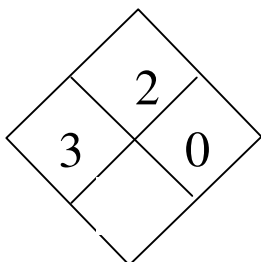


RISK DIAMMOND**Fire 2 – risk with light heating****Health 3 – very hazardous****Reaction risk 0 – no hazard under normal conditions**

Revision Risk Diamond; item 2, exclusion formaline 50%; item 3, hazards identification; item 7, storage; item 9, flash point item 10 stability and reactivity; item 11, toxicological data; item 12 ecotoxicity revision, insertion of the Henry Law Constant and Partition Coefficient octanol/water; item 15, insertion EPA data; item 16, updating bibliographical references.

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name (label): Formaldehyde
- Name in English: Formaldehyde.
- Supplier name, address and telephone number:
Elekeiroz S.A. (Várzea Paulista-SP Unit) - Rua Dr. Edgardo de Azevedo Soares, 392
CEP 13224-030
Phone: **(0xx11) 4596-8800 (24 h)**. Fax: (0xx11) 4596-8881
Elekeiroz S.A. (Camaçari-BA Unit) - Rua João Úrsulo, 1261, Pólo Petroquímico do Nordeste
CEP 42810-000
Phone: **(0xx71) 3632-7711 (24 h)**
Fax: (0xx71) 3632-2110
E-mail (customer service):
elisabete.moskalenko@elekeiroz.com.br
carlos.villani@elekeiroz.com.br

2. COMPOSITION AND INFORMATION ABOUT INGREDIENTS

- Common chemical name of the substance:
Formaldehyde 37% inhibited
Formaldehyde 37% stabilized
Formaldehyde 44%
- Synonyms:
Formaldehyde, Morbicide and Formaline solution.
- Register in *Chemical Abstract Service* (CAS Nº): [50-00-0]
- Hazardous ingredients:
Formaldehyde (37 to 44%), nº C.A.S.: 50-00-0
Methanol (0 to 9%), nº C.A.S.: 67-56-1

3. HAZARDS IDENTIFICATION

- Hazards and most important effects:
Colorless, irritant liquid, suffocating odour. Corrosive to eyes, to skin and to respiratory tract. It can cause skin sensitization.
Chronic effects: dermatitis, damages to kidneys.
Classified by ACGIH as Group A2: suspect human carcinogenic.
Classified by IARC as human carcinogenic (Group).

4. FIRST AID MEASURES

- Inhalation:
Remove the victim to fresh air and keep him/her laid. If he/she is not respirating, apply artificial respiration, by qualified person.
- Contact with the skin:
Wash the skin with plenty of water (15 minutes) and soap, while contaminated clothing is removed.
- Contact with eyes:
Wash the eyes with plenty of water (15 minutes), including under eyelids. Remove contact lenses, if it is the case, with medical help. Consult an ophthalmologist. .
- Ingestion:
Drink water or milk immediatel, if the victim is conscious.
- Observation: in all cases, the victim should be sent to emergency medical assistance.
- Notes to physician:
Take into consideration the risk of pulmonar edema due to the inhalation of the substance. Use corticoestheroids since the beginning.
The ingestion of the substance causes fixation risk in the vocal cords tissue with possible perforation in the first three days. Give a careful shower with an isotonic solution of sodium chloride and activated carbon.
Administer (via probe), from 100 to 150 ml of carbamic acid solution at 20% to form an non-poisonous combination.
Treat the victim by acidosis due to lack of anions and, simultaneously, monitor methanol level in blood.
Formic acid quickly metabolized requires attention: treat for acidosis and use dialysis to remove formic acid.
Causes severe damages to tissues.

5. FIREFIGHTING MEASURES

- Extinguishing media:
Alcohol foam, dry powder and CO₂.
- Specific hazards:
Liquid combustible, normally, there is no fire hazard. When heated, flammable gases are evaporated, forming a possible explosive mixture with air. Explosion range is from 7 to 73%. Flash point of formaldehyde solution decreases as the methanol concentration increases.
- Special methods:
For large fires, they are recommended the use of alcohol foam and cooling with water fog. The personnel involved in firefighting should wear self-contained breathing apparatus and full protection clothing.

6. CONTROL MEASURES FOR SPILLS AND LEAKAGES

- Personal precautions:
Remove ignition sources. Isolate the area. Approach the incident area for containment and/or cleaning with adequate PPE's (see item 8). Prevent gases inhalation and contact with skin, mucous membranes and eyes. Avoid dust formation coming from eventual paraformaline formation (see item 10) from its drying.
- Environmental precautions:
Contain the spill with sand dikes or specific accessories, avoid gases releasing to the environment.
- Cleaning methods:
Do not use tools or equipment that generate sparks. Absorb the substance with sand or other absorbant material and dispose in a polyurethane container for later disposal or recycling. The material can dissolved or mixed with combustible solvent and incinerated in a chemical burner properly regulated.

7. HANDLING STORAGE

- Handling:
Prevent contact with eyes and skin. Do not inhale vapours. Keep the container closed and sealed. Use exhaustion (explosion proof) in the area where the substance is handled. Electrical installations in the area should be explosion proof. It's necessary eyes washing facilities and emergency shower in handling area. Wear adequate PPE's (see item 8).
- Fire and explosions prevention:
Be careful with flames, sparks and weld. Prevent sparks formation resulting from static electricity.
- Proper material for package: Polyethylene.

- Storage:

Inhibited Formaline 37%: 304 stainless steel tanks with minimum temperature of 15°C.

Stabilized Formaline 37%: 304 stainless steel or fiberglass with polyester resin tanks, with minimum temperature of 15°C.

Formol 44%: 304 stainless steel or fiberglass with polyester resin tanks, with thermal isolation, with controlled temperature between 50 and 55°C.

Avoid physical damages to storage containers.

Store the substance in an area proper **for flammables**. The place should be dry, well ventilated and without direct and indirect heat incidence.

Do not store together with incompatible substances (see item 10).

Prevent static discharge generation, keep grounded all equipment used in the substance storage, manufacturing and transportation.

Use only antistatic tools.

For 44% concentrations it's recommended agitation, heating, isolation and storage at temperatures 5°C above storage temperature (example: **49°C for 44%**).

For 37% concentration, inhibited or stabilized, the product can be stored at ambient temperature and agitation is not necessary.

Prolonged exposure can cause corrosion in some metals like aluminum, steel and copper.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

- Control Parameters:

Decree 3214/78, Regulatory Standard NR-15, chart I: 1.6 ppm (2.3 mg/m³) – ceiling value.
ACGIH-TLV/TWA = 0.3 ppm (ceiling value).

- Personal Protective Equipment:

Safety glasses, full vision; hard hat; apron (barber type) made of PVC or Tyvek (in the proper specification); PVC or hexanol gloves; safety boots or PVC boots; facial mask with cartridge for acid gases, self-contained breathing apparatus or with supplied air.

For emergency assistance involving fires use self-contained breathing apparatus and full clothing.

For large spills, use adequate clothing.

9. PHYSICAL-CHEMICAL PROPERTIES

Property	Formol 37% stabilized	Formol 37% inhibited	Formol 44%
Physical state	Volatile liquid		
Color	Colorless		
Odour	Irritant		
PH	3.0 to 4.0	4.3	3.0 to 4.0
Boiling point (°C)	96 (760 mmHg)	96 (760 mmHg)	99 to 100
Flash point (°C) open cup	96°C	93°C	97°C
Ignition point (°C)	430°C		
Explosion limits	7.0% V/V (lower) and 73% V/V (upper)		
Vapour pressure	4.2 mmHg (40°C)		

Vapour density	1.03 (Air = 1)		
Density/specific gravity	at 25° C: 1.1040 g/ml	at 25°C: 1.084 g/ml	at 55°C: 1.12 g/ml
Solubility	Water up to 55%, alcohol and ketone.		

10. STABILITY AND REACTIVITY

- Specific conditions:

The substance can polymerize by itself thus forming paraformaldehyde which remains suspended, but it is not hazardous/dangerous.

The substance polymerizes and reacts easily when in contact with phenol and aniline, releasing heat.

The atmospheric air can oxidize the substance forming formic acid, mainly when heated.

It occurs auto-ignition when in contact with oxidizing substances, like potassium permanganate, **nitrites, peroxides, chlorates and perchlorates.**

It's incompatible also with ammonia, alkalis, bisulfides, copper salts, iron salts, silver salts and iodides.

It can occur corrosion in metals like aluminum, steel and copper due to prolonged contact.

The substance can react with hydrogen chloride under certain atmospheric conditions forming chloromethyl which is carcinogenic.

The substance undergoes polymerization and subsequent degradation when the substance is below 28°C.

- Hazardous decomposition products:

Toxic gases like carbon monoxide that can be produced during fires involving formaline solutions. Biodegradation produces formic acid and methanol.

11. TOXICOLOGICAL INFORMATIONS

- Acute toxicity and local effects:

- Inhalation:

When inhaled the substance can cause ardor in nose and throat, cough, rouquidão, tears and pressure over the chest. High concentrations can cause risks of cramps and swelling of the larynx, eventually pulmonar edema and pneumonia.

Even low concentrations can result in the risk of allergic reaction (hypersensitivity) resulting in nasal congestion and difficult respiration, like an asthma.

- Contact with skin:

Causes irritation. Frequent or prolonged exposure causes hardening and crackings in the skin resulting in hypersensitivity and increased risk of allergic eczema.

- Contact with eyes:

Causes acute pain that can be followed by ulceration/ulceração. Substance vapours cause extreme irritation and frequent contact result eyelids inflammation.

- Ingestion:

When ingested the substance causes hemorrhagic vomits, abdominal pain, possible shock and damages to kidneys or death. Ulcers in abdomen and intestines can occur even when little quantities are ingested.

- Known toxicological data:
Oral (woman) LD_{LO}: 108 mg/kg.
Oral (rat) LD₅₀: 800 mg/kg.
Inhalation (human): TC_{LO} 17 mg/m³/30M.
Inhalation (rat) LC₅₀: 590 mg/m³.
Dermic (rabbit) LD₅₀: 270 mg/kg.
- Irritation:
Skin (human): 0.15 mg/3d-I average.

12. ECOLOGICAL INFORMATIONS

- Environmental effects, behaviors and product impacts: the product is acid. Before discharging waters in purification units it's normally necessary neutralization. In case of a correct introduction of little concentrations, they are not expected changes in the function of activated sludge of a purification unit biologically adapted.

Ecotoxicity:

LC₅₀: 10 – 100 mg/l, 96 hours (fish)

EC₅₀: 2 mg/l, 48 hours (*Daphnia*)

IC₅₀: 0.4 mg/l, 24 hours (alga)

The product is readily biodegradable.

Bioaccumulative potential: it is not expected bioaccumulation in aquatic organisms.

Risks to environment:

Water: it is not referred in Decree 36, 01/19/90 of Health Ministry avou maximum allowed value in potable waters.

Air: odours emission can cause nuisance to community.

- Indications for elimination:
DBO: 37% in 5 days and 47% (theoretical) in 5 days.
DQO: not available.
- Henry Law constant: 3.27×10^{-7}
- Partition coefficient octanol/water: $\log K_{ow} = 0.35$.

13. CONSIDERATIONS ABOUT TREATMENT AND DISPOSAL

- Treatment and disposal methods for product, wastes and used packages:

Any wastes treatment should be in accordance with local and national regulation.

14. TRANSPORTATION INFORMATION

- National and international regulations:
Follow hazardous goods road transportation regulation according to decree n° 96044, 05/18/88 and their updatings and Resolution ANTT 420/04 and their updatings.
Follow hazardous goods rail transportation regulation according to decree n° 98973, 02/21/90 and their updatings.
Follow Mercosur hazardous goods transportation regulation according to decree n° 1797, 01/25/96 and their updatings.
- **Road transportation (Brazil and MERCOSUR):**
Proper name for shipping: FORMALDEHYDE, SOLUTIONS
Risk class: 8 (corrosive)
Risk Nº: 80
UN Nº: 2209
Packing group: III
- Marine: Follow IMDG
Proper Shipping Name: Formaldehyde solution
Regulations page number: 8176-1
UN number: 2209
UN class: 8
- Aerial: Follow IATA-DGR
UN ID number: 2209
Proper Shipping Name: Formaldehyde solution
UN class: 8
Label: CORROSIVE
Packing Group: III

15. REGULATIONS

EPA regulations:

-RCRA 40 CFR: listed U122 toxic waste.

-CERCLA 40 CFR 302.4: listed by CWA Section 311 (b) (4), by Section RCRA 3001 100 lb (45.35 kg)

-SARA 40 CFR 372.65: Listed.

-SARA EHS 40 CFR 355: listed.

RQ: 100 lb

TPQ: 500 lb

-TSCA: listed.

EPA – Environmental Protection Agency

SARA - Superfund Amendments and Reauthorization Act

RCRA - Resource Conservation and Recovery Act

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

TSCA - Toxic Substances Control Act

16. OTHER INFORMATION

References:

- MSDS - GENIUM PUBLISHING CORP. (record n.º **FOR1000** – revision date **June/06**)
- Elekeiroz specification.
- IATA/DGR – International Air Transport Association – **Edition 2008**.
- IMO/IMDG – International Maritime Dangerous Goods – Edition 2006.
- Manual ACGIH, Portuguese version **2007** (translation: ABHO).
- Commented Regulatory Standards – Occupational Health and Safety Regulation Volume I – Press GVC 2005.

Observation:

The information contained in this MSDS are offered in good faith and as guide tool, without incurring expressed or implicit liability. If clearings or additional information are needed, consult the manufacturer.