Phénomènes dangereux d’origine chimique

Subjects:

1. CERN chemical safety rules
2. Chemical hazards and labelling
3. Safety Data Sheet (SDS) – Fiche de Données de Sécurité
4. Chemical storage
5. Collective protection
6. Mitigation
7. Personal protective equipment
8. Disposal of chemicals
9. Safety Training

CERN chemical safety rules

CERN has defined its **chemical safety rules**.

The **Safety Regulation on Chemical agents** sets out the minimum requirements for the protection of persons from risks to their occupational health and safety.

General Safety Instructions (GSI) have also been established and apply to:

- prevention and protection measures
- explosives atmospheres
- monitoring of exposure to hazardous chemical agents in workplace atmospheres

Chemical safety rules

Chemical hazards and labelling

Chemical products must be **labelled**.

An **international classification and labelling system** of chemical products is now used

Former

New

Chemical hazards and labelling

EC labels

Acetone

Danger!

Highly flammable liquid vapor. Causes severe eye irritation.

Keep away from heat, sparks and flame – No smoking. Take precautionary measures against static discharge. Keep from direct sunlight. Keep container closed when not in use. Store in a cool/low temeprature, well-ventilated place away from heat and ignition sources. Use only in a well-ventilated area. Avoid contact with eyes, skin and clothing. Wear appropriate personal protective equipment, avoid direct contact.

IF CONTACT WITH EYES: Flush eyes with water for at least 15 minutes while holding eyelids open.

In case of fire, use water spray, fog or mist. Dry chemicals. Halon. Powder, foam or CO2.

See Safety Data Sheet for further details regarding safe use of this product.

ABC Company, Main Street, Anytown, NJ 00000, Tel: 555 123 4567

Labels available from the CERN Stores

edh.cern.ch

SCEM: 19.19.35

SCEM: 50.55.20

Chemical hazards and labelling

The label is used to provide mandatory information about the **gases** contained in the bottle.

1. Name of product
2. Material identification number
3. Hazard diamond
4. Hazards and precautions
5. Contact information

Chemical hazards and labelling

“Toxics”

These substances **can be poisonous** even at small doses, can pose a serious health risk, in the short or long term, and may even result in death.

Examples: *cyanides, methanol, asbestos, wood dust, mercury, lead…*

CMR products are carcinogenic, mutagenic and toxic to reproduction.

Examples of carcinogens: *asbestos, beryllium and some of its compounds, tobacco, wood dust, chromic acid, chromium VI…*

Examples of mutagens: *chromic acid, bromine, benzene…*

Examples of substances that are toxic to reproduction: *lead and some of its compounds, carbon monoxide, mercury…*

Chemical hazards and labelling

Specific Target Organ Systemic Toxicity

Nervous system

Examples: *organic solvents, lead, mercury, carbon monoxide…*

Kidneys, bladder, liver

Examples: *carbon tetrachloride, lead, mercury…*

Chemical hazards and labelling

“Agressive chemicals”

Corrosive substances which, when in contact with living tissue, can have a destructive effect.

Examples: *acids (nitric, hydrochloric, sulphuric), bases (sodium hydroxide), some glue hardeners, halogen gas…*

Non-corrosive substances which, on immediate, delayed or repeated contact with skin or the respiratory system can provoke an **inflammatory reaction**.

Examples: *diluted solutions of acids and alkalis, glass fibres, epoxy resins, acetone…*

Chemical hazards and labelling

Physical hazards

Substances which can provoke or aggravate a **fire**, or even provoke an **explosion**, if in the presence of flammable materials.

Examples: *oxygen, hydrogen peroxide, sodium hypochlorite, nitric acid, perchlorates, permanganates, persulfates…*

Substances which can **explode**:

- in contact with a flame, a spark, static electricity,
- heat, shock, friction…

Chemical hazards and labelling
Physical hazards

Flammable substances

- Self-heating and self-igniting in air normal temperature,
- Solids, easily self-igniting in brief contact with an ignition source,
- Liquids, which have a flash point below 60°C,
- Gases which are flammable in air at normal atmospheric pressure,
- Substances which, in contact with water or humidity in the air, react to produce flammable gases in dangerous quantities

Examples: *flammable gases (acetylene, methane, isobutane, hydrogen), flammable liquids (ethanol, methanol, acetone), flammable solids (certain metals in the form of dust), alkali metals ("water-reactive"): potassium, sodium, lithium)…*

Chemical hazards and labelling
Others

Sensitising agents are chemicals that cause a substantial proportion of people exposed to them to develop an allergic reaction in normal tissue after repeated exposure.

Sensitising in case of skin contact, or respiratory sensitisers (asthma).

Typical reactions to sensitisers can include skin disorders such as eczema.

Examples: *some glues, some epoxy resins, some fluxes used in welding/soldering…*

Chemical hazards and labelling
Others

Hazardous for the environment

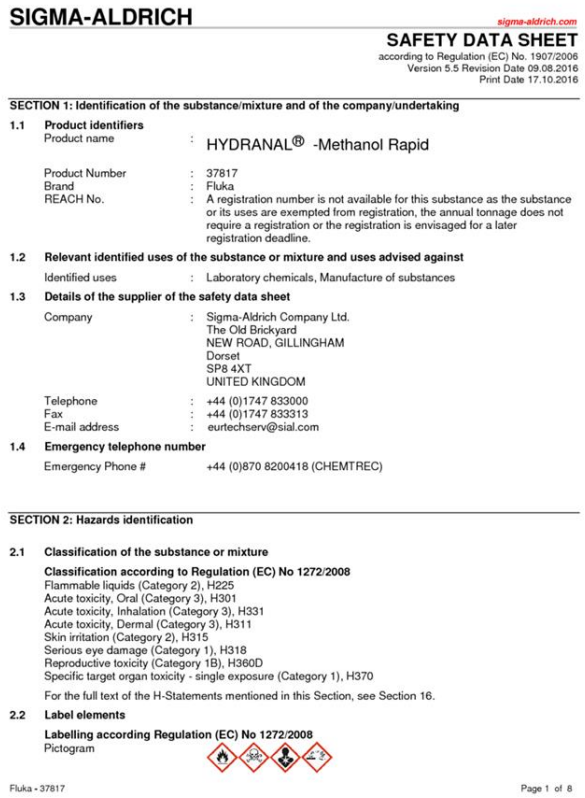
Examples: *solvents, some glues, paints, hardeners, biocides/pesticides…*

Pressurised gas

Examples: *compressed gases, liquefied gases and dissolved gases*

Safety Data Sheet (SDS) – Fiche de Données de Sécurité

Safety Data Sheet
=
main tool to communicate information on chemical product risks



SIGMA-ALDRICH

sigma-aldrich.com

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 09.08.2016
Print Date 17.10.2016

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : HYDRANAL® -Methanol Rapid

Product Number : 37817
Brand : Fluka
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Company Ltd.
The Old Brickyard
NEW ROAD, GILLINGHAM
Dorset
SP8 4XT
UNITED KINGDOM

Telephone : +44 (0)1747 833000
Fax : +44 (0)1747 833313
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # +44 (0)870 8200418 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Reproductive toxicity (Category 1B), H360D
Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Fluka - 37817 Page 1 of 8

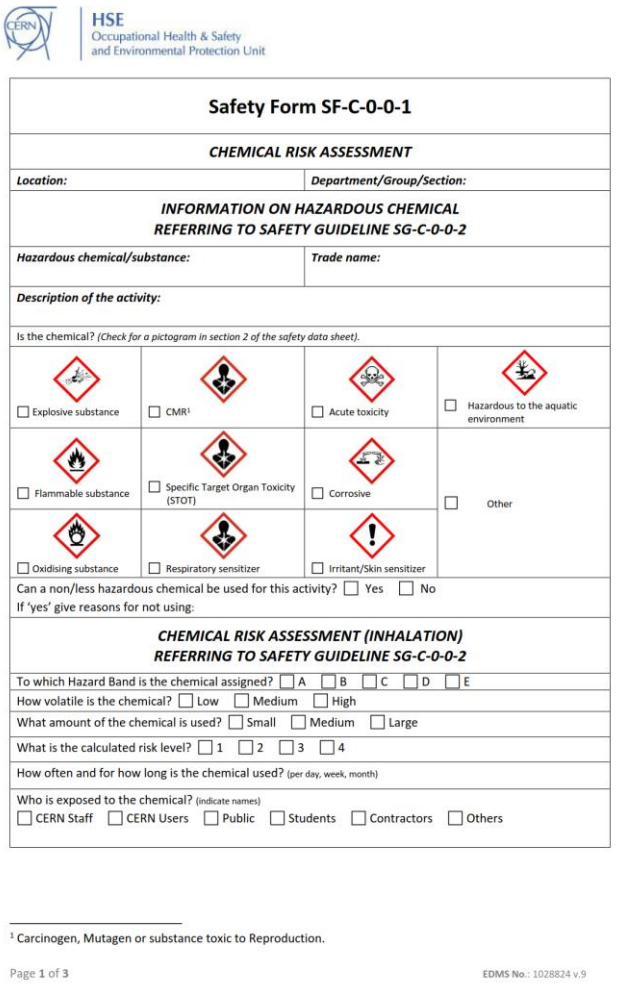
The **SDS** is:

- provided by a supplier to the customer before or at the time of first delivery
- free of charge,
- on paper or in electronic form,
- in English or French.

Note: SDS are available in EDH for chemical products purchased from the CERN Store

Chemical storage

- Use original containers, in good condition,
- Legible labels,
- Limit the quantities stored,
- Permanent general ventilation,
- Fill-in the chemical inventory form (SF-C-1-0-2).



HSE
Occupational Health & Safety and Environmental Protection Unit

Safety Form SF-C-0-0-1

CHEMICAL RISK ASSESSMENT

Location:	***Department/Group/Section:***

INFORMATION ON HAZARDOUS CHEMICAL REFERRING TO SAFETY GUIDELINE SG-C-0-0-2

Hazardous chemical/substance:	***Trade name:***

Description of the activity:

Is the chemical? *(Check for a pictogram in section 2 of the safety data sheet).*

☐ Explosive substance	☐ CMR[1]	☐ Acute toxicity	☐ Hazardous to the aquatic environment
☐ Flammable substance	☐ Specific Target Organ Toxicity (STOT)	☐ Corrosive	☐ Other
☐ Oxidising substance	☐ Respiratory sensitizer	☐ Irritant/Skin sensitizer	

Can a non/less hazardous chemical be used for this activity? ☐ Yes ☐ No
If 'yes' give reasons for not using:

CHEMICAL RISK ASSESSMENT (INHALATION) REFERRING TO SAFETY GUIDELINE SG-C-0-0-2

To which Hazard Band is the chemical assigned? ☐ A ☐ B ☐ C ☐ D ☐ E

How volatile is the chemical? ☐ Low ☐ Medium ☐ High

What amount of the chemical is used? ☐ Small ☐ Medium ☐ Large

What is the calculated risk level? ☐ 1 ☐ 2 ☐ 3 ☐ 4

How often and for how long is the chemical used? (per day, week, month)

Who is exposed to the chemical? (indicate names)
☐ CERN Staff ☐ CERN Users ☐ Public ☐ Students ☐ Contractors ☐ Others

[1] Carcinogen, Mutagen or substance toxic to Reproduction.

Page 1 of 3 EDMS No.: 1028824 v.9

Chemical storage

- Separate incompatible chemicals
- Place flammable liquids / water reactive chemicals / oxidising / in specific cupboards
- Place toxic chemicals in ventilated cupboards
- Separate strong acids and bases

+	-	-	+	
O	-	+	-	
+				
+				

Click on the sign to enlarge it

											none
	+	+	-	-	-	+	+	+	+	+	+
	+	+	+	+	-	+	+	+	+	+	+
	-	+	+	+	-	-	+	-	+	+	+
	-	+	+	+	-	-	-	-	-	-	-
	-	-	-	-	+	+	+	+	+	+	+
	+	+	-	-	+	+	-	+	+	+	+

- Flammable liquids and aerosols
- Substances liable to spontaneous combustion
- Substances that form flammable gases in contact with water
- Flammable solids

Click here to see the colour key

Chemical storage

Make sure you have:

- **Appropriate containers and cupboards**
- **Suitable spill retention**
- **Appropriate means for dealing with emergencies (absorbent materials for liquid spills)**

Articles available from the CERN Store

SCEM: 55.50.71

Absorbent 'Snow': **SCEM: 58.81.30.500.9** or 'Absorbent multiforme' **(SCEM: 58.81.30.600.6)**

SAFETY CANS
SCEM: 50.70.00 & 50.70.00.A

FIRE RESISTANT CABINETS.
SCEM: 53.12.63.A

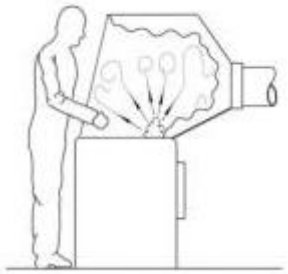
Collective protection equipment

Local exhaust ventilation (LEV) systems are used to eliminate hazardous chemical agents which are likely to become airborne

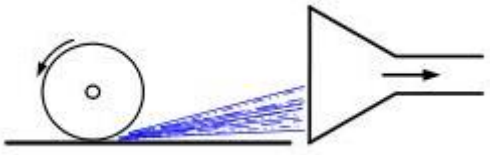
They must be designed, built, installed and maintained to enable:

- either the safe and effective evacuation of the contaminated air from the workplace to a safe area,
- or the filtration or treatment of the contaminated air.

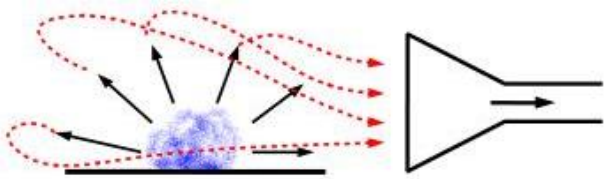
Three basic types of LEV hood:



Enclosing
(Contain and separate)



Receiving
(Receive, contain and empty)



Capturing
(Capture)

Collective protection equipment

All Local Exhaust Ventilation systems (fume cupboard, capturing/receiving hood…) are subject to an annual inspection and the HSE Unit should have a record of them.

A label which indicates the result of the test and the date for the next control must be visible on the equipment (pink label if test was failed).

Mitigation

The installation should be based on an assessment of the hazards present

It should be:

- as close to the hazard as possible,
- at a maximum distance of 30 metres (corresponding to a maximum walking time of 10 seconds),
- at a maximum distance of 10 metres (where the risk is judged to be elevated),
- easily visible, with unobstructed access (no doors / steps),
- safe distance from electrical equipment in the vicinity.

Mitigation

For situations where the installation of a fixed safety shower or eye wash is not practical (e.g. maintenance) or where there are problems with the quality of the water supply…

… **portable equipment** (e.g. wash bottles, sprays, portable safety shower, etc.) should be used (CERN Stores, SCEM: 50.64.41).





Mitigation

Use the Safety form “Test of safety showers / eyes washes” to register:

- **weekly test,**
- **faults, observations…**

The form should be displayed next to the apparatus

HSE
Occupational Health & Safety
and Environmental Protection Unit

Safety Form SF-C-1-0-3

TEST OF SAFETY SHOWERS / EYES WASHES

INFORMATION REFERRING TO GENERAL SAFETY INSTRUCTION GSI-C-1
Prevention and Protection Measures

WEEKLY TEST

The following points must be verified during the weekly test (in accordance with EN 15154 parts 1 and 2):

- The ON/OFF valves must be operational, activated by a single motion; water flow remains ON when the operator removes his/her hand;
- Water flows freely and is directed at the proper angles to flush the eyes or body as appropriate;
- The temperature is tepid (recommended range is between 20°C – 25°C).

Run the eyewash/shower for ten seconds. The running water must be clear. If the water is cloudy, discoloured, or contains sediment, start another ten-second flush; continue flushing at ten-second intervals until the water flushes clear. Ensure the water is captured in a suitable container (if no plumbed drain exists). If any water is spilled on the floor, dry the area before leaving to prevent a slip hazard.

Item:	***Location:***

TO REPORT ANY FAULT, CALL: TEL. 77777 (or create a ticket in ServiceNow)
(for all site buildings, with the exception of "Machine structures" at PS, SPS, LHC, CNGS, POPS and buildings 180, 183, 212, 354, 378, 513. For these buildings **CALL CONTROL ROOM: TEL. 72201**)

Mitigation

Points to check:

- activated in a single action;
- water flows freely, at correct angles;
- temperature controlled (tepid water, 20-25 °C);
- clear (not cloudy or coloured) drinking water quality.

Personal protective equipment

Chemical protective gloves

A range of chemical protective gloves is available from the CERN Stores. Safety Guideline SG-C-1-0-2, Chemical protective gloves.

No. SCEM: 50.43.20.AB **Material: Natural rubber**	No. SCEM: 50.43.20.AC (060.5 to 063.1) **Material: Butyl rubber**	No. SCEM: 50.43.20.A **Material: Viton ®**	No. SCEM: 50.43.20.AC (054.5 to 058.1) **Material: Nitrile**	No. SCEM: 50.43.20.AD **Material: Nitrile**	No. SCEM: 50.43.20.AC (770.1 to 780.3) **Material: PVC**
					
Handling of concentrated acids: - nitric, - hydrofluoric, - chromic, - etc.	Handling of certain solvents/acids: - acetone, - ethylene diamine, - methyl ethyl ketone, - methanol, - acetic acid (glacial), - etc.	Handling of certain solvents: - toluene, - methylene chloride, - perchlorethylene, - xylene, - etc.	Handling of acids and weak bases, oils and certain solvents: - phosphoric acid, - acetic acid, - hydrochloric acid, - sodium hydroxide, - hexane, - propanol, - etc.	Handling of certain substances where dexterity is required. Low chemical and mechanical resistance. Very short-term protection against accidental splashes of low hazard substances.	Handling of acids and weak bases, oils and certain solvents. Ideal for anyone sensitive to natural rubber latex proteins or glove chemicals.

Personal protective equipment

Eye protection.

Safety glasses are the minimum protection required when handling hazardous chemicals. Risk of splashing – use a visor, or even a visor and goggles.

50.49.10.BD – SAFETY GLASSES

50.49.10.D – CHEMICAL GOGGLES

50.49.15.A – VISOR

Personal protective equipment

Make sure you wear the appropriate respiratory protective equipment when there is a risk of being exposed to hazardous chemical agents through inhalation, in particular for the following categories:

- **Dusts and fibers,**
- **Aerosol and fumes,**
- **Gas and vapours.**

Articles available from the CERN Store

50.49.20.A – HALF-MASKS

50.49.20.AD – FULL-FACE MASK

50.49.20.BD – DISPOSABLE MASKS, PROTECTION AGAINST PARTICLES, P2 – P3

Personal protective equipment

Respiratory protective equipment

If you need to wear respiratory protective equipment, complete the **Safety form** SF-C-1-0-4 – Respirator use.

HSE
Occupational Health & Safety
and Environmental Protection Unit

Safety Form SF-C-1-0-4	
RESPIRATOR USE	
INFORMATION REFERRING TO GENERAL SAFETY INSTRUCTION GSI-C-1 Prevention and Protection Measures	
When there is a need to wear Respiratory Protective Equipment (RPE)[1] to control exposure to chemicals this form must be completed before a respirator may be worn to ensure that the wearer is competent and suitably protected.	
RESPIRATOR SAFETY TRAINING INCLUDING PRACTICAL FIT TEST	
Training completed: ☐	***Date of training course:*** date
Reference for training course: STRPE01IF (Respiratory Protective Equipment – Fundamentals)	
Fit Test successfully completed by the wearer for all the types of masks to be worn[2]: ☐	***Date of Fit Test:*** date
AUTHORIZATION BY SUPERVISOR: (takes note that wearer has been trained in relation to the protection equipment defined in Table 1)	***ACCEPTANCE BY WEARER:*** (agrees to use, wear and maintain RPE in accordance with the training received, the manufacturers' instructions and this assessment) (Table 1)
Print name: name ***Date:*** date	***Print name:*** name ***Department/Group:*** dep/grp ***Date:*** date
Signature:	***Signature:***
TRACEABILITY	
EDMS No.: edms No	
Distribution: Wearer-supervisor, HSE Unit, for CERN Members: CERN Medical Service, for CERN Contractors: Prevention Plan.	

To be authorised, you must:

- complete the assessment form
- attend the training course "Use of respiratory protective equipment" from the safety training catalogue
- successfully complete your «Fit-test»

Personal protective equipment

The fit-test

- checks that the respirator facepiece matches the person's facial features and provides an adequate seal to the wearer's face.
- also useful for checking that wearer can put on the facepiece correctly.
- should be repeated if the wearer's facial characteristics change (e.g. significant loss or gain of weight) or if a different size or model of RPE is selected.
- should be redone every year

The Fit-Test normally takes 15-20 minutes and is organised after registering for the course "Respiratory Protective Equipment - Fit Test" in the Training Catalogue. This should normally occur after attendance of the half-day training course "Respiratory Protective Equipment – Fundamentals".

Disposal of chemicals

- Systematically dispose of chemicals that are no longer used or are out-of-date !
- Have at hand a means of recovering chemicals in the event of small spills (e.g. absorbent materials)
- Use original or suitable containers, identified with the name of the chemical and appropriate hazard warning symbols.
- Don’t dispose of chemicals down the sink.
- Empty containers are still classed as waste.
- All containers (full or empty) must be transported to Building 262, by completing an internal transport request (via EDH).

Consult the dedicated procedure for dealing with chemical waste:

http://smb-dep.web.cern.ch/en/Waste/Chemical_waste

Chemical safety training

- SIR – on-line training:
  - Chemical Safety – Awareness

- Classroom courses:
  - ATEX Habilitation - Level 1
  - ATEX Habilitation - Level 2

  - Respiratory Protective Equipment – Fundamentals
  - Respiratory Protective Equipment - Fit Test


CERN