UNIVERSITÀ DEGLI STUDI FIRENZE

03/05/2017

Waste Management in CERM laboratories
&
Instructions in case of emergency at CERM

Dr. Ph.D. Marco Allegrozzi

- Basic concepts of Italian and EU law about waste
- Classification and identification codes of waste
- Main types of waste which are produced in CERM: their origin, types of waste containers, collection in laboratories, pre-processing, labelling.
- Final collection, stocking and waste disposal procedures
- SISTRI system general overview

- What to do in case of an emergency situation

From an historical point of view, in Italy, the first law concerning waste was issued in ***1982*** (**D.P.R. 915/82**).

In ***1997***, following the EU Directive 91/156/CEE, 91/689/CEE on "*waste and dangerous waste*" and 94/62/CEE on "*packaging and packaging waste*", the **D.Lgs. 22/97** ("Decreto Ronchi") was issued.

Today
Italian norms about **WASTE MANAGEMENT** are described in the

Decreto Legislativo 152/06
(Testo Unico Ambientale)

and following amendments
(D.Lgs. 4/2008, D.Lgs. 205/2010)

D.Lgs. 152/06 widely concerns about many issues regarding
PROTECTION OF ENVIRONMENT

…thus describing **DEFINITIONS** and **LIMITS** of **CONTAMINANTS** for the quality of **AIR**, **SOLE**, and **WATER..**.

Many **ADMINISTRATIVE COMPLIANCE** are described and formalized

(for example VIA, Valutazione di Impatto Ambientale….)….

….**RESPONSABILITIES** of the Italian authorities

with respect to the protection of the environment are described……

….and also **TECHNICAL ISSUES** are presented:

for example, *freshwater sources* are classified in 3 different class on the basis of the limits of chemical and microbiological contaminants, and the methods of purification which are requested for each class to make the water *drinking* are indicated.

Part IV of D. Lgs.152/06

concerns about **waste mangement**

Some basic law concepts about waste management are:

WASTE must be recovered and disposed without any risk for **MEN'S HEALTH**,
and without using any procedure which can cause damage to the **ENVIRONMENT**
(water, air, soil, animals and plants…noise, smells, landscapes, artistic areas)

WASTE MANAGEMENT is organized according to the principle of **COLLABORATION** among all the "**players**" which are involved in the "**CHAIN**" and according to the principle that "the polluter must pay"

It is essential to develop:

"**clean**" **technologies**, for a more rational use and saving of the natural resources;

manufacturing and **commercializing** goods which, with respect to their production, use and disposal, can save or reduce waste and risk of pollution;

technical abilities to remove dangerous substances from waste, to support recycling;

Waste for final disposal treatment must be

as reduced as possible (in mass and volume)

increasing abilities on re-use, recycling, and recovery

Among the definitions, law identifies what can be considered **WASTE**,
who is the **PRODUCER**, the **HOLDER**….

WASTE

«every substance or object *(...in Annex A*) that the holder throws away,
or decided to throw away, or must throw away»

PRODUCER

«the person whose activity produced waste...and the person who did pre-processing, mixing or some other activity that changed the initial composition of waste»

Not only the producer, but also the legal subject

HOLDER

«the producer or the legal subject which own waste»

(Art 183 D.Lgs. 152/06)

and all other **"PLAYERS"** and **"ACTIONS"**
which are involved in the **CHAIN** of waste management
(HOLDING AREA, CARRIERS, DRIVERS, PLANTS, DISPOSAL and RECOVERY OPERATIONS…)

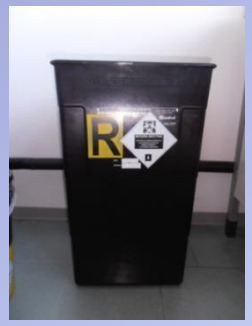
WASTE

«every substance or object *(...in Annex A)* that the holder throws away, or decided to throw away, or must throw away»

Cyt c of 1995!

OLD

+



=

?

?

EXPIRED

?

THROWN AWAY

NORMED

Legge 221/2015

ABANDONED

?

WASTE MANAGEMENT is a **CHAIN**:

in the lab we are the **FIRST LINK**!

WASTE ORGANIZATION IN THE LAB

is carefully described in the

Documento di Valutazione dei Rischi DVR

(Risk Assessment Document) of D.Lgs. 81/08

Additionally, for some classes of **WASTE** there are
specific laws which describe their management
In particular, for what concerns waste produced at CERM, these classes are:

WASTE containing ***BIOLOGICAL AGENTS***
(**Title X of D.Lgs. 81/08)**

WASTE containing ***GENETICALLY MODIFIED ORGANISMS***
(**D.Lgs. 206/01** and amendments)

***HEALTHCARE* WASTE**
(the **D.Lgs. 152/06** refers to the **D.P.R. 254/03**)

CLASSIFICATION

Classification is related to the **ORIGIN, SOURCE** of waste...

MUNICIPAL SOLID WASTE

Waste from household refusal, from street washing, from gardens, from seasides…

SPECIAL WASTE

Waste from farm activities, from building demolition and excavation materials , **from industrial, commercial and handmade activities**, from recovery and disposal of waste, from health related activities….

CLASSIFICATION

...is also related to the **HAZARD** of waste...

HAZARDOUS WASTE and NOT HAZARDOUS WASTE

The fact that waste could be classified as "**HAZARDOUS WASTE**" is based on

- **CHARACTERISTIC OF ACTIVITY** they come from: in this case they can be classified as HAZARDOUS since their origin;
- possible **OVERCOMING OF THRESHOLD VALUES** from the EC directives on the classification, the labeling and the packaging of the dangerous substances;

Waste Classification
List of Waste & Determining if Waste is Hazardous or Non-hazardous
VALID FROM 1 JUNE 2015
ENVIRONMENTAL PROTECTION AGENCY

...and also to the **PHYSICAL STATE** of the waste

- **POWDERED SOLID**
- **NOT POWDERED SOLID**
- **MUDDY LIQUID**
- **LIQUID**

CLASSIFICATION

WHY CODES? ≡ WHY WE NEED TO DIFFERENTIATE WASTE?

DIFFERENTIATION
in laboratory is necessary for our
HEALTH and SAFETY
(**dangerous mixing**, **transport security...**)

Different waste can meet different "end"
(different plants; different disposal if solid or liquid; recovery or final disposal)

WASTE MANAGEMENT is a **CHAIN**:
in the lab we are the **FIRST LINK**!

CLASSIFICATION

CODES

4 CODES can be required to classify a special waste!

C.E.R. Code and **Hazard Class Code**

which are strictly related to the **characteristic of waste**

Class of Transport Code and UN Number Code

which are more closely related to the characteristic of the substances which are contained in the waste, **with respect to their transport**

E.W.C. Code
Codice C.E.R.

from European Waste Catalogue

European Waste Catalogue it is a not exhaustive list, periodically reviewed, which has a common nomenclature accepted in all Europe (in Italy it has been accepted since 2002)

Code is based on **WASTE SOURCE**

* identifies HAZARD WASTE

C.E.R. codes related to the first 2 numbers.

- **01** Wastes resulting from exploration, mining, quarrying, physical and chemical treatment of minerals
- **02** Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
- **03** Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard
- **04** Wastes from the leather, fur and textile industries
- **05** Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal
- **06 Wastes from inorganic chemical processes** ←
- **07** Wastes from organic chemical processes
- **08** Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), sealants and printing inks
- **09 Wastes from photographic industry** ←
- **10** Wastes from thermal processes
- **11** Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy
- **12** Wastes from shaping and physical and mechanical surface treatment of metals and plastics
- **13** Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)
- **14** Waste organic solvents, refrigerants and propellants (except 07 and 08)
- **15 Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified**
- **16 Wastes not otherwise specified in the list**
- **17** Construction and demolition wastes (including excavated soil from contaminated sites)
- **18 Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)**
- **19** Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
- **20** Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions

…if we would try to identify waste relating to industrial production of hydrochloric acid…

06 WASTES FROM INORGANIC CHEMICAL PROCESSES

industrial or activity category

06 01 wastes from the manufacture, formulation, supply and use (MFSU) of acids
06 02 wastes from the MFSU of bases
06 03 wastes from the MFSU of salts and their solutions and metallic oxides
06 04 metal-containing wastes other than those mentioned in 06
06 05 sludges from on-site effluent treatment
06 06 wastes from the MFSU of sulphur chemicals, sulphur chemical processes and desulphurisation processes
06 07 wastes from the MFSU of halogens and halogen chemical processes
06 08 wastes from the MFSU of silicon and silicon derivatives
06 09 wastes from the MSFU of phosphorous chemicals and phosphorous chemical processes
06 10 wastes from the MFSU of nitrogen chemicals, nitrogen chemical processes and fertiliser manufacture
06 11 wastes from the manufacture of inorganic pigments and opacificiers
06 13 wastes from inorganic chemical processes not otherwise specified

sub-categories (specific industrial process)

06 01 01* sulphuric acid and sulphurous acid
06 01 02* hydrochloric acid
06 01 03* hydrofluoric acid
06 01 04* phosphoric and phosphorous acid
06 01 05* nitric acid and nitrous acid
06 01 06* other acids
06 01 99 wastes not otherwise specified

type

CER Code
060102*

Hazard Class Code

(Classe di pericolo)

It describes the PROPERTIES of waste which make them hazardous:

HP1 'Explosive' : waste which is capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic waste, explosive organic peroxide waste and explosive self-reactive waste is included.

HP2 'Oxidizing' : waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials.

HP3 'Flammable' :

— flammable liquid waste: liquid waste having a flash point below 60 °C or waste gas oil, diesel and light heating oils having a flash point > 55 °C and ≤ 75 °C;

— flammable pyrophoric liquid and solid waste: solid or liquid waste which, even in small quantities, is liable to ignite within five minutes after coming into contact with air;

— flammable solid waste: solid waste which is readily combustible or may cause or contribute to fire through friction;

— flammable gaseous waste: gaseous waste which is flammable in air at 20 °C and a standard pressure of 101.3 kPa;

— water reactive waste: waste which, in contact with water, emits flammable gases in dangerous quantities;

— other flammable waste: flammable aerosols, flammable self-heating waste, flammable organic peroxides and flammable self-reactive waste.

HP4 'Irritant — skin irritation and eye damage' : waste which on application can cause skin irritation or damage to the eye.

HP5 'Specific Target Organ Toxicity (STOT)/Aspiration Toxicity' : waste which can cause specific target organ toxicity either from a single or repeated exposure, or which cause acute toxic effects following aspiration.

Hazard Class Code

(Classe di pericolo)

HP6 'Toxic' : waste which can cause acute toxic effects following oral or dermal administration, or inhalation exposure.

HP7 'Carcinogenic': waste which induces cancer or increases its incidence.

HP8 'Corrosive' : waste which on application can cause skin corrosion.

HP9 'Infectious' : waste containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms.

HP10 'Toxic for reproduction' : waste which has adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring.

HP11 'Mutagenic' : waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell.

HP12 "Release of an acute toxic gas" : waste which releases acute toxic gases (Acute Tox. 1, 2 or 3) in contact with water or an acid.

HP13 "Sensitizing" : waste which contains one or more substances known to cause sensitising effects to the skin or the respiratory organs.

HP14 'Ecotoxic' waste which presents or may present immediate or delayed risks for one or more sectors of the environment.

HP15 "Waste capable of exhibiting a hazardous property listed above not directly displayed by the original waste" : when a waste contains one or more substances assigned to one of the hazard statements or supplemental hazards shown in Table 9, the waste shall be classified as hazardous by HP 15, unless the waste is in such a form that it will not under any circumstance exhibit explosive or potentially explosive properties.

From **01/06/2015**

EU Regulation 1357/2014 — **2014/955/EU Decision**

■ **UPDATE OF C.E.R.**
(now it consists of **842** codes)

■ **H** changed to **HP (Hazardous Properties)**.

■ Changes in the **Hazard Class Code**:
It is now more strictly related to the
hazard characteristic of the substances contained into the waste.
(**Hazard statements H** - UE Regulation 1272/2008 - **CLP**)

■ Changes in **treshold limits** in **Hazard Class**

Hazard characteristic	If inside there is a substance with the following hazard statement	Waste is HAZARDOUS if the concentration is
HP7 'Carcinogenic'	H350	≥ 0.1 %
HP7 'Carcinogenic'	H350i	≥ 1 %

Class of dangerous goods for transport Code (Classi di trasporto)

The international norms which regulate transport of **HAZARD MATERIALS** are:

RID Règlement concernant le trasport International ferroviaire des merchandises dangereuses
for rail transport

ADR **European Agreement concerning the International Carriage of Dangerous Goods by Road**
for road transport

IATA International Air Transport Association
for air transport

IMDG International Maritime Dangerous Goods
for sea transport

In **ADR**, many rules about classification of hazardous materials with respect to conditions of road transport, conditions of packaging, characteristics of containers, building characteristics of vehicles and tanks...and other more are described

ADR 2011 book I consist of more than 600 pages…
ADR is updated and revised every 2 years.

ADR issued in 2017 reports also new ONU Numbers

Class of dangerous goods for transport Code

Hazard is defined according to the risks that substances have to cause damage with respect to **PEOPLE** and **ENVIRONMENT.**

9 classes are identified

- **Class 1** Explosive substances and articles
- **Class 2** Gases
- **Class 3** Flammable liquids
- **Class 4.1** Flammable solids, self-reactive substances and solid desensitized explosives
- **Class 4.2** Substances liable to spontaneous combustion
- **Class 4.3** Substances which, in contact with water, emit flammable gases
- **Class 5.1** Oxidizing substances
- **Class 5.2** Organic peroxides
- **Class 6.1** Toxic substances
- **Class 6.2** Infectious substances
- **Class 7** Radioactive material
- **Class 8** Corrosive substances
- **Class 9** Miscellaneous dangerous substances and articles
  (inside this class there are 9 sub-classes)

UN Number Code

To quickly identify the hazard commodity or substance, independently from technical words or languages, to each of them has been assigned a **UN number (ONU number)**, which identifies them without doubts. For example all over the world the **UN 1333** will identify **Cerium**. The following types of entries are used:

- **Single entries** for well defined substances or articles including entries for substances covering several isomers

  UN 1090 acetone
  UN 1104 amyl acetate
  UN 1194 ethyl nitrite solution

- **Generic entries** for a well defined group of substances or articles which are not n.o.s (not otherwise specified) entries

  UN 1133 adhesives
  UN 1266 perfumery products
  UN 2757 carbamate pesticides solid, toxic

- **Specific n.o.s. entries** covering a group of substances or articles of a particular chemical or technical nature, not otherwise specified

  UN 1477 nitrates, in organics n.o.s.
  UN 1987 alcohols n.o.s.

- **Generic n.o.s. entries** covering a group of substances or articles having one or more dangerous properties, not otherwise specified

  UN 1325 flammable solid, organic, n.o.s.
  UN 1993 flammable liquid, n.o.s.

The entries defined under B, C, D are defined as collective entries

There is no UN number for non-hazardous substances.

These will simply have not any UN number

For *HEALTHCARE WASTE*
the **D.Lgs. 152/06** refers to the **D.P.R. 254/03**

HEALTHCARE WASTE are those waste **COMING FROM** PUBLIC or PRIVATE facilities which provide medical, veterinary, physical therapy and **RESEARCH** activities.

They are **DESCRIBED**, and **CLASSIFIED**:
NOT dangerous, dangerous,
dangerous NOT potentially infective, dangerous potentially infective…

.....disposable nappies, drips, needles, syringes, litters, drugs...

…and are assigned a specific **CER Code!**

For example:

Petri plates contaminated by pathogen
from research activities
are classified as **dangerous potentially infective**

…and are assigned **CER Code 180103*** !!
Annex I [Articolo 2, comma 1, lettera (a)]

From Annex I [Articolo 2, comma 1, lettera (a)] DPR 254/03 – (not complete)

Composizione	Tipo rifiuto	Regime giuridico
1. Rifiuti a rischio infettivo di cui all'art. 2, comma 1, lett. d) C.E.R. 1801030 o 180202	Assorbenti igienici, pannolini pediatrici e pannoloni	Pericolosi a rischio infettivo
	Bastoncini cotonati per colposcopia e pap-test	
	Bastoncini oculari non sterili	
	Bastoncini oftalmici di TNT	
	Cannule e drenaggi	
	Cateteri (vescicali, venosi, arteriosi per drenaggi pleurici, ecc.) raccordi, sonde	
	Circuiti per circolazione extracorporea	
	Cuvette monouso per prelievo bioptico endometriale	
	Deflussori	
	Flebodisi contaminate	
	Filtri di dialisi. Filtri esausti provenienti da cappe (in assenza di rischio chimico)	
	Guanti monouso	
	Materiale monouso: vials, pipette, provette, indumenti protettivi mascherine, occhiali, telini, lenzuola, calzari, seridrape, soprascarpe, camici	
	Materiale per medicazione (garze, tamponi, bende, cerotti, lunghette, maglie tubolari)	
	Sacche (per trasfusioni, urina stomia, nutrizione parenterale)	
	Set di infusione	
	Sonde rettali e gastriche	
	Sondini (nasografici per broncoaspirazione, per ossigenoterapia, ecc.)	
	Spazzole, cateteri per prelievo citologico	
	Speculum auricolare monouso	
	Speculum vaginale	
	Suturatrici automatiche monouso	
	Gessi o bendaggi	
	Denti e piccole parti	

1-bis Rifiuti provenienti dallo svolgimento di attivit? di ricerca e di diagnostica batteriologica C.E.R. 180103 o 180202	Piastre, terreni di colture ed altri presidi utilizzati in microbiologia e contaminati da agenti patogeni	Pericolosi a rischio infettivo
2. Rifiuti taglienti C.E.R. 180103 o 180202	Aghi, siringhe, lame, vetri, lancette pungidito, venflon, testine, rasoi e bisturi monouso	Pericolosi a rischio infettivo
2-bis Rifiuti taglienti inutilizzati C.E.R. 180101 o 180201	Aghi, siringhe, lame, rasoi	Non pericolosi
3. Organi e parti anatomiche non riconoscibili - Piccoli animali da esperimento C.E.R. 180103 o 180202	Tessuti, organi e parti anatomiche non riconoscibili. Sezioni di animali da esperimento	Rifiuti sanitari che richiedono particolari sistemi di gestione. Pericolosi a rischio infettivo
4. Contenitori vuoti, in base al materiale costitutivo dell'imballaggio va assegnato un codice C.E.R. della categoria 1501: 150101 - 150102 - 150103 - 150104 - 150105 - 150106 - 150107 - 150109	Contenitori vuoti di farmaci, di farmaci veterinari, dei prodotti ad azione disinfettante, di medicinali veterinari prefabbricati, di premiscele per alimenti medicamentosi, di vaccini ad antigene spento, di alimenti e di bevande, di soluzioni per infusione	Assimilati agli urbani se conformi alle caratteristiche di cui all'art. 5 del presente regolamento
5. Farmaci scaduti o inutilizzabili C.E.R. 180109 o 180208	Farmaci scaduti o di scarto, esclusi i medicinali citotossici e citostatici	Rifiuti sanitari che richiedono particolari sistemi di gestione. Non pericolosi
6. Sostanze chimiche di scarto C.E.R. 180107 o 180206	Sostanze chimiche di scarto, dal settore sanitario e veterinario o da attivit? di ricerca collegate, non pericolose o non contenenti sostanze pericolose ai sensi dell'art. 1 della decisione Europea 2001/118/CE	Non pericolosi

The recommendations regarding waste containing
BIOLOGICAL AGENTS
are described **Title X of D.Lgs. 81/08**

BIOLOGICAL AGENTS are well defined:

Every microorganism, also genetically modified, cell culture and human endoparasite which could cause infections, allergies, poisonings....

They are classified in **4 GROUPS**,
with increasing risk to **CAUSE DISEASES**
which could be **NOT CURABLE** and
NOT RESTRICTED...

...with respect to other **WORKERS**,
but also to the **TOTAL COMMUNITY**

Annex 46: List of the classified biological agents

*Escherichia coli (*not pathogen strains):	**GROUP 1**
Escherichia coli:	**GROUP 2**
Escherichia coli O157:H7:	**GROUP 3**
Virus Ebola:	**GROUP 4**

In the Annex 47 *and* **48**, for *laboratory activities and for industrial activities as well which work with biological agents belonging to class 2,3 and 4*, *formalized specific* ***working methods*** *and* ***methodologies***,

including **WASTE TREATMENTS**,

are described and recommended, thus defining

CONTAINMENT LEVELS – BIOSAFETY LEVELS

….The **EMPLOYER** provides **MEANS** for collection, storing and disposal of waste, with **SUITABLE** and **RECOGNIZABLE** containers and box....

[Art. 272, comma 2, lettera l)]

These procedures must be described by the employer in the

Risk Assessment Document

(Documento di valutazione dei rischi)

ALLEGATO XLVII

AGENTI BIOLOGICI - SPECIFICHE SULLE MISURE DI CONTENIMENTO E SUI LIVELLI DI CONTENIMENTO

Nota preliminare:

Le misure contenute in questo Allegato debbono essere applicate in base alla natura delle attività, la Valutazione del rischio per i lavoratori e la natura dell'agente biologico di cui trattasi.

A. Misure di contenimento	B. Livelli di contenimento		
	2	3	4
1. La zona di lavoro deve essere separata da qualsiasi altra attività nello stesso edificio	No	Raccomandato	Si
2. L'aria immessa nella zona di lavoro e l'aria estratta devono essere filtrate attraverso un ultrafiltro (HEPA) o un filtro simile	NO	SI, sull'aria estratta	SI, sull'aria immessa e su quella estratta
3. L'accesso deve essere limitato alle persone autorizzate	Raccomandato	Si	Si attraverso una camera di compensazione
4. La zona di lavoro deve poter essere chiusa a tenuta per consentire la disinfezione	No	Raccomandato	Si
5. Specifiche procedure di disinfezione	Si	Si	Si
6. La zona di lavoro deve essere mantenuta ad una pressione negativa rispetto a quella atmosferica	No	Raccomandato	Si
7. Controllo efficace dei vettori, ad esempio, roditori ed insetti	Raccomandato	Si	Si
8. Superfici idrorepellenti e di facile pulitura	Si, per il banco di lavoro	Si, per il banco di lavoro e il pavimento	Si, per il banco di lavoro, l'arredo, i muri, il pavimento e il soffitto
9. Superfici resistenti agli acidi, agli alcali, ai solventi, ai disinfettanti	Raccomandato	Si	Si
10. Deposito sicuro per agenti biologici	Si	Si	Si, deposito sicuro
11. Finestra d'ispezione o altro dispositivo che permetta di vederne gli occupanti	Raccomandato	Raccomandato	Si
12. I laboratori devono contenere l'attrezzatura a loro necessaria	No	Raccomandato	Si
13. I materiali infetti, compresi gli animali, devono essere manipolati in cabine di sicurezza, isolatori o altri adeguati contenitori	Ove opportuno	Si, quando l'infezione è veicolata dall'aria	Si
14. Inceneritori per l'eliminazione delle carcasse degli animali	Raccomandato	Si (disponibile)	Si, sul posto
15. Mezzi e procedure per il trattamento dei rifiuti	Si	Si	Si, con sterilizzazione
16. Trattamento delle acque reflue	No	Facoltativo	Facoltativo

The recommendations regarding waste containing
GENETICALLY MODIFIED MICROORGANISMS
are described in the **D.Lgs. 206/01** (and amendments) and in the **Directive 2009/41/EC**

GENETICALLY MODIFIED MICROORGANISMS are well-defined…
To avoid **damage to human health and environment**, their use must be "**CONTAINED**"

4 CLASS of "**CONTAINED USE**" with correspondent
CONTAINMENT LEVELS - BIOSAFETY LEVELS are described

http://www.unifi.it/vp-3285-misure-di-contenimento-e-altre-misure-di-protezione.html
(Allegato 4)

USER (scientific manager) → **Risk Assessment Document (Documento di valutazione dei rischi)**

taking into account **many PARAMETERS**
to assign a genetically modified microorganism to its class:

for example, **plasmid, DNA insert, cell strains features and characteristics**
with respect to the possibility to cause **damage to human health and environment**

For each class there is a **SET OF SPECIFICATIONS**
for building characteristics, equipments, working protocols and **WASTE TREATMENTS**

UNIVERSITÀ DEGLI STUDI FIRENZE

03/05/2017

Misure di contenimento e altre misure di protezione (allegato 4)

1.Le sottoelencate tabelle indicano i requisiti minimi e le misure necessarie, per ciascun livello di contenimento in attività di laboratorio (tabella I) e per altre attività (tabella II). Le tabelle Ib e Ic riportano aggiunte e modifiche, rispetto alla tabella Ia, rispettivamente per serre o camere di crescita (Ib) e per stabulari (Ic).

Tabella I a: misure di contenimento, di prevenzione e altre misure di protezione per le attivita' di laboratorio

Specifiche		*Livelli di contenimento*			
		1	*2*	*3*	*4*
1	Ambienti di laboratorio: isolamento(1)	Non necessario	Non necessario	Necessario	Necessario
2	Laboratorio: sigillabile in modo da consentire la fumigazione	Non necessario	Non necessario	Necessario	Necessario

Attrezzature

Specifiche		*Livelli di contenimento*			
		1	*2*	*3*	*4*
3	Superfici resistenti ad acqua, acidi, alcali, solventi, disinfettanti, agenti decontaminanti e facili da pulire.	Necessario (bancone)	Necessario (bancone)	Necessario (bancone, arredo pavimento)	Necessario (bancone, arredo, pavimento, soffitto, pareti)
4	Accesso al laboratorio attraverso zona filtro (2)	Non necessario	Non necessario	Se necessario	Necessario
5	Pressione negativa rispetto alla pressione nelle immediate vicinanze	Non necessario	Non necessario	Necessario ad eccezione di attività in cui la trasmissione non avviene per via aerea	Necessario
6	L'aria immessa nel ed emessa dal laboratorio deve essere sottoposta ad ultrafiltrazione (HEPA) (3)	Non necessario	Non necessario	Necessario per aria emessa ad eccezione di attività in cui la trasmissione non avviene per via aerea	Necessario per aria immessa ed emessa. Quando si impiegano virus che non sono trattenuti da filtri HEPA si renderanno necessari requisiti supplementari per l'aria emessa
7	Cappa/box di sicurezza microbiologica	Non necessario	Se necessario	Necessario	Necessario
8	Autoclave	Nel sito	Nell'edificio	Sul piano (4)	In laboratorio = a doppia entrata
9	Presenza di strutture per il lavaggio e la decontaminazione del personale	Necessari apparati di lavaggio	Necessario	Necessario	Necessario
10	Deposito sicuro per MOGM, nonché per attrezzatore e materiali di laboratorio contaminati	Non necessario	Se necessario	Necessario	Necessario

Modalità di funzionamento

Specifiche		*Livelli di contenimento*			
		1	*2*	*3*	*4*
11	Accesso limitato	Non necessario	Necessario	Necessario	Necessario
12	Segnale di pericolo biologico sulla porta	Non necessario	Necessario	Necessario	Necessario
13	Specifica formazione del personale addetto	Non necessario	Necessario	Necessario	Necessario
14	Misure specifiche per controllare la diffusione di aerosol	Non necessario	Necessario minimizzare	Necessario prevenire	Necessario prevenire
15	Il personale deve fare una doccia prima di uscire dalla zona controllata	Non necessario	Non necessario	Se necessario	Necessario
16	Indumenti protettivi	Indumenti di protezione adeguati	Indumenti di protezione adeguati	Indumenti di protezione e (se necessario) calzature adeguate	Cambio completo di indumenti e calzature all'entrata e all'uscita
17	Guanti	Non necessario	Se necessario	Necessario	Necessario
18	Controllo efficace di possibili vettori (ad esempio per roditori ed insetti)	Se necessario	Necessario	Necessario	Necessario
19	Specifiche procedure di disinfezione	Se necessario	Necessario	Necessario	Necessario

Rifiuti

Specifiche		*Livelli di contenimento*			
		1	*2*	*3*	*4*
20	Inattivazione degli MOGM negli effluenti dei lavandini, degli scarichi o delle docce, se presenti, o in effluenti analoghi	Non necessario	Non necessario	Se necessario	Necessario
21	Inattivazione degli MOGM nei materiali e nei rifiuti contaminati	Se necessario	Necessario	Necessario	Necessario

Altre misure

Specifiche		*Livelli di contenimento*			
		1	*2*	*3*	*4*
22	Il laboratorio deve contenere la propria attrezzaturai	Non necessario	Non necessario	Se necessario	Necessario
23	Deve essere presente una finestra di osservazione, o una soluzione alternativa, che consenta di vedere gli occupanti	Se necessario	Se necessario	Se necessario	Necessario

Packaging
Containers

Waste must be **PROPERLY PACKAGED** by the **producer**

All types of containers must pass **technical tests**. Types of tests are based on the characteristic of the container and of the material it must contain. Some of these tests are:

- drop test (prova di caduta)
- leak test (prova di tenuta)
- hydraulic test (prova idraulica)
- stacking test (prova di impilaggio)

Packaging containers must exactly match the model which has passed the tests

The containers are classified and are assigned a code as well, based, among other thing, on type of packaging (box, jugs....) and type of material (steel, plastic...)

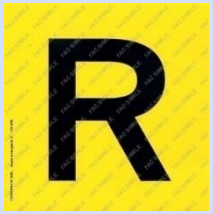
Just an example of a code of a container: u n 1A1/X1.8/400/98/I/ISP 0357590-S8

Packaging

Labels and Symbols

The waste producer must mark the containers with suitable
LABELS
which report **CER Code**, **Class of Transport Code** and **UN number Code** and
SYMBOLS

UN 3291



LABELS also must describe **type of waste**, **weight** or **volume**, and
data about laboratory where they have been produced

COLLECTION IN LABORATORIES

It is **FORBIDDEN** to mix different kind of waste
It is **FORBIDDEN** to throw liquid waste in the sink

It is **ADVISIBLE** to get togheter as much as possible the material to be discarded, observing CER characteristics and chemical compatibility (in case of any doubt, refer to **SDS)**, in order to minimize the number of containers inside the laboratories;

Waste containers must be placed in **stable position**,
far from source of heat, solar beams, electrical panels

Plastic waste jugs must be placed inside **bigger tank** to avoid accidental spill in the lab environment

In the laboratories some **adsorbent material**
for adsorbing liquids in case of large spilling is also available

When handling waste**,** **wear DPI**

So, mainly, what kind of WASTE are we producing in CERM?

1. Biological stuff contaminated by cell debris, protein, DNA,....
   ....*E. Coli* culture liquid...human fluids (metabolomic)...

2. Chemicals...(electrophoresis poliacrylammide and agarose gels)...

3. Buffers, dialysis buffers....Coomassie solution, acidic or basic solutions....

4. Plastic or glass bottles which contained chemicals... falcon, eppendorfs, pipettes which contained chemicals...metallic gas bottles...

5. A lot of gloves and adsorbent paper...

6. Toner, computers, video, electrical material...

How do we classify them?

1. 1. Biological stuff contaminated by cell debris, protein, DNA,....*E. Coli* culture liquid....
   ...human fluids (for metabolomic)...

CER 180103*

Description:

"WASTES WHOSE COLLECTION AND DISPOSAL IS SUBJECT TO SPECIAL REQUIREMENTS IN ORDER TO PREVENT INFECTION"

Hazard Class	Transport Class RID/ADR	UN Number
HP9	**6.2**	**3291**
«Infectious»	«Infectious substances»	"clinical waste or unspecified, n.o.s, or (bio)medical waste n.o.s. or regulated medical waste n.o.s"

SOLID	LIQUID
Petri plates, tubes and all other not powdered solid material which contains microorganism, proteins or DNA	**Colture media for microorganisms and, in general, all the liquids which contains microorganisms, proteins or DNA**

CER 180103*

With a bag inside

"Black" box

"waste jug"

Those waste must be managed in order to reduce hazard, optimize collection, transport and disposal

Container for "health waste" must be different from the other

Remove liquid from solid container (falcon, ecc.) and pour it in the waste jugs

Petri plates are autoclaved

Add 5% sodium ipochlorite to liquid biological waste

Wash colture flasks with 5% sodium ipochlorite

CER 180103*

Room 72

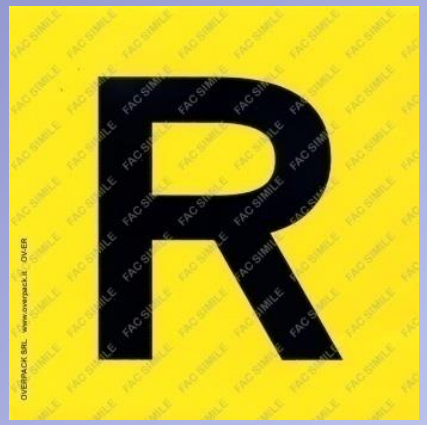
“Viezzoli” Lab

Plastic waste jugs, once full, are closed and, in the “holding area”, are placed inside the black box

In any case of leaking use adsorbent material, and then wash with 5% sodium ipochlorite

CER 180103*

03/05/2017



identification for hazardous waste

Class of transport

UN Number

3291

UN number code

Lab origin

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

Phisycal state

RIFIUTO BIOLOGICO LIQUIDO

Description

CER 180103

CER Code

Kg

Weight

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

RIFIUTO BIOLOGICO SOLIDO

CER 180103

Kg

CER 180103*

03/05/2017

Sodium Ipochlorite Solution
GERMICIDE, virucide, fungicide

Concentration in solutions is often expressed in terms of “active chlorine”.

Commercial solution contains 50g/L of “active” Cl_2

↓ ↓

50 X dilution **10 x dilution**

1g/L “active” Cl_2 **5g/L “active” Cl_2**

Laboratory Biosafety Manual,
World Health Organisation

2L colture media ⟶ **40 - 200 ml sodium ipochlorite solution**

With acids it can form Cl_2 (toxic gas)
Use it in ventilated rooms or in chemical hood with gloves and glass

CER 180103*

03/05/2017

Virkon

BIOCIDE

It is a powder which must be dissolved in water, composed by peroxides, surfactant, organic acids

It is an oxiding agent,

The solution is stable for 5 days (pink color)

The solution is not toxic.

100 X dilution

15 minutes

It is active against a wide range of bacteria (Escherichia coli, Pseudomonas aeruginosa, Staphilococcus aureus, Enterococcus hirae), viruses (HIV, HBV, HCV, SARS, H1N1...) and fungi (Candida albicans, Aspergillus niger)

CER 180103*

For Metabolomics…

For
REDUCING THE RISK
of contamination of the workers

liquid human fluids are not divided by their solid containers
(NMR tubes, cryovials)

Full tubes and vials are discarded in a **suitable box**, with addition of ipochlorite,

then **hermetically sealed** and placed in the black box...

2. Chemicals...(electrophoresis poliacrylammide and agarose gels)...

3. Buffers, dialysis buffers....Coomassie solution, acidic or basic solutions....

CER 160506*

Description:

“LABORATORY CHEMICALS, CONSISTING OF OR CONTAINING DANGEROUS SUBSTANCES, INCLUDING MIXTURES OF LABORATORY CHEMICALS (LIQUID)”; “CHEMICAL SUBSTANCES OF LABORATORY (SOLID)”

Hazard Class	Transport Class RID/ADR	UN Number
HP3 “Flammable”	**6.1** “Toxic substances”	**3287** “toxic liquid inorganic, n.o.s”
HP5 “Specific Target Organ Toxicity (STOT)/Aspiration Toxicity”		**3288** “toxic solid inorganic, n.o.s”
HP6 “Toxic”		

SOLID

Acrylammide gels, agarose gels and all contaminated material

LIQUID

Chemical solution, buffers, acids, bases; acrylamide gel destaining solution, ecc.

CER 160506*

03/05/2017

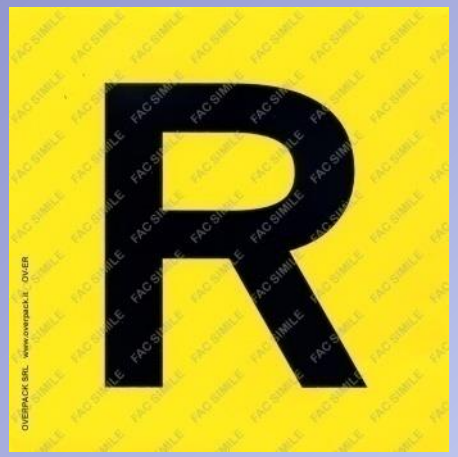
Room 81

3 different kind of jugs:
1 for acid solutions, 1 for alkaline solutions, 1 for buffers in general

There is also a jug for organic chemical solutions;
in case of halogenated solvents use different jug

CER 160506*

03/05/2017



UN Number

3288
(3287)

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

Sostanze chimiche di laboratorio contenenti o costituite da sostanze pericolose, comprese le miscele di sostanze chimiche di laboratorio
LIQUIDI

CER 160506 Kg

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

Sostanze chimiche di laboratorio contenenti o costituite da sostanze pericolose, comprese le miscele di sostanze chimiche di laboratorio
SOLIDI

CER 160506 Kg

4. Plastic or glass bottles which have contained chemicals... falcon, eppendorfs, which contained chemicals...metallic gas bottles...

CER 150110*

Description:

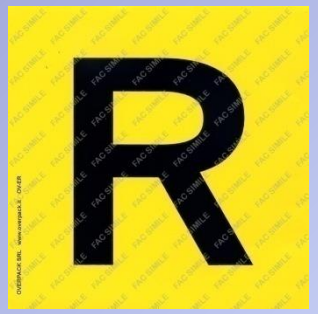
“PACKAGING CONTAINING RESIDUES OF DANGEROUS SUBSTANCES OR CONTAMINATED BY DANGEROUS SUBSTANCES”

Hazard Class	Transport Class RID/ADR	UN Number
HP5	**9**	**3509**
“Specific Target Organ Toxicity (STOT)/ Aspiration Toxicity”	“Miscellaneous dangerous substances and articles”	“Packaging, discarded, empty, uncleaned”

SOLID

glass bottles, Pasteur pipette, broken glass, plastic bottles, metal bottles, ecc.

CER 150110*



UN Number

3509

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

PLASTICA CONTAMINATA

CER 150110

Kg

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

METALLO CONTAMINATO

CER 150110

Kg

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

VETRERIA CONTAMINATA

CER 150110

Kg

5. A lot of gloves and adsorbent paper...

CER 150202*

Description:

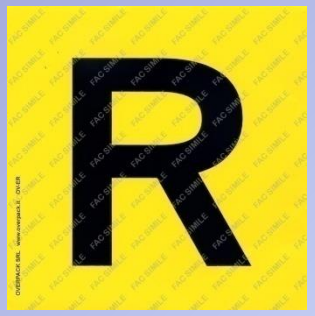
ABSORBENTS, FILTER MATERIALS (INCLUDING OIL FILTERS NOT OTHERWISE SPECIFIED), WIPING CLOTHS, PROTECTIVE CLOTHING CONTAMINATED BY DANGEROUS SUBSTANCES

Hazard Class	Transport Class RID/ADR	UN Number
HP4 "Irritant skin irritation and eye damage"	**9** "Miscellaneous dangerous substances and articles"	**3077** «enviromentally hazardos substance solid, n.o.s»
HP5 "Specific Target Organ Toxicity (STOT)/ Aspiration Toxicity"		

SOLID

Dirty adsorbent paper, gloves, rags, gum ecc.

CER 150202*



UN Number

3077

UNIVERSITA' DI FIRENZE
CENTRO DI RISONANZE MAGNETICHE

Assorbenti, materiali filtranti, stracci e indumenti protettivi contaminati da sostanze pericolose

CER 150202

Kg

6. Toner, computers, video...

Codice CER **CER code**	**Descrizione** **Description**	**Classe di pericolo** **Hazard Class**	**Classe di trasporto RID/ADR** **Transport Class RID/ADR**	**Numero ONU** **UN Number**	**Contenuto** **Contents**
160211*	apparecchiature fuori uso, contenenti clorofluorocarburi, HCFC, HFC **Frigoriferi** discarded equipment containing chlorofluorocarbons, HCFC, HFC	**HP14** "Ecotoxic"	-	NO ADR	frigoriferi contenenti CFC, HCFC, HFC freezer containing CFC; HCFC, HCF
160213*	apparecchiature fuori uso, contenenti componenti pericolosi diversi da quelli di cui alle voci 160209 e 160212 **Video** discarded equipment containing hazardous components other than those mentioned in 160209 to 160212	**HP5** "Specific Target Organ Toxicity (STOT)/ Aspiration Toxicity»	-	NO ADR	Videoterminali Video
160214	apparecchiature fuori uso, diverse da quelle di cui alle voci da 160209 a 160213 **Apparecchiature fuori uso** discarded equipment other than those mentioned in 16 02 09 to 16 02 13		-	NO ADR	Computer, stampanti Computers, printers
080317* **(080318)**	**Toner** e nastri di stampa esauriti waste printing toner containing dangerous substances	**HP4** "Irritant — skin irritation and eye damage"	**9** "Miscellaneous dangerous substances and articles"	3077	Toner

HOLDING AREA-TEMPORARY STORAGE

Waste are moved
to LAP room nr. 58 and 72

Here they are
weighed and
properly labelled

Waste must be discarded for recycling or disposal:
- at least every 3 months, independently from the quantity;
- when the hazardous waste reach 10 m^3 and not hazardous reach 20 m^3;
- if the quantity is less than the previous values, anycase within 1 year;

Waste with CER 180103* must be discarded for disposal:
- within 5 days after sealing
- within 30 days if they do not reach 200 liters.

Procedure for Disposal

EXPENSES for waste disposal must be paid by the **PRODUCER**, which gives wastes to an authorized **WASTE CARRIER COMPANY** and to an authorized **WASTE DISPOSAL COMPANY**

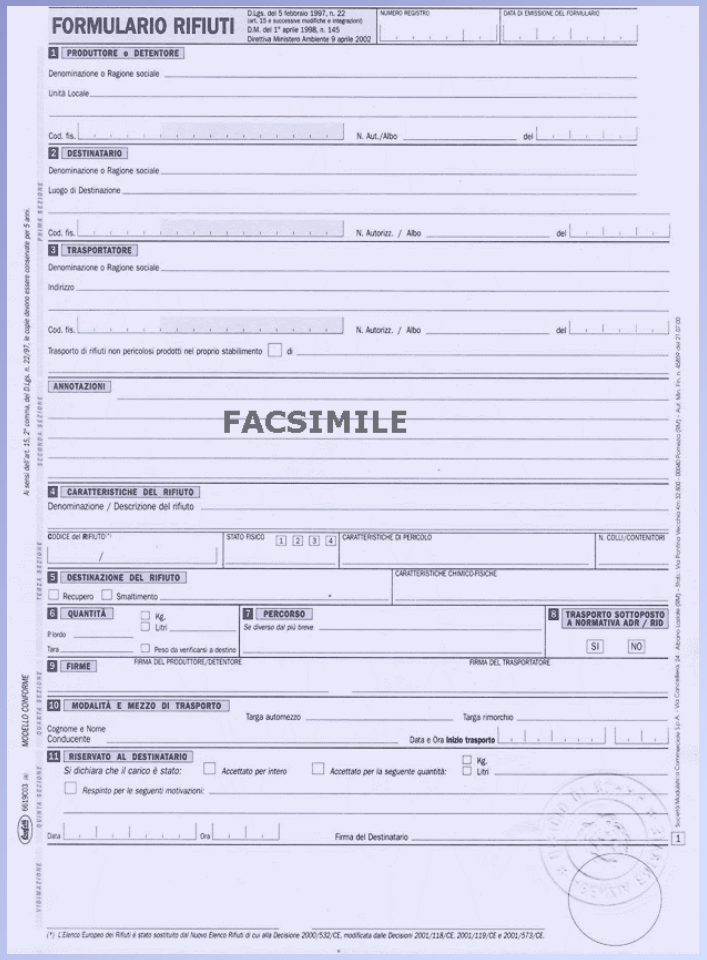
The producer (CERM) must:

Fill and sign the **WASTE IDENTIFICATION FORM**

Fill the **WASTE REGISTER**

Fill the **MUD (Modello Unico di Dichiarazione ambientale)**
an annual notification to the Chamber of Commerce
about quantities and characteristics of waste produced in the year
(Università di Firenze)

WASTE IDENTIFICATION FORM



FORMULARIO RIFIUTI

D.Lgs. del 5 febbraio 1997, n. 22 (art. 15 e successive modifiche e integrazioni) D.M. del 1° aprile 1998, n. 145 Direttiva Ministero Ambiente 9 aprile 2002

NUMERO REGISTRO | DATA DI EMISSIONE DEL FORMULARIO

1 PRODUTTORE o DETENTORE

Denominazione o Ragione sociale

Unità Locale

Cod. fis. | N. Aut./Albo | del

2 DESTINATARIO

Denominazione o Ragione sociale

Luogo di Destinazione

Cod. fis. | N. Autorizz. / Albo | del

3 TRASPORTATORE

Denominazione o Ragione sociale

Indirizzo

Cod. fis. | N. Autorizz. / Albo | del

Trasporto di rifiuti non pericolosi prodotti nel proprio stabilimento di

ANNOTAZIONI

FACSIMILE

4 CARATTERISTICHE DEL RIFIUTO

Denominazione / Descrizione del rifiuto

CODICE del RIFIUTO(*) | STATO FISICO 1 2 3 4 | CARATTERISTICHE DI PERICOLO | N. COLLI/CONTENITORI

5 DESTINAZIONE DEL RIFIUTO | CARATTERISTICHE CHIMICO-FISICHE

Recupero Smaltimento

6 QUANTITÀ Kg. Litri

Fiordo

Tara Peso da verificarsi a destino

7 PERCORSO

Se diverso dal più breve

8 TRASPORTO SOTTOPOSTO A NORMATIVA ADR / RID SI NO

9 FIRME

FIRMA DEL PRODUTTORE/DETENTORE | FIRMA DEL TRASPORTATORE

10 MODALITÀ E MEZZO DI TRASPORTO

Targa automezzo | Targa rimorchio

Cognome e Nome Conducente | Data e Ora inizio trasporto

11 RISERVATO AL DESTINATARIO

Si dichiara che il carico è stato: Accettato per intero Accettato per la seguente quantità: Kg. Litri

Respinto per le seguenti motivazioni:

Data | Ora | Firma del Destinatario

(*) L'Elenco Europeo dei Rifiuti è stato sostituito dal Nuovo Elenco Rifiuti di cui alla Decisione 2000/532/CE, modificata dalle Decisioni 2001/118/CE, 2001/119/CE e 2001/573/CE.

MODELLO CONFORME

It contains basically the following information:

1) name and address of producer
2) data about characteristic and quantity of the waste (including **hazard class**)
3) address of destination plant
4) date and **ROUTE** of transport
5) name and address of the carrier and disposer

It consists of 4 paper copies, must be compiled, dated and signed by the producer and signed by the driver of the truck which loads waste. The copies are then passed out to producer, disposers and carrier…

RESPONSIBILITY OF PRODUCER COMES TO THE END ONLY UPON RECEIPT OF THE FORM WHICH CERTIFIES DISPOSAL OF WASTE (WITHIN 3 MONTHS)

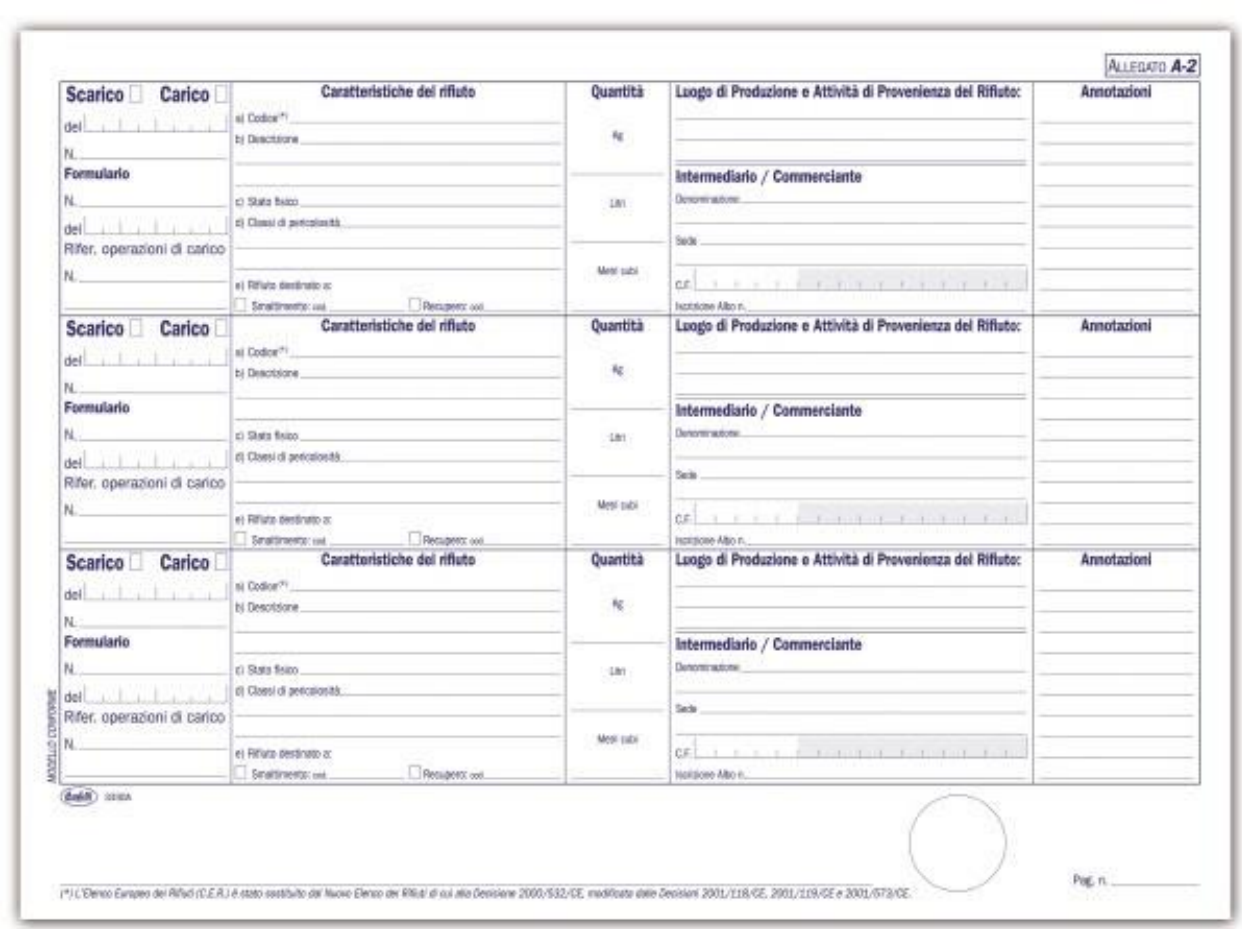
WASTE REGISTER

It must be present in every **producing, stocking, recovery and disposal waste plant**

Basically it contains same information of the waste identification form.

It must be updated with data and date regarding

UPLOADING of waste and DOWNLOADING of waste



ALLEGATO A-2

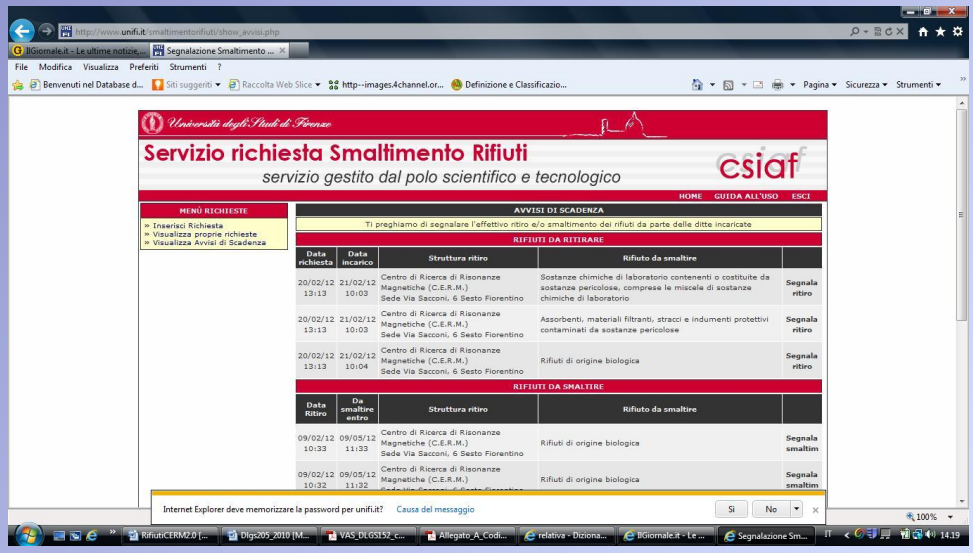
Scarico / Carico	Caratteristiche del rifiuto	Quantità	Luogo di Produzione e Attività di Provenienza del Rifiuto:	Annotazioni
del N. Formulario N. del Rifer. operazioni di carico N.	a) Codice(*) b) Descrizione c) Stato fisico d) Classi di pericolosità e) Rifiuto destinato a: Smaltimento: sì/no Recupero: sì/no	Kg Litri Metri cubi	Intermediario / Commerciante Denominazione: Sede C.F. Iscrizione Albo n.	
Scarico / Carico	Caratteristiche del rifiuto	Quantità	Luogo di Produzione e Attività di Provenienza del Rifiuto:	Annotazioni
del N. Formulario N. del Rifer. operazioni di carico N.	a) Codice(*) b) Descrizione c) Stato fisico d) Classi di pericolosità e) Rifiuto destinato a: Smaltimento: sì/no Recupero: sì/no	Kg Litri Metri cubi	Intermediario / Commerciante Denominazione: Sede C.F. Iscrizione Albo n.	
Scarico / Carico	Caratteristiche del rifiuto	Quantità	Luogo di Produzione e Attività di Provenienza del Rifiuto:	Annotazioni
del N. Formulario N. del Rifer. operazioni di carico N.	a) Codice(*) b) Descrizione c) Stato fisico d) Classi di pericolosità e) Rifiuto destinato a: Smaltimento: sì/no Recupero: sì/no	Kg Litri Metri cubi	Intermediario / Commerciante Denominazione: Sede C.F. Iscrizione Albo n.	

MODELLO COMPOSTO

(*) L'Elenco Europeo dei Rifiuti (C.E.R.) è stato sostituito dal Nuovo Elenco dei Rifiuti di cui alla Decisione 2000/532/CE, modificata dalle Decisioni 2001/118/CE, 2001/119/CE e 2001/573/CE.

Pag. n.

HOW DO WE PROCEED?



Through a web site of the University of Florence it is possible to contact an office to list wastes we have to discard. The office then contact the company which is in charge of waste transport to fix an appointment for collecting waste, often every 15 days

The company fills the WASTE IDENTIFICATION FORM, also the part concerning the data of producer

The part of the WASTE REGISTER relating to LOADING is filled

The driver loads the wastes on the truck and finishes to fill the WASTE IDENTIFICATION FORM writing the **WEIGHTS** and **NUMBER OF CONTAINERS**. The form is then signed by driver and producer. Wastes are then driven to waste disposal company plants

The web site of University of Florence as well as the WASTE REGISTER is then updated, recording that the waste have been collected by the carrier and driven to the disposal plant

After disposal procedure, finally the carrier will deliver to the producer the final form which certifies disposal of waste, so closing the whole process.

The web site of University of Florence is finally updated whit this final data

Disposal operations

D 1 Deposit into or on to land (e.g. landfill, etc.)
D 2 Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.)
D 3 Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.)
D 4 Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.)
D 5 Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.
D 6 Release into a water body except seas/oceans
D 7 Release into seas/oceans including sea-bed insertion
D 8 Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 7 and D 9 to D 12
D 9 Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 8 and D 10 to D 12 (e.g. evaporation, drying, calcination, etc.)
D 10 Incineration on land
D 11 Incineration at sea
D 12 Permanent storage (e.g. emplacement of containers in a mine, etc.)
D 13 Blending or mixing prior to submission to any of the operations numbered D 1 to D 12
D 14 Repackaging prior to submission to any of the operations numbered D 1 to D 13
D 15 Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where it is produced)

Operazioni di smaltimento

D 1 Deposito sul o nel suolo (ad es. discarica)
D 2 Trattamento in ambiente terrestre (ad es. biodegradazione dei rifiuti liquidi o fanghi nei suoli)
D 3 Iniezioni in profondità (ad es. iniezioni dei rifiuti pompabili in pozzi, in cupole saline o faglie geologiche naturali)
D 4 Lagunaggio (ad es. scarico di rifiuti liquidi o di fanghi in pozzi, stagni o lagune, ecc)
D 5 Messa in discarica specialmente allestita (ad es. sistematizzazione in alveoli stagni separati, ricoperti o isolati gli uni dagli altri e dall'ambiente)
D 6 Scarico dei rifiuti solidi nell'ambiente idrico eccetto l'immersione
D 7 Immersione, compreso il seppellimento nel sottosuolo marino
D 8 Trattamento biologico non specificato altrove nel presente allegato, che dia origine a composti o a miscugli che vengono eliminati secondo uno dei procedimenti elencati nei punti da D1 a D12
D 9 Trattamento chimico-fisico non specificato altrove nel presente allegato, che dia origine a composti o a miscugli eliminati secondo uno dei procedimenti elencati nei punti da D1 a D12 (ad es. evaporazione, essiccazione, calcinazione, ecc.)
D 10 Incenerimento a terra
D 11 Incenerimento in mare
D 12 Deposito permanente
D 13 Raggruppamento preliminare prima di una delle operazioni di cui ai punti da D1 a D12
D 14 Ricondizionamento preliminare prima di una delle operazioni di cui ai punti da D1 a D13
D 15 Deposito preliminare prima di una delle operazioni di cui ai punti da D1 a D14 (escluso il deposito temporaneo, prima della raccolta, nel luogo in cui [i rifiuti] sono prodotti).

Operazioni di recupero

R 1 utilizzazione principale come combustibile o altro mezzo per produrre energia
R 2 rigenerazione/recupero di solventi
R 3 riciclo/recupero delle sostanze organiche non utilizzate come solventi (comprese le operazioni di compostaggio e le altre trasformazioni biologiche)
R 4 riciclo/recupero dei metalli o dei composti metallici
R 5 riciclo/recupero di altre sostanze inorganiche
R 6 rigenerazione degli acidi o delle basi
R 7 recupero dei prodotti che servono a captare gli inquinanti
R 8 recupero dei prodotti che provengono dai catalizzatori
R 9 rigenerazione o altri reimpieghi degli oli
R 10 spandimento sul suolo a beneficio dell'agricoltura o dell'ecologia
R 11 utilizzazione dei rifiuti ottenuti da una delle operazioni indicate da R1 a R10
R 12 scambio di rifiuti per sottoporli ad una delle operazioni indicate da R1 a R11
R 13 messa in riserva di rifiuti per sottoporli a una delle operazioni indicate nei unti da R1 a R12 (escluso il deposito temporaneo, prima della raccolta, nel luogo in cui sono prodotti)
R 14 deposito temporaneo, prima della raccolta, nel luogo in cui sono prodotti i rifiuti qualora non vengano rispettate le condizioni stabilite dalla normativa vigente

Recovery operations

R 1 Use principally as a fuel or other means to generate energy
R 2 Solvent reclamation/regeneration
R 3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other
biological transformation processes)
R 4 Recycling/reclamation of metals and metal compounds
R 5 Recycling/reclamation of other inorganic materials
R 6 Regeneration of acids or bases
R 7 Recovery of components used for pollution abatement
R 8 Recovery of components from catalysts
R 9 Oil re-refining or other reuses of oil
R 10 Land treatment resulting in benefit to agriculture or ecological improvement
R 11 Use of wastes obtained from any of the operations numbered R 1 to R 10
R 12 Exchange of wastes for submission to any of the operations numbered R 1 to R 11
R 13 Storage of wastes pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where it is produced

SISTRI

DM 17/12/2009

SISTRI

Sistema di controllo della tracciabilità dei rifiuti

(System for control and traceability of waste)

From SISTRI web site (http://www.sistri.it/):
SISTRI was born in 2009 on Ministry of Environment's initiative to allow the **ON-LINE REGISTRATION** of the chain of SPECIAL WASTES of whole Italy and of MUNICIPAL WASTES of Campania region.

In principle, the procedures are not so much changing from the «classic» method.
The main characteristic is theon line registration by logging on with an **USB key** supplied by the **Ministry of Environment** and assigned to the producer, and possibility to control on **real time** the whole system

The WASTE IDENTIFICATION FORM is substituted by the **SISTRI FORM (on line)**

The WASTE REGISTER is substituted by the **SISTRI CHRONOLOGICAL DATABASE (on line)**

Producer enters his data logging on SISTRi web site through the USB key.

Not only the producer, but also the other “players” are supplied by the USB key. On the truck is also installed a black box for connection with GPS system

All the information are
on-line forwarded
in real time to
Controlling Body –
CARABINIERI (NOE)

It is possible to cancel an operation, writing a reason, which anyway remains in the SISTRI CHRONOLOGICAL DATABASE

HOW WILL WE PROCEED? 2 possibilities, this is one...

TIMING	PLAYER	ACTION	PROCEDURE
t1;	Producer (CERM)	Waste production	Waste are carried to LAP
t2; within 10 days from waste production / before waste movement	Producer (CERM)	Recording LOAD on **SISTRI CHRONOLOGICAL DATABASE**	With USB key by SISTRI web pages
t3; Before waste movement; for hazardous waste at least 4 hour before waste movement Before transport; for hazardous waste at least 2 hours before waste transport	Producer (CERM) Carrier Company	Filling **WASTE MOVEMENT FORM**	With USB Key by SISTRI web pages
t4; before transport;	Producer (CERM) Driver Driver	Printing the **WASTE MOVEMENT FORM** (2 copies) and delivering to the Driver Loading of WASTES on the truck; logging on SISTRI through the **PRODUCER PC** Activating **BLACK BOX** and transport	With USB Key on SISTRI web pages With USB Key on SISTRI web pages With USB key on BLACK BOX inside truck

SISTRI system had shown some technical problems:
difficult server connection, many software updates,
improvements of procedures, ecc.

Since 2009 it has been postponed **many times**,
and updates of the technological and administrative systems
have been occurred...

To this day, it is into effect, but it is not mandatory

BASIC INSTRUCTIONS
IN CASE OF EMERGENCY AT CERM

Art. 20 D.Lgs. 81/08

.....every worker must:

....**TAKE CARE** about her/his safety and of the safety of all the other people with respect to which her/his actions or omissions are related, accordingly with her/his education, instructions and devices supplied by the employer....

....**CONTRIBUTE**, together with the employer, the managers and the *preposti* to fullfill duties for health and safety on working places...

....**FOLLOW** regulations and instructions which are given by the employer, by the managers, by the *preposti* to pursue individual and collective safety....

At CERM in case of emergency there is an
EMERGENCY PLAN
which goes into effect to manage safety

Trained personnel are assigned to manage medium risk situations
IN CASE OF FIRE and to give **FIRST AID**
IN CASE OF INJURY

In an emergency situation they are recognizable by their
ORANGE SMOCKS

EMERGENCY RESPONSE PERSONNEL

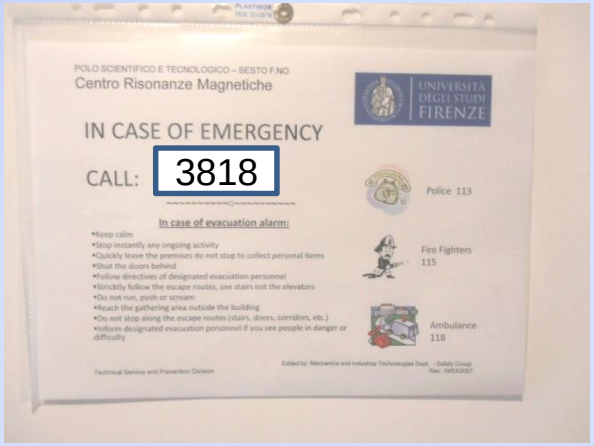
Dr. Marco Allegrozzi	**055 457 4278**
Dr. Rebecca Del Conte	**055 457 4243**
Dr. Leonardo Gonnelli	**055 457 4278**
Mrs. Cristina Mescalchin	**055 457 4270**

In an emergency situation all personnel are required to follow EMERGENCY PERSONNEL INSTRUCTIONS

GENERAL HINTS

All CERM personnel and visitors must locate
EMERGENCY EXIT, SAFETY APPARATUS

Read the
EMERGENCY INFORMATION CARDS
containing:



CAMPUS SECURITY TELEPHONE NUMBER 3818

- Emergency number for
- **Fire Department 115** (0115),
- **Ambulance 118** (0118),
- **Police 113** (0113)

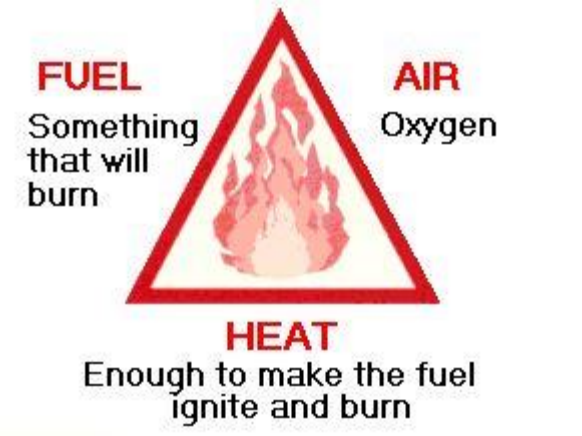
The closest **EMERGENCY EXIT** to your location
and related **GREEN EVACUATION ROUTES**

CERM EMERGENCY TELEPHONE NUMBER: 4252
(+390554574252)

During working hours (Monday - Friday, 7.30-19.30) the front desk will answer,

FIRE!

why it happens



NO!

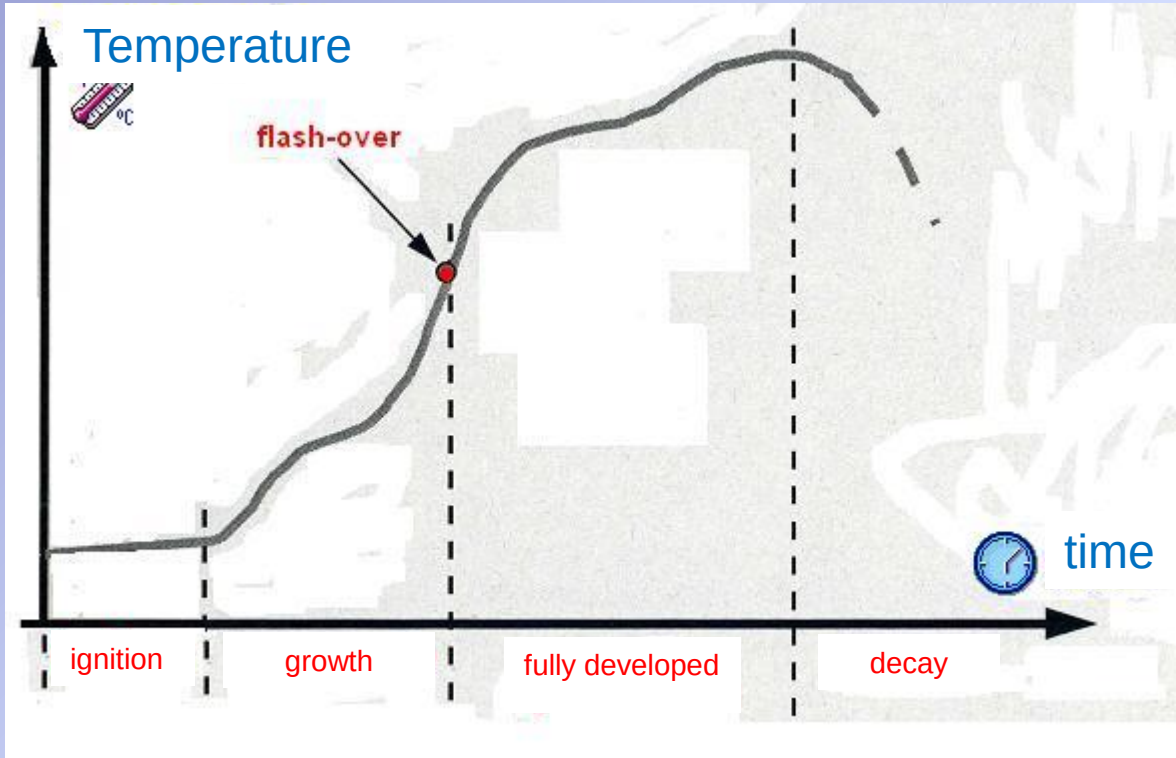
Primers:
free flames, lighters, lamps, electric resistance, stoves, heaters...

Pay attention to:
...not properly adequate **storing** or **handling** of **FLAMMABLE SUBSTANCES**, **PAPER, CARDBOARD**
negligence in using **FREE FLAMES** or **HEATER APPARATUS**....

AMONG ACTIONS FOR PREVENTION OF FIRE:

The quantity **DISPLAYED, USED or STOCKED** of **FLAMMABLE SUBSTANCES** in the laboratories must be as limited as possible

FIRE!



Effects: lack of oxygen, toxic action of smokes (ex. CO, CO_2, HCN, $COCl_2$...), heating, low visibility

150°C is the limit temperature tolerable over skin for very short time (with dry air)

https://www.youtube.com/watch?v=QqMVm72FMRk

IN CASE OF A SMALL FIRE:

• If there is smoke, burning odor or small fire **call 4252**, wait for instruction;

• If there is no response to 4252, actuate the **FIRE ALARM BOX;**

• If there is no immediate danger, hold on to provide additional information and remain in the area for helping **EMERGENCY PERSONNEL** in locating the fire;

• Otherwise, leave the area and close doors behind you (do not lock them!), proceed along **GREEN EVACUATION ROUTES** and go to the **MEETING AREA** outside the building

IN CASE OF A MAJOR FIRE:

- Alert others around you
- Leave the burning location and if possible close doors behind you (do not lock them!)
- Actuate the **FIRE ALARM BOX**
- Leave the building following the nearest **GREEN EVACUATION ROUTE**
- Proceed to the **MEETING AREA** outside the building and wait for instructions from **EMERGENCY PERSONNEL**

IN CASE OF A GENERAL EVACUATION ALARM:

- **LEAVE THE BUILDING IMMEDIATELY**, if possible close doors behind you (do not lock!)
- Proceed along **GREEN EVACUATION ROUTES** nearest you
- Proceed to the **MEETING AREA** outside the building
- Stay outside until emergency personnel advice that it is possible to access the building again

IN ANY CASE:

- Leave the area promptly;
- Keep calm, do not rush, push or scream;
- Do not use elevators;
- Do not stop along evacuation routes;
- Alerts others around you and help those in need, safeguarding yourself; if you cannot help them, alert emergency personnel and give them information about location of persons who may still be in the building; notify emergency personnel if you are trapped;

- **DO NOT RE-ENTER THE BUILDING**

ONLY IF POSSIBLE:

- Close doors behind you (do not lock!)
- Secure all equipment and machines
- Close all water taps, gas tanks, shut off laboratory electrical instruments (chromatography apparatus, autoclaves, heaters...)

DO NOT TOUCH NMR INSTRUMENTS

IN CASE OF INJURY:

- **Call 4252,** wait for the instructions and remain with the injured person.
- If there is no response to 4252 or if the injure is severe **call 118 (0118)** and be prepared to clearly state the address of the building, your location, telephone number and condition of the injured person.
- Call again 4252 to notify that an *emergency call* was placed.

Remember that in case of injury TIME is a critical parameter

CERM emergency plan is online available:
http://www.cerm.unifi.it/internals/documents-templates

Thank you very much for your attention