturing
Polarised target magnet system	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
Polarised target power and control	☐ Existing	☐ To be used without any modification ☐ To be modified
	☒ New	☐ Standard equipment supplied by a manufacturer ☒ CERN/collaboration responsible for the design and/or manufacturing
Hadron absorber	☐ Existing	☐ To be used without any modification ☐ To be modified
	☒ New	☐ Standard equipment supplied by a manufacturer ☒ CERN/collaboration responsible for the design and/or manufacturing
Tracking upstream SM1 magnet	☒ Existing	☒ To be used without any modification ☐ To be modified
	☒ New	☐ Standard equipment supplied by a manufacturer ☒ CERN/collaboration responsible for the design and/or manufacturing
SM1 Magnet	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
Tracking between SM1 and RICH	☒ Existing	☒ To be used without any modification ☐ To be modified
	☒ New	☐ Standard equipment supplied by a manufacturer ☒ CERN/collaboration responsible for the design and/or manufacturing
RICH	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
tracking between RICH and SM2	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or

		manufacturing
ECAL1 and HCAL1	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
SM2 Magnet	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
tracking between SM2 and Muon Filter 2	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
ECAL2 and HCAL2	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
tracking downstream Muon Filter 2	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
Hodoscopes	☒ Existing	☐ To be used without any modification ☒ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing
tracking between SM2 and Muon Filter 2	☒ Existing	☒ To be used without any modification ☐ To be modified
	☐ New	☐ Standard equipment supplied by a manufacturer ☐ CERN/collaboration responsible for the design and/or manufacturing

2.3 Hazards generated by the experimental apparatus/test beam

Identify the hazards associated to each part of the experiment and the associated equipment that is to be integrated in the experimental apparatus/test beam. Double click on the boxes and check as appropriate. Provide comments or values under the description.

Domain	Hazards/Hazardous Activities		Description
Mechanical Safety	Pressure	☐	[pressure][bar]; [volume][l]
	Vacuum	☒	insulation vaccum of superconducting target magnet
	Lifting equipment	☒	cranes, cherry picker, paloniers

	Machinery / Machine Tools	☒	small workshop
	Mechanical energy (moving parts)	☐	
	Mechanical properties (sharp, rough, slippery)	☐	
	Industrial Vehicles	☐	
	Hot Work (e.g. welding, grinding)	☐	
	Hot/cold surfaces	☒	target system, pumps
	Vibration	☐	
Cryogenic Safety	Cryogenic fluid	☒	He liquid[~2 m^3]
Structural Safety	Shielding Walls	☒	around zone, hadron absorber, muon filters
	Specific actions/conditions	☐	
Electrical and Electro-magnetic Safety	Electrical equipment and installations	☒	[voltage] [V], [current][A]
	High Voltage Equipment	☒	chambers and PMs up to 4500V
	Magnetic field	☒	max 2.5T
	Equipment in potentially explosive atmospheres	☒	gas mixing area
Chemical Safety	Hazardous chemical agent (HCA)	☒	NH3, 320g
	CMR (carcinogens, mutagens and substances toxic to reproduction)	☐	
	Toxic/Harmful	☐	[fluid], [quantity]
	Corrosive	☐	[fluid], [quantity]
	Oxidizing	☐	[fluid], [quantity]
	Flammable	☒	chamber gases: methane, ethane, ~1 m^3
	Potentially explosive atmospheres	☐	[fluid], [quantity]
	Irritant	☐	[fluid], [quantity]
	Asphyxiant	☐	[fluid], [quantity]
	Nanomaterial's	☐	
	Dangerous for the Environment	☐	
	Asbestos	☐	

Biological Safety	Legionella	☐	
	Biological Agents	☐	
Non-ionizing radiation Safety	Laser, class	☒	several lasers for calibration
	Radiofrequency	☒	NMR system
	Microwaves	☒	polarised target DNP
	UV light	☐	
	Electromagnetic (Frequency & Field strength)	☐	Hz, Vm^{-1}
Workplace	Excessive Noise	☐	
	Temperature constraints (non-comfortable)	☐	
	Insufficient Lighting	☐	
	Indoor Air quality (e.g. clean rooms)	☐	
	Confined space	☒	RICH vessel
	Work at height	☒	occasionally
	Obstructions in passageways	☐	
	Lone working	☐	
	Falling objects	☐	
	Internal Traffic (e.g workshops, experiments)	☐	
	Slippery/unstable ground	☐	
	Working outside normal working hours	☒	of course, 24h during data taking
Environment	Usage/storage of potentially polluting substances (gases, liquids, solids)	☐	
	Emissions of substances into the atmosphere	☐	
	Discharge of effluents to the site drainage (i.e. infiltration water, rain water, cooling water…)	☐	
	Discharge of effluents to sewage (i.e. sanitary water…)	☐	
	Activated or radioactive soil	☐	
	Polluted or contaminated soil	☐	
	Emission of noise harmful for the environment	☐	
	Vibrations harmful for the environment	☐	
	Odours	☐	
	Waste generation	☐	

	Significant consumption of resources (e.g. water, electricity gas, fuels, ...)	☒	electricity: SM1 and SM2 are conventional magnets
Worksite	Construction & dismantling activities	☐	
	Co-activity	☐	
Fire Safety	Hot works	☐	
	Combustible Materials	☐	
	Ignition sources	☐	
Ionizing Radiation	Target material	☒	NH_3
	Beam particle type	☒	negative pions
	Beam intensity	☒	10^8/s during spill
	Beam energy	☒	190 GeV
	Source		occasionally

Table 1 - Hazard identification

Include below a table of any other hazards that may be present – if applicable.

3 DESCRIPTION OF THE ACTIVITIES CARRIED OUT AT CERN

3.1 Description of installation activities

*Please type below a description, with explanations as necessary, to provide an understanding of the **installation** activities, i.e.: handling procedures, handling equipment needs (mobile cranes...):*

The main installations are
- reinstallation of the polarised target system, requires crane
- installation of new power supplies and control of the target system, racks and cabling
- installation of the hadron absorber, requires cranes
- multiple rearrangements, some requiring cranes

3.2 Description of the operation

*Please type a description, with explanations as necessary, to provide an understanding of the **operation** of the experimental apparatus.*

The apparatus will start operation in September for check out. From October to December operation with negative pion beam. The control room has been moved to 892 to keep radiation as low as possible. The operation consists of scattering the beam pion off the polarised target and recording the traces left by the particles in the detector via central data recording. Shifts are operated by 2-3 people around the clock. They check continuously the performance of the appartus Shifts are of 8h and coordinated by a Period Coordinator. The whole run is supervised by a Run Coordinator. Daily meetings will discuss problems and the progress of the data taking.

3.3 Description of the maintenance

*Please type a description, with explanations as necessary, to provide an understanding of the **maintenance** activities related to the experiment/ equipment.*

Maintenance is different for each equipment. Most equipment does not require regular maintenance but is switched on before the beam arrives and problems are fixed as they occur. Regular maintenance is mainly for pumps: changing oil, membranes, etc.

4 SAFETY ASSESSMENT

For the key identified hazards of an experimental apparatus and activity, measures shall be taken in order to eliminate, control or mitigate them. The table below shall contain the list of the key hazards and the measures that are to be implemented.

Key hazards identified	Location	Measures to be implemented
magnetic fields	polarised target	flash lights, emergency stops, being installed
cryogenic fluids	polarised target	included in design, e.g. quench line
flammable gases	wire chambers	gas detection stopping flow, installed

5 ROLES AND RESPONSABILITIES

5.1 GLIMOS

According to the § 5.4 of the Safety Policy at CERN (SAPOCO): *"For Safety matters, an experiment or test is represented by a Group Leader in Matters of Safety (GLIMOS), who is responsible for Safety, with the necessary authority, from the design stage and subsequently throughout the development, construction, and operational stages of the equipment until it is finally dismantled and correctly disposed of*".

In the absence of an appointed GLIMOS, all his duties and responsibilities fall automatically on the Technical Coordinator or, if one does not exist, to the Spokesperson.

5.2 HSE Unit

According to the § IV of the Mandate of the Occupational Health & Safety and Environmental Protection Unit (HSE):

"*The HSE Unit provides Safety clearance for activities, special equipment, installations, experiments and projects with* ***major Safety implications*** *prior to design, operation or dismantling activities*".

For experiments less than 3 weeks duration, and if there are no major safety implications, then the PH-SO procedure will be followed (the ISIEC form and formal safety clearance by PH-SO).

5.3 TSO

According to the Safety Guide for experiments at CERN the task of Territorial Safety Officers is to watch over the safety of and in the region or building(s) under their responsibility, thereby ensuring that no part of the CERN site(s) escapes safety surveillance. However, the character of the various regions differs considerably, and consequently also the roles of the TSOs. We shall in this guide limit the considerations to those TSOs that are responsible for either experiment areas or buildings housing experiment support labs/workshops.

6 SAFETY CLEARANCE

The procedure for the safety clearance will depend on the type and duration of the experiment and whether or not there are major safety implications. In all cases a formal safety clearance is a requirement before an experiment can start operating

7 PS/SPS PHYSICS COORDINATOR

The PS/SPS physics coordinator establishes the AD/PS/SPS user schedules, represents the users at the different scientific and technical committees, being the contact person for both the accelerator groups and the experimental users. He also reports to the CERN management.

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ANNEX

Terms and abbreviations in English

CSHS	Special Health and Safety Committee
CSO	Cryogenic Safety Officer
CSOC	Cryogenic Safety Officers' Committee
DSO	Departmental Safety Officer
DSOC	Departmental Safety Officers' Committee
FGSO	Flammable Gas Safety Officer
FGSOC	Flammable Gas Safety Officers' Committee
GLIMOS	Group Leader In Matters Of Safety
HSE	Occupational Health & Safety and Environmental Protection Unit
PH-SO	Physics Department Safety Office
RSO	Radiation Safety Officer
SAPOCO	SAfety POlicy COmmittee
SLIMOS	Shift Leader In Matters Of Safety
TSO	Territorial Safety Officer