SAFETY DATA SHEET

In compliance with EC Regulations No.: 1907/2006, 830/2015 and 1272/2008 (CLP).

Date last modified: 22 December 2017 - Version 6.0

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY

1.1 Product Identifier

Product Name: MARZINE - PLUS
Product Code #: 673013 (30 lt)

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

Intended Use: FOR PROFESSIONAL USERS ONLY
Industrial applications; Boiler Water Treatment.

Uses advised against: This product is not recommended for any industrial, professional or consumer use other than the Intended Uses above and the instructions written in this Safety Data Sheet.

1.3 Details of the supplier of the safety data sheet

Company/undertaking identification

Supplier/Manufacturer:

Marichem Marigases Hellas SA
Sfaktirias 64,
185 45 Piraeus,
Greece
Tel. No.: ++30 210 4148800
Fax No.: ++30 210 4133985
http://www.marichem-marigases.com

e-mail: mail@marichem-marigases.com

1.4 Emergency telephone number

Tel. No.: ++30 210 4148800 (including working hours)

Emergency Information:
Inside U.S. and Canada: (800)-424-9300 (CHEMTREC)
Outside U.S. and Canada: 1-703-527-3887 (CHEMTREC)
National Emergency Centre (Greece): ++30 210 7793777

2. HAZARDS IDENTIFICATION

2.1. Classification of the mixture

Classification (Regulation (EC) No 1272/2008):

Carcinogenicity, 1B, H350
Inhalation: Acute toxicity, 3, H331
Dermal: Acute toxicity, 3, H311
Oral: Acute toxicity, 4, H302
Skin corrosion, 1B, H314
Eye irritation, 1, H318
Skin sensitization, 1A, H317
Acute aquatic toxicity, 1, H400
Chronic aquatic toxicity, 1, H410

SIGNAL WORD: DANGER

Hazard Statements:

H311: Toxic in contact with skin.
H331: Toxic if inhaled.
H350: May cause cancer.
H302: Harmful if swallowed.
H314: Causes severe skin burns and eye damage.
H317: May cause an allergic skin reaction.
H410: Very toxic to aquatic life with long lasting effects.

2.2 Label Elements

Labelling according to Regulation (EC) No. 1272/2008.
The substance is classified and labelled according to the CLP Regulation.

Hazardous components which must be listed on the label:
Hydrazine

Hazard Pictograms

GHS06 GHS08 GHS05 GHS09

Hazard Statements:

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Precautionary statements:

Prevention:
P201: Obtain special instructions before use.
P260: Do not breathe gas/mist/vapours/spray.
P273: Avoid release to the environment.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P303 + P361 + P353: IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/ physician.

Storage:
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
Additional information: Restricted for use only to professional users.

Special labelling:
2.3. Other hazards
Potential health effects:
Causes burns. May cause sensitization by skin contact.
Inhalation: At high concentrations headache, Drowsiness confusion, Neurological disorders, risk of irritation of respiratory system.
Chronic exposure: May cause cancer.

Environmental Effects:
Very toxic to aquatic organisms. Readily biodegradable. Not bioaccumulable.

Product classification and labelling according to Directive 67/548/EEC, European Dangerous Preparations Directive (1999/45/EC), European Regulation 648/2004 and their amendments.

Symbol: **T, N**

Toxic (T)

Dangerous for the Environment (N)

Risk Phrases

R45: May cause cancer.
R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
R34: Causes burns.
R43: May cause sensitization by skin contact.

R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases

S2: Keep out of the reach of children.
S53: Avoid exposure – obtain special instructions before use.
S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S60: This material and its container must be disposed of as hazardous waste.
S61: Avoid release to the environment. Refer to special instructions/Safety Data Sheets.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Composition:

Ingredients	CAS Number	Proportion	Classification*
Hydrazine	302-01-2	10% - 35%	H311; H331; H350; H302; H314; H317; H410.
Ingredients that do not contribute to the classification of the product	-	65% - 90%	-

*See section 16 for the full text of the Hazard Codes declared above.

Occupational Exposure Limits, if available, are listed in section 8.

4. FIRST AID MEASURES

4.1. & 4.2. Description of necessary first-aid measures & Most important symptoms/effects, acute and delayed

General advice
Under the shower: Take off immediately all contaminated clothing, including shoes.

Inhalation
Inhalation of vapours/mists:
Move to fresh air.
Oxygen or artificial respiration if needed.
Hospitalize immediately.

Skin contact
Wash immediately, abundantly and thoroughly with water. Consult a doctor quickly. In case of extensive burns: Hospitalize immediately.

Eye contact
Wash open eyes immediately, abundantly and thoroughly for at least 15 minutes. Consult an ophthalmologist immediately.

Ingestion
Do not induce vomiting, rinse mouth and lips with plenty of water if the subject is conscious, then hospitalize.

Protection of first-aiders:
For any intervention, wear appropriate breathing apparatus and protective suit.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available.

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media
Water spray, foam, powder.

5.2. Special hazards arising from the substance or mixture
Contact with incompatible products can create flammable or explosive atmospheres (formation of: Hydrogen).

5.3. Advice for firefighters

Specific methods:
Evacuate non-essential staff and those not equipped with individual protection apparatus. Cool containers/tanks with water spray. Ensure a system for the rapid emptying of containers. In case of fire, remove exposed containers.

Special protective actions for fire-fighters:
Wear self-contained breathing apparatus and proper protective suit.

Hazardous Combustion Products
These products are Nitrogen Oxides (NO, NO_2…).

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Evacuate non-essential staff and those not equipped with individual protection apparatus. Prohibit contact with skin and eyes and inhalation of vapours. Remove all sources of ignition. In case of insufficient ventilation, wear suitable respiratory equipment.

6.2. Environmental precautions:

Do not release into the environment. Do not let product enter drains. Dam up with sand or inert earth (do not use combustible materials).

6.3. Methods and materials for containment and cleaning up

Recovery:
Pump into a labelled inert emergency tank. Dilute with water. Do not mop up (risk of decomposition) (do not use sawdust, prohibit the use of cloths or rags)

Elimination:
Destroy product by oxidation with dilute solutions of: Hypochlorites (sodium - calcium)

6.4. Reference to other sections:
None.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Technical measures/Precautions:
Storage and handling precautions applicable to products: Liquid. Toxic. Corrosive. Sensitizing. Dangerous for the environment. Provide appropriate exhaust ventilation at machinery. Provide showers, eye-baths. Provide water supplies near the point of use. Provide self-contained breathing apparatus nearby. Well ventilate empty vats and tanks before entering.

Safe handling advice:
Avoid splashing when handling. Use only explosion-proof equipment. Strictly limit the quantities of product in the work area to those which are absolutely necessary for the work in hand.

Hygiene measures:
Prohibit contact with skin and eyes and inhalation of vapours. When using do not eat, drink or smoke. Wash contaminated clothing before reuse.
Wash hands after handling. Remove contaminated clothing and protective equipment before entering eating areas.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a cool, well-ventilated place. Provide facilities to capture any vapours. Store away from heat and ignition sources. Provide impermeable floor. Provide a catch-tank in a bunded area. Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres.

Incompatible products:
Oxidizing agents, Nitrites, Metallic oxides, Finely divided substances (decomposition catalysts)

Packaging material:
Recommended: Stainless steel, Epoxy resin coated steel, Polyethylene (specific for hydrazine)

To be avoided: Ordinary steel, Ordinary metals

7.3. Specific end uses

Used as boiler water treatment; Industrial use only.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Name of Substance: Hydrazine

8.1. Control parameters:
Exposure Limit Values

Source	Date	Value type	Value (ppm)	Value (mg/m^3)	Remarks
ACGIH (US)	2007	TWA	0.01	-	-
ACGIH (US)	2007	SKIN	-	-	Can be absorbed through the skin

Derived No Effect Level (DNEL):

End Use	Inhalation	Ingestion	Skin contact
Workers	0.1332 mg/m^3 (ST, LE, SE) 0.01 ppm (LT, SE)		6.4 µg/kg bw/day (LT, SE)

LE: Local effects, **SE:** Systemic effects, **LT:** Long term, **ST:** Short term

Predicted No Effect Concentration (PNEC):

Compartment:	Value:
Water	0.0006 mg/l
Marine Water	0.00006 mg/l
Effects on waste water treatment plants	0.055 mg/l

8.2. Exposure controls

General protective measures
Ensure sufficient air exchange and/or exhaust in work areas, frequently monitor and control the working atmosphere. Use material of high integrity for loading and unloading. Investigate engineering techniques to reduce exposures. Routine monitoring and inspections for leaks to reduce fugitive emissions.

Personal protective equipment
Respiratory protection: In case of leak, wear a self-contained breathing apparatus.
In case of insufficient ventilation wear suitable respiratory equipment.
Hand protection: PVC gloves
Protective gloves complying with EN 374.
Eye/face protection: Safety glasses with side-shields, face-shield.
Skin and body protection: Protective suit, Boots

Environmental exposure controls
See Chapter 6

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

9.1.1. Appearance

Physical State: Liquid

Color: Colorless to light yellow.

Odor: Odorless

9.1.2. Basic data

Boiling Point (1 Atm):	104^{o}C
Freezing Point:	-24^{o}C
Solubility in water:	Totally miscible with water
Flash Point:	Not Applicable
Autoignition Temperature:	Not Available
Lower Explosive Limit (vol %):	4.7 % (Hydrazine)
Upper Explosive Limit (vol %):	100% (Hydrazine)
Vapour Pressure:	17 mmHg at 20^{o}C
Viscosity:	1.08 cP at 25^{o}C
Specific Gravity (gr/cm^{3}):	1.01 – 1.02 at 20^{o}C
pH value:	11.5 – 13.0

9.2. Other Information

Solubility in other solvents:	Soluble in Ethanol
Henry constant:	960E+00 Pa.m^{3}/mol (calculated)

10. STABILITY AND REACTIVITY

10.1. & 10.2. Reactivity & Chemical stability
The product is stable under normal handling and storage conditions.
Powerful reducer.

10.3. Possibility of hazardous reactions
No data available.

10.4. Conditions to avoid
Keep away from heat and sources of ignition.

10.5. Incompatible materials to avoid:
Oxidizing agents, Nitrites, Metallic oxides, Finely divided substances (decomposition catalysts)
• Corrosion with: Ordinary metals.

10.6. Hazardous decomposition products:
Thermal decomposition:
Decomposition temperature: > 250 °C
Nitrogenous derivatives, Hydrogen.

11. TOXICOLOGICAL INFORMATION

Name of Substance: Hydrazine

11.1. Information on toxicological effects

ACUTE TOXICITY

Inhalation: According to its composition: Toxic by inhalation.

In man: Effects of breathing high concentrations of vapour may include: Neurological disorders, headache, drowsiness, confusion, coma, difficulty in breathing, risk of pulmonary oedema, metabolic problems, acidosis, hypoglycaemia and liver disorders

In animals: LC50/4 h/rat: 0.75 mg/l
LC50/4 h/mouse: 0.33 mg/l

Ingestion: According to its composition: Harmful if swallowed.

In animals: LD50/rat: 108 mg/kg

Dermal: According to its composition: Toxic in contact with skin.

In animals: LD50/rabbit: 91 mg/kg.
Local effects (Corrosion/Irritation/Serious eye damage):
Skin contact: According to its composition: Causes burns.
Corrosive to skin.

Eye contact: According to its composition: Causes serious eye damage.
Vapour at high concentrations and direct contact with liquid: Risk of serious damage to eyes.
In animals: Severely irritating, or even corrosive, to eyes.

Respiratory or skin sensitization:
Inhalation: No data available.
Skin contact: According to its composition: Skin sensitizer
• In man: Proven human sensitizer
• In man: Eczema-like dermatitis possible
• In man: Possible cross sensitization with hydrazine derivatives

CMR effects
Mutagenicity
In vivo
Several in vivo and in vitro tests indicate potential genotoxicity.

Carcinogenicity: According to its composition: May cause cancer.
Exposure to vapours
Nasal tumours only observed at high concentrations in association with permanent irritating lesions of the epithelium in the upper respiratory tract induced by the exposure.
Absence of causal relationship between incidence of cancer and exposure to product in epidemiological studies.
Slight carcinogenic effects in animals.

No Observed Adverse Effect Level (NOAEL) (rodent, 1 year) (1,3 mg/m^3) 0.3 mg/m^3.
Lowest Observed Adverse Effect Level (LOAEL) Neoplasic lesion (0,3 mg/m^3) 1.3 mg/m^3.

Reproductive toxicity
Fertility
According to available experimental data: Absence of toxic effects on fertility.

Foetal development:
Absence of congenital malformations and embryotoxic effects in rodents at non-toxic doses for the mothers.

Specific target organ toxicity
Single exposure
Inhalation
Risk of severe irritation of respiratory system.

Repeated exposure
Target organs: Target organs at high doses: Liver, Kidney, Nervous system.
By inhalation: Target organs: nasal tissues, site of contact, LOAEL= 0.066 mg/m^3 (rat) (various animal species - Chronic)
By oral route: NOAEL= 1.92 mg/kg (rat, Subacute)

Aspiration hazard: No data available.

12. ECOLOGICAL INFORMATION

Name of Substance: Hydrazine

12.1. Toxicity

GENERAL OVERVIEW
No environmental problems are expected when the product is used/handled correctly. In its intended use, the product will not be released into the environment.

Fish: According to its composition:, Very toxic to fish.
LC50, 96 h (Lebistes reticulatus): 0,61 mg/l (Test substance: Active ingredient).

Aquatic invertebrates: According to its composition: Very toxic to daphnia.
EC(I)50, 48 h (Daphnia pulex (Water flea)) : 0.16 mg/l (Immobilization, Test substance: Active ingredient).

Aquatic plants: According to its composition: Very toxic to algae.
IC50, 72 h (Pseudokirchneriella subcapitata): = 0,017 mg/l (Method: OECD Test Guideline 201, growth rate, Test substance: Active ingredient)
NOEC: = 0,006 mg/l

Microorganisms
Very toxic to bacteria.
EC 5, 16 h (Pseudomonas putida) : 0,019 mg/l

Aquatic toxicity / Long term toxicity:
Aquatic invertebrates
NOEC, 21 d (Daphnia magna (Water flea)): = 0.01 mg/l (Method: OECD Test Guideline 211, Reproduction inhibition, Test substance: Active ingredient).
NOEC: = 0,123 mg/l (Immobilization)

12.2. Persistence and degradability

Biodegradation (In water): According to its composition: Readily biodegradable
Zahn-Wellens Test: 100 % after 1 d (Method: OECD Test Guideline 302 B)

Photodegradation (In air)
Overall half-life time: 6.3 h

12.3. Bioaccumulative potential
Bioaccumulation: According to its composition: Not bioaccumulable
Partition coefficient: n-octanol/water: log Kow: -0.16 (Method: OECD Test Guideline 107)

12.4. Mobility in soil - Distribution among environmental compartments:
Henry constant
960E+00 Pa.m3/mol, (Method: calculated)

12.5. Results of PBT and vPvB assessment
According to REACH regulation, annex XIII; this mixture contains no substance meeting PBT and vPvB criteria.

12.6. Other adverse effects
None known.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment

Disposal of product
Destroy product by oxidation with dilute solutions of: Hypochlorites (sodium - calcium).

Disposal of packaging
Clean container with water. Recover waste water for processing later.

14. TRANSPORT INFORMATION

14.1 Proper Shipping Name: Hydrazine, aqueous solution

14.2 LAND TRANSPORT

UN number:	3293	RID-class:	6.1
ADR class:	6.1	Packing group:	III

14.3 SEA TRANSPORT

UN number:	3293	EmS:	F-A, S-A
IMDG class:	6.1	IMDG packing group:	III

14.4 AIR TRANSPORT

UN number:	3293		
IATA/ICAO class:	6.1	Packing group:	III

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

15.2 Chemical Safety Assessment

A CSA has been carried out for the raw materials in this product, from the raw materials manufacturers (when needed to be carried out).

16. OTHER INFORMATION

16.1 Full text of Hazard Codes referred in Section 3.

H311: Toxic in contact with skin.
H331: Toxic if inhaled.
H350: May cause cancer.
H302: Harmful if swallowed.
H314: Causes severe skin burns and eye damage.
H317: May cause an allergic skin reaction.
H410: Very toxic to aquatic life with long lasting effects.

16.2 Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road).
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail).
IMDG: International Maritime Code for Dangerous Goods.
IATA: International Air Transport Association.
ICAO: International Civil Aviation Organization.
bw: Body weight.
Carc.: Carcinogenicity.
CAS number: Chemical Abstracts Service number.
CLP: Classification Labelling Packaging Regulation.
CSA: Chemical Safety Assessment.
CSR: Chemical Safety Report.
DNEL: Derived No Effect Level.
dw: Dry weight.
EC number: EINECS and ELINCS number.
EC: European Commission.
EC50: Half maximal effective concentration.
EINECS: European Inventory of Existing Commercial Chemical Substances.
ELINCS: European List of Notified Chemical Substances.
EmS: Emergency Schedule.
ERC: Environmental Release Category.
ES: Exposure scenario.
food: oral feed.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
Irrit.: Irritation.

LC50: Lethal concentration, 50 %.
LD50: Median Lethal dose.
LOAEC: Lowest Observed Adverse Effect Concentration.
LOAEL: Lowest Observed Adverse Effect Level.
MK value: Maximum Concentration value.
NCO: An international corporation that provides customer service contracting.
NOAEC: No Observed Adverse Effect Concentration.
NOAEL: No Observed Adverse Effect Level.
NOEC: No Observed Effect Concentration.
OECD: Organisation for Economic Cooperation and Development.
PBT: Persistent, Bioaccumulative and Toxic.
PNEC: Predicted No Effect Concentration.
PROC: Process category.
REACH: The Registration, Evaluation, Authorisation and Restriction of Chemicals.
Resp.: Respiratory.
Sens.: Sensitization.
STEL value: Short Term Exposure Limit value.
STOT RE: Specific target organ toxicity — repeated exposure.
STOT SE: Specific target organ toxicity — single exposure.
STOT: Specific Target Organ Toxicity.
STP: Sewage Treatment Plant.
SU: Sector of use.
Tox.: Toxicity.
TWA value: Time Weighted Average value.
vPvB: Very Persistent and Very Bioaccumulative.

16.3 Notice to reader

All information, instructions and statements contained in this Material Safety Data Sheet are compiled in accordance with European Directives, corresponding national legislation and on the basis of information given by our suppliers.
The information disclosed in this Material Safety Data Sheet (which supersedes all previous versions) is believed to be correct, at the date of issue, to the best of our current knowledge and experience. It only relates to the specific product designated herein and it may not be valid when said product is used in combination with any other products or in any processed form, unless specified in the text. This document aims to provide the necessary health and safety information of the product and is not to be considered a warranty or quality specification. It is the responsibility of the recipient of this Material Safety Data Sheet to ensure that information given here is read and understood by all who use, handle, dispose of or in any way come in contact with the product.
Also, it is the responsibility of the user to comply with local legislation relating to safety, health, environment and waste management. Data and information provided concerning the product are informative, exclusively presented to the customer.