



ISO TANK PROJECT



ایستا صنعت فولاد غرب
نوین سازه فیدار زاگرس
طراحی و اجرای سازه‌های فلزی
Permanent Satisfaction
رضایت ماندگار با سازه‌های فلزی کایکم



ISO TANK PROJECT

JAN 04, 2021


گزارش روند اجرایی پروژه ایزو تانک جهت حمل مواد و محصولات پتروشیمی

با توجه به جلسات تشکیل شده با حضور آقایان مهندسین : شهرام قره گزلو، علی نوروزی نژاد، محمد رسول آرش، محمدرضا پسند و پیرو مذاکرات انجام گرفته با جناب آقای دکتر آدینه و جناب آقای مهندس MAHMUT AHMET UNAL برای روند اجرایی استعلام های مربوط به مشخصات، استانداردها و قیمت تمام شده ایزو تانک جهت حمل مواد و محصولات شیمیایی پتروشیمی کرمانشاه اطلاعات مورد نیاز استخراج و جمع بندی قیمت ساخت ایزو تانک به شرح ذیل صورت گرفت:

۱: داده های پروژه

ردیف	نوع سیال	فشار کاری -بخار	درجه خوردگی		چگالی سیال Kg/m3	درجه احتراق	دمای نکهداری	حالت	بررسی دیگر الزامات MSDS	متریال پیشنهادی
			LCS	SS						
۱	LAB	N.A	0.2	3	760	Combustible	-40 +314	مایع	*	ASTM A 516
۲	حلال آروماتیک پارافین	N.A	0.2	3	775	Combustible	<105	مایع	*	ASTM A 516
۳	نفتای سنگین	6-96 hPa	0.2	3	730	Flammable		مایع	*	SS AISI 316L- 304
۴	آلکیلات سنگین	N.A	0.3	3	790	Combustible	<186	مایع	*	ASTM A 516

***درخصوص سایر موارد مورد نظر جناب دکتر آدینه به علت نبود SMDS امکان اظهار نظر قطعی وجود نداشت.

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1 PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Use

This high purity product is used primarily for the production of biodegradable synthetic detergents.

1.2 Manufacturer's Name and Address

SEEF Limited

P.O. Box: 50077.

Emergency contact:

Mesaieed, State of Qatar.

Control room: +974 44776495

Tel: +974 44223565

Shift supervisor: +974 44773728

2 COMPOSITION / INFORMATION ON INGREDIENTS

2.1 Product Information

Material Name Benzene, C 10-13- alkyl derives

CAS No. 67774-74-7


EINECS No. 267-051-0

Synonyms / Trade Name Linear Alkyl Benzene / LAB.

3 HAZARD IDENTIFICATION

3.1 Health Effect

Eye	Accidental exposure to the eyes may produce a mild but transient irritation.
Skin	Prolonged and repeated contact of product with skin can cause irritation.
Inhalation	Under normal conditions, this product shows a very low vapor pressure. The risk of inhalation is therefore very low.
Ingestion	This Product has a very low level of toxicity.

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3.2 Environmental Hazard

LAB is biodegradable product. Sulphonate derivative of LAB are highly biodegradable

4 FIRST AID MEASURES

Eye	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
Skin	Wash skin with soap and water upon contact. Remove contaminated clothing. If irritation persists, get medical attention. Wash Clothing before reuse.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	Accidental ingestion may cause drunkenness, lung congestion and damage to liver and kidneys. Treat symptomatically; get medical attention. DO NOT induce vomiting. Get Medical attention. Never give anything by mouth to an unconscious person.

5 FIRE FIGHTING MEASURES

5.1 Fire Data


- Extinguishing Media: CO₂, dry chemical powder, foam.
- Flash point and method: >130 °C (Pensky Martens).
- Explosive limits in air: Not Available.
- Auto ignition Temperature: Not available.
- Combustible Products: Carbon monoxide (CO), carbon dioxide (CO₂)

5.2 Small Fires

Use a dry chemical powder, CO₂ or AFFF foam.

5.3 Large Fires

Use water spray, Fog or AFFF foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Thermal decomposition may include toxic oxides of carbon. Use self-contained breathing apparatus.

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5.4 Fire involving Tanks or Trailer Loads

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Self-contained breathing apparatus should be worn during fires in confined spaces.

6 ACCIDENTAL RELEASE MEASURES

6.1 Safety Precautions

Eliminate all ignition sources (no smoking, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basement or confined areas. A vapour suppressing foam may be used to reduce vaporous. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material.

6.2 Major Spill

Dike far ahead of liquid spill for later disposal. Water spray may reduce vapour; but may not prevent ignition in closed spaces.


6.3 Empty Containers

Empty containers retain product residue (liquid and/or vapor) and can be dangerous. do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Empty drums should be completely drained, properly bunged and promptly returned to a drum re-conditioner.

7 HANDLING & STORAGE

7.1 Handling

Handle in accordance with good hygiene and safety procedures. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Since empty containers contain product residue, follow all hazard warnings and precautions even after container is emptied. Keep away from sources of ignition. During all handling operations, both transferring and receiving vessels must be properly grounded.

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7.2 Storage

Store in the closed containers in a cool, dry, well ventilated areas. This product is non-corrosive; it does not therefore call for special storage materials.

Usual materials of construction are suitable for storage. Keep away from sparks, flame and other ignition sources. Store away from all combustible, organic and oxidizable materials.

7.3 Others

- Usual shipping containers: Tank cars, Tank trucks, Drums.
- Type of material: Carbon steel, baked epoxy or phenolic resin coatings, Aluminum.
- Storage / transport pressure: Atmospheric.
- Storage / transport temperature: Ambient.
- Loading / unloading temperature: Ambient.

8 EXPOSURE CONTROL / PERSONAL PROTECTION

8.1 Exposure Control

- Engineering Controls: Local exhaust is recommended (preferred mechanical) for use of material at elevated temperatures or in enclosed areas.
- Good industrial hygiene should be followed.
- Avoid breathing (heated) vapors. Avoid eye and skin contact.

8.2 Personal Protective Equipment

- Eye: Goggles or face shield with goggles, dependent upon potential exposure.
- Skin: Rubber gloves (or Neoprene); Dependant upon degree of potential exposure, additional personal protective equipment may be required, such as chemical boots and full protective clothing.
- Inhalation: Use an appropriate NIOSH/MSHA approved respirator for exposure to contaminated atmosphere. A NIOSH/MSHA approved self-contained breathing apparatus or air-supplied respirator is recommended if the concentration exceeds the capacity of cartridge respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
- Other Controls: Boots, Eye wash fountain, Safety Shower, Apron, Protective clothing.



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9 PHYSICAL AND CHEMICAL PROPERTIES

- Physical State: Liquid
- Appearance: Colorless
- Odor: Odorless
- pH: Not Applicable.
- Boiling Range: 278 - 314°C
- Flash Point: >130°C
- Flammability: Not Available
- Explosive properties: None
- Oxidizing properties: Not Available
- Vapor Pressure mm Hg @ 20°C: < 0.1
- Freezing Point -40°C
- Water Solubility: Negligible
- Viscosity: 5 – 10 cps @ 20°C
- Vapor Density : 8.4
- Specific Gravity: 0.86

10 STABILITY AND REACTIVITY

- Stability: Stable.
- Materials to Avoid: Incompatible with strong oxidizers.
- Hazardous Polymerization: No dangerous polymerization.

11 TOXICOLOGICAL INFORMATION

- Acute Toxicity
- Dermal: Ld50: > 2000 Mg/Kg (Rats).
- Inhalation: Lc50: > 1.82mg/L (Rats).
- Skin: Negligible To Slight Irritation (Rabbits).
- Eye: Negligible Irritant Properties (Rabbits).
- Sensitization: Not a Skin Sensitizer.
- Mutagenicity: Not Mutagenic
- Carcinogenicity : Not Carcinogenic
- Teratogenicity: Not Teratogenic
- Toxicity to reproduction: Not Reprotoxic



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12 ECOLOGICAL INFORMATION

12.1 General

Sulphonate derivative of LAB are highly biodegradable (97% or greater). It is acutely toxic to Daphnia, however, shows no adverse effects in fish and Algae. LAB has low solubility in water (0.041 mg/l).

12.2 Ecotoxicity

Daphnia magna: 48h LC50 = 0.009 – 0.08 mg/l

12.3 Persistence and Degradability


- Aerobic biodegradation: LAB biodegrades readily
- Anaerobic biodegradation: Biodegradation of >70%.

13 DISPOSAL CONSIDERATIONS

Wastes can be incinerated under controlled conditions according to official regulations

14 TRANSPORTATION INFORMATION

This product is not a dangerous good or hazardous for ground and water transportation.

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15 OTHER INFORMATION

Sulfonate derivatives of LAB are highly biodegradable (97% or greater), according to O.E.C.D.'s official method described on E.E.C. Directive, 82/243.

HAZARD RATING

HAZARD	NFPA	HMIS
Health	1	1
Flammability	1	1
Reactivity	0	0

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	Naphtha (petroleum), heavy catalytic cracked	Issue date : 04/02/2015
		Supersedes :

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

1.1. Product identifier

Trade name/designation : Naphtha (petroleum), heavy catalytic cracked
EC Index : 649-289-00-0
EC No : 265-055-7
CAS No. : 64741-54-4

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

Main use category : Industrial use, Professional use

1.3. Details of the supplier of the safety data sheet

Company : Mercuria Energy Trading B.V. supplying for and on behalf of Mercuria Energy Trading S.A
Herculesplein 108
3584AA Utrecht , Netherlands
Telephone +41 22 594 7000
Telefax: +41 22 594 3904
E-mail: emergency@sgs.com

1.4. Emergency telephone number

Emergency telephone : +32 3 575 11 30 (SGS 24/7 Emergency Hotline)

IRELAND (REPUBLIC OF)

National Poisons Information Centre
Beaumont Hospital

+353 18 37 99 64/+353 1 809 21 66

UNITED KINGDOM

National Poisons Information Service
(Newcastle Centre)
Regional Drugs and Therapeutics Centre,
Wolfson Unit

0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EU) 1272/2008


CLP-Classification : The product is classified as hazardous in accordance with Regulation (EC) No. 1272/2008.

Flam. Liq. 1 H224
Skin Irrit. 2 H315
Muta. 1B H340
Carc. 1B H350
Repr. 2 H361fd
STOT SE 3 H336
Asp. Tox. 1 H304
Aquatic Chronic 2 H411

Full text of H-phrases: see section 16

2.1.2. Classification according to EU Directives 67/548/EEC or 1999/45/EC

Classification : This substance is classified as hazardous according to 67/548/EEC.
Carc.Cat.2; R45
Muta.Cat.2; R46

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Repr.Cat.3; R62
 Repr.Cat.3; R63
 F+; R12
 Xn; R65
 Xi; R38
 N; R51/53
 R67

Full text of R-phrases: see section 16

2.2. Label elements

2.2.1. Labelling according to Regulation (EU) 1272/2008

Hazard pictograms :



Signal word : Danger

Hazard statements :
 H224 - Extremely flammable liquid and vapour.
 H304 - May be fatal if swallowed and enters airways.
 H315 - Causes skin irritation.
 H336 - May cause drowsiness or dizziness.
 H340 - May cause genetic defects.
 H350 - May cause cancer.
 H361fd - Suspected of damaging fertility. Suspected of damaging the unborn child.
 H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements :
 P201 - Obtain special instructions before use.
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273 - Avoid release to the environment.
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor/.
 P331 - Do NOT induce vomiting.

2.2.2. Labelling according to Directives (67/548 - 1999/45)

Not relevant


2.3. Other hazards

Other hazards : Vapours can form explosive mixtures with air.
 Results of PBT and vPvB assessment :
 This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance name	Product identifier	%	Classification according to Directive 67/548/EEC
Naphtha (petroleum), heavy catalytic cracked	(CAS No.) 64741-54-4 (EC No) 265-055-7 (EC Index) 649-289-00-0	100	Carc.Cat.2; R45 Muta.Cat.2; R46 Repr.Cat.3; R62 Repr.Cat.3; R63 F+; R12 Xn; R65 Xi; R38 N; R51/53 R67

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Substance name	Product identifier	%	Classification according to Directive 67/548/EEC
Toluene	(CAS No.) 108-88-3 (EC No) 203-625-9 (EC Index) 601-021-00-3	>= 3	Repr.Cat.3; R63 F; R11 Xn; R65 Xn; R48/20 Xi; R38 R67
n-Hexane	(CAS No.) 110-54-3 (EC No) 203-777-6 (EC Index) 601-037-00-0	>= 3	Repr.Cat.3; R62 F; R11 Xn; R65 Xn; R48/20 Xi; R38 N; R51/53 R67
Benzene	(CAS No.) 71-43-2 (EC No) 200-753-7 (EC Index) 601-020-00-8	>= 0,1	F; R11 Carc.Cat.1; R45 Muta.Cat.2; R46 T; R46/23/24/25 Xn; R65 Xi; R36/38

Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Naphtha (petroleum), heavy catalytic cracked	(CAS No.) 64741-54-4 (EC No) 265-055-7 (EC Index) 649-289-00-0	100	Flam. Liq. 1, H224 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1B, H350 Repr. 2, H361fd STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
Toluene	(CAS No.) 108-88-3 (EC No) 203-625-9 (EC Index) 601-021-00-3	>= 3	Flam. Liq. 2, H225 Repr. 2, H361d Asp. Tox. 1, H304 STOT RE 2, H373 Skin Irrit. 2, H315 STOT SE 3, H336
n-Hexane	(CAS No.) 110-54-3 (EC No) 203-777-6 (EC Index) 601-037-00-0	>= 3	Flam. Liq. 2, H225 Repr. 2, H361f Asp. Tox. 1, H304 STOT RE 2, H373 Skin Irrit. 2, H315 STOT SE 3, H336 Aquatic Chronic 2, H411
Benzene	(CAS No.) 71-43-2 (EC No) 200-753-7 (EC Index) 601-020-00-8	>= 0,1	Flam. Liq. 2, H225 Carc. 1A, H350 Muta. 1B, H340 STOT RE 1, H372 Asp. Tox. 1, H304 Eye Irrit. 2, H319 Skin Irrit. 2, H315

Full text of R- and H-phrases: see section 16


3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	: Remove person to fresh air and keep comfortable for breathing. If breathing is irregular or stopped, administer artificial respiration. Get medical advice/attention.
Skin contact	: Wash with plenty of soap and water. When in doubt or if symptoms are observed, get medical advice. Remove contaminated clothing and wash it before reuse.
Eye contact	: Rinse immediately carefully and thoroughly with eye-bath or water. When in doubt or if symptoms are observed, get medical advice.

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- In case of ingestion : Rinse mouth thoroughly with water.
Do NOT induce vomiting.
Get immediate medical advice/attention.
- Additional advice : First aider: Pay attention to self-protection!
Personal protection equipment: see section 8
Treat symptomatically.
Never give anything by mouth to an unconscious person or a person with cramps.
When in doubt or if symptoms are observed, get medical advice.
Show this safety data sheet to the doctor in attendance.

4.2. Most important symptoms and effects, both acute and delayed

- Inhalation : May cause drowsiness or dizziness. Vapours may cause drowsiness and dizziness. The following symptoms may occur: Cough, Mental confusion Headache.
- Skin contact : Causes skin irritation. The following symptoms may occur: erythema (redness).
- Eye contact : Contact with eyes may cause irritation. The following symptoms may occur: erythema (redness).
- Ingestion : May be fatal if swallowed and enters airways. The following symptoms may occur: Central nervous system depression.
- Other adverse effects : Suspected of damaging fertility. Suspected of damaging the unborn child. May cause cancer. May cause genetic defects.

4.3. Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media


- Suitable extinguishing media : Water spray, alcohol resistant foam, Dry extinguishing powder, Carbon dioxide
- Extinguishing media which must not be used for safety reasons : Strong water jet

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Extremely flammable liquid and vapour.
- Specific hazards : Heating causes rise in pressure with risk of bursting.
Vapours can form explosive mixtures with air.
Vapours are heavier than air, spread along floors and form explosive mixtures with air.
Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode.
Hazardous decomposition products
Carbon oxides (COx)
Organic compounds
as appropriate :
Hydrogen sulfide (H₂S)
Sulphur oxides
Sulphuric acid
Do not allow run-off from fire-fighting to enter drains or water courses.
Dispose according to legislation.

5.3. Advice for firefighters

- Advice for firefighters : Special protective equipment for firefighters.
In case of fire: Wear self-contained breathing apparatus.
Use water spray jet to protect personnel and to cool endangered containers.
Evacuate area.

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Do not allow run-off from fire-fighting to enter drains or water courses.
Dispose according to legislation.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel :
- Evacuate area.
 - Stay upwind/keep distance from source.
 - Provide adequate ventilation.
 - Use personal protective equipment as required.
 - Personal protection equipment: see section 8
 - Avoid contact with skin, eyes and clothes.
 - Do not breathe vapour/spray.
 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 - Ensure that the equipment is adequately grounded.
 - Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.
 - Use only non-sparking tools.
 - As appropriate :
 - Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.
- For emergency responders :
- Ensure procedures and training for emergency decontamination and disposal are in place.
 - Personal protection equipment: see section 8 .

6.2. Environmental precautions

- Environmental precautions :
- Do not allow to enter into ground-water, surface water or drains.
 - If the product contaminates rivers and lakes or drains inform respective authorities.

6.3. Methods and material for containment and cleaning up

- Methods for cleaning up :
- Use foam on spills to minimise vapours.
 - Stop leak if safe to do so.
 - Clean-up methods - small spillage: Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents)., Collect in closed and suitable containers for disposal.
 - Clean-up methods - large spillage: Use foam on spills to minimise vapours., Dam up., Large spills should be collected mechanically (remove by pumping) for disposal., Collect in closed and suitable containers for disposal.
 - Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.
 - Dispose of waste product or used containers according to local regulations.


6.4. Reference to other sections

Personal protection equipment: see section 8,
Disposal: see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Handling :
- Obtain special instructions before use.
 - Do not handle until all safety precautions have been read and understood.
 - Provide adequate ventilation.
 - Use personal protective equipment as required.
 - Personal protection equipment: see section 8

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Avoid contact with skin, eyes and clothes.
 Do not breathe vapour/spray.
 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 Take precautionary measures against static discharges.
 Ensure that the equipment is adequately grounded.
 Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.
 Use only non-sparking tools.
 Take any precaution to avoid mixing with incompatible materials.
 See also section 10.
 Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH, time).
 Do not allow contact with soil, surface or ground water.
 as appropriate
 Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

Advices on general occupational hygiene :

- Keep good industrial hygiene.
- Wash hands before breaks and immediately after using the product.
- Take off contaminated clothing.
- When using do not eat, drink or smoke.
- Keep work clothes separately.
- Keep away from food, drink and animal feedingstuffs.
- Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage :

- Storage of flammable liquids
- Keep in a dry, cool and well-ventilated place.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Open valve slowly to avoid pressure shock.
- Do not store near or with any of the incompatible materials listed in section 10.
- Protect from sunlight.
- Bund storage facilities to prevent soil and water pollution in the event of spillage.
- As appropriate :
- Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances.

Packaging materials :

- Keep/Store only in original container.
- Suitable material: Mild steel, Stainless steel
- Unsuitable material: synthetic material


7.3 Specific end use(s)

see attached exposure scenario.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limit values : Not applicable

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8.2. Exposure controls

Personal protection equipment	: The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection	: In case of insufficient ventilation, wear suitable respiratory equipment. Filter type: ABEK (EN 141) Half-face mask (DIN EN 140) Full face mask (EN 136) Self-contained open-circuit compressed air breathing apparatus (EN 137) The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used.
Hand protection	: Wear chemically resistant gloves (tested to EN374) ,NBR (Nitrile rubber) > 0,3 mm, BTT: >480 min, The quality of the protective gloves resistant to chemicals must be chosen as a function of the specific working place concentration and quantity of hazardous substances.
Eye protection	: Use suitable eye protection. (EN 166) Goggles
Body protection	: Wear suitable coveralls to prevent exposure to the skin. Chemical protection clothing Antistatic clothing In case of large spillages: Wear full chemical protective clothing.
Thermal hazard protection	: Not required under normal use. Use dedicated equipment.
Engineering control measures	: Provide adequate ventilation. Safe handling: see section 7 Use only outdoors or in a well-ventilated area. Store locked up. Transfer and handle product only in closed systems. Take precautionary measures against static discharges. Ensure that the equipment is adequately grounded. Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.
Environmental exposure controls	: Do not allow to enter into surface water or drains. Comply with applicable Community environmental protection legislation. Do not allow contact with soil, surface or ground water.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	: liquid
Colour	: colourless
Odour	: petroleum hydrocarbon odour
Odour threshold	: No data available
pH	: No data available
Melting point/freezing point	: No data available
Initial boiling point and boiling range	: No data available
Flash point	: No data available
Evaporation rate	: No data available
Flammability (solid, gas)	: Not applicable, liquid
Vapour pressure	: < 6 - 96 hPa (at 37.8 °C)

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Vapour density	: No data available
Density	: 0,68 - 0,78 g/cm ³ (at 15 °C)
Relative density	: No data available
Water solubility	: No data available
Solubility in different media	: No data available
Partition coefficient n-octanol/water	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Explosive properties	: Not applicable The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.
Oxidising properties	: Not applicable The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: Extremely flammable liquid and vapour. Reference to other sections: 10.4 & 10.5
------------	--

10.2. Chemical stability

Stability	: The product is stable under storage at normal ambient temperatures.
-----------	---

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	: Vapours can form explosive mixtures with air.
------------------------------------	---

10.4. Conditions to avoid

Conditions to avoid	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Safe handling: see section 7
---------------------	--

10.5. Incompatible materials

Incompatible materials	: Oxidising substances, Safe handling: see section 7
------------------------	--

10.6. Hazardous decomposition products


Hazardous decomposition products	: Burning produces noxious and toxic fumes. Reference to other sections: 5.2
----------------------------------	--

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Not classified (Based on available data, the classification criteria are not met.)
----------------	--

Naphtha (petroleum), heavy catalytic cracked (64741-54-4)	
LD50/oral/rat	5000 mg/kg
LD50/dermal/rat	> 2000 mg/kg
LD50/dermal/rabbit	> 2000 mg/kg
LC50/inhalation/4h/rat	> 5,25 mg/l/4h

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Skin corrosion/irritation	: Causes skin irritation. pH: No data available
Serious eye damage/eye irritation	: Not classified (Based on available data, the classification criteria are not met.) pH: No data available
Respiratory or skin sensitisation	: Not classified (Based on available data, the classification criteria are not met.)
Germ cell mutagenicity	: May cause genetic defects. Benzene
Carcinogenicity	: May cause cancer. Benzene
Reproductive toxicity	: Suspected of damaging fertility. Suspected of damaging the unborn child. n-Hexane Toluene
STOT-single exposure	: May cause drowsiness or dizziness.
STOT-repeated exposure	: Not classified (Based on available data, the classification criteria are not met.)
Aspiration hazard	: May be fatal if swallowed and enters airways.

Other information

Symptoms related to the physical, chemical and toxicological characteristics, For further information see section 4

SECTION 12: Ecological information


12.1. Toxicity

Toxicity : Toxic to aquatic life with long lasting effects.

Naphtha (petroleum), heavy catalytic cracked (64741-54-4)	
LC50 fish 1	10 mg/l (96h)
EC50 Daphnia 1	4,5 mg/l (48h)
LC50 fish 2	8,2 mg/l (96h)
ErC50 (algae)	3,1 mg/l (72h)
EC50 72h Algae [mg/l] (1)	880 mg/l (Species: Pseudokirchneriella subcapitata)
Additional information	LL50, fish, acute, freshwater, Pimephales promelas (fathead minnow): 8.2 mg/l (96 hours, equivalent or similar to EPA 66013-75-009) NOELR, fish, Chronic, freshwater, Pimephales promelas (fathead minnow): 2.6 mg/l (14 days, OECD 204) EL50, daphnia, acute, freshwater, daphnia: 4.5 mg/l (48 hours, OECD Test Guideline 202) NOELR, daphnia, Chronic, freshwater, daphnia: 2.6 mg/l (21 days, OECD 211) EL50, algae, freshwater, Pseudokirchneriella subcapitata: 3.1 mg/l (72 hours, OECD Test Guideline 201) LL50, microorganisms, freshwater, Tetrahymena pyriformis: 15.41 mg/l (72 hours, Quantitative structure-activity relationship (QSAR))

12.2. Persistence and degradability

Persistence and degradability : Not applicable
Substance is complex UVCB.

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12.3. Bioaccumulative potential

Bioaccumulation : Not applicable
Substance is complex UVCB.
Partition coefficient n-octanol/water : No data available

12.4. Mobility in soil

Mobility : No data available
Substance is complex UVCB

12.5. Results of PBT and vPvB assessment

PBT/vPvB data : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

12.6. Other adverse effects

Other information : No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product waste: : Handle with care.
Safe handling: see section 7
Handling and storage
Refer to manufacturer/supplier for information on recovery/recycling.
Collect and dispose of waste product at an authorised disposal facility.
Do not allow contact with soil, surface or ground water.
Dispose of empty containers and wastes safely.
Recycling is preferred to disposal or incineration
If recycling is not possible, eliminate in accordance with local valid waste disposal regulations

Contaminated packaging : Do not burn, or use a cutting torch on, the empty drum.
Do not puncture or incinerate.
Delivery to an approved waste disposal company.
Handle contaminated packages in the same way as the substance itself.
Dispose according to legislation.

List of proposed waste codes/waste designations in accordance with EWC : This material and its container must be disposed of as hazardous waste.
Waste codes should be assigned by the user based on the application for which the product was used.
The following Waste Codes are only suggestions:
13 07 02*
150110* - packaging containing residues of or contaminated by dangerous substances


SECTION 14: Transport information

14.1. UN number

UN number : 1268

14.2. UN proper shipping name

Proper Shipping Name : PETROLEUM DISTILLATES, N.O.S.
Proper Shipping Name (IATA) : Petroleum distillates, n.o.s.
Proper Shipping Name (IMDG) : PETROLEUM DISTILLATES, N.O.S.
Proper Shipping Name (ADN) : PETROLEUM DISTILLATES, N.O.S.

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14.3. Transport hazard class(es)

14.3.1. Overland transport

Class(es) : 3 - Flammable liquid
 Hazard identification number (Kemler No.) : 33
 Classification code : F1
 ADR/RID-Labels : 3 - Flammable liquid



14.3.2. Inland waterway transport (ADN)

ADN : Hazards :3+N2
 Class (UN) : 3

14.3.3. Transport by sea

Class or Division : 3 - flammable liquids

14.3.4. Air transport

Class or Division : 3 - flammable liquids

14.4. Packing group

Packing group : I

14.5. Environmental hazards

Environmental hazards : p



Other information : ADN : N2.

14.6 Special precautions for user

Special precautions for user : No data available.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Code: IBC : No data available.


SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006 :

- 3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008 : Naphtha (petroleum), heavy catalytic cracked
- 5. Benzene : Benzene

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28. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Carcinogen category 1A or 1B (Table 3.1) or Carcinogen category 1 or 2 (Table 3.2) and listed as follows: Carcinogen category 1A (Table 3.1)/Carcinogen category 1 (Table 3.2) listed in Appendix 1 Carcinogen category 1B (Table 3.1)/Carcinogen category 2 (Table 3.2) listed in Appendix 2

: Naphtha (petroleum), heavy catalytic cracked

29. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Germ cell Mutagen category 1A or 1B (Table 3.1) or Mutagen category 1 or 2 (Table 3.2) and listed as follows: Mutagen category 1A (Table 3.1)/Mutagen category 1 (Table 3.2) listed in Appendix 3 Mutagen category 1B (Table 3.1)/Mutagen category 2 (Table 3.2) listed in Appendix 4

: Naphtha (petroleum), heavy catalytic cracked

40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.

: Naphtha (petroleum), heavy catalytic cracked

48. Toluene

: Toluene

This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC.

: none

Authorisations

: Not applicable

Take note of Directive 92/85/EEC on the safety and health at work of pregnant workers.

Take note of Directive 94/33/EC on the protection of young people at work.

15.1.2. National regulations

DE : WGK	:	3
DE : German storage class (LGK)	:	LGK 3 - Flammable liquid materials (Flashpoint < 55 °C)
DE : TA-Luft	:	Organic Substances, Carcinogenic substances, Mutagenic
DE : Technische Regeln für Gefahrstoffe (TRGS)	:	applicable
DE : Risk classification according to VbF	:	A I - Liquids with a flashpoint below 21°C
FR : Installations classées	:	143X; ;113X; 117X
NL : ABM	:	2 - May cause heritable genetic damage. (A)
NL : NeR (Nederlandse emissie Richtlijn)	:	Organic substances in vapour or gaseous form


15.2. Chemical safety assessment

Chemical Safety Assessment : For this substance a chemical safety assessment has not been carried out.

SECTION 16: Other information

Full text of R-, H- and EUH-phrases:


Aquatic Chronic 2	:	Hazardous to the aquatic environment - chronic hazard category 2
Asp. Tox. 1	:	Aspiration hazard, Category 1
Carc. 1A	:	Carcinogenicity, Category 1A
Carc. 1B	:	Carcinogenicity, Category 1B
Eye Irrit. 2	:	Serious eye damage/eye irritation Category 2

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Flam. Liq. 1	: Flammable liquids, Category 1
Flam. Liq. 2	: Flammable liquids, Category 2
Muta. 1B	: Germ cell mutagenicity, hazard categories 1B
Repr. 2	: Reproductive toxicity, Hazard Category 2
Repr. 2	: Reproductive toxicity, Hazard Category 2
Repr. 2	: Reproductive toxicity, Hazard Category 2
Skin Irrit. 2	: Skin corrosion/irritation, Category 2
STOT RE 1	: Specific target organ toxicity — Repeated exposure, Category 1
STOT RE 2	: Specific target organ toxicity — Repeated exposure, Category 2
STOT SE 3	: Specific target organ toxicity — Single exposure, Category 3, Narcosis
H224	: Extremely flammable liquid and vapour.
H225	: Highly flammable liquid and vapour.
H304	: May be fatal if swallowed and enters airways.
H315	: Causes skin irritation.
H319	: Causes serious eye irritation.
H336	: May cause drowsiness or dizziness.
H340	: May cause genetic defects.
H350	: May cause cancer.
H361d	: Suspected of damaging the unborn child.
H361f	: Suspected of damaging fertility.
H361fd	: Suspected of damaging fertility. Suspected of damaging the unborn child.
H372	: Causes damage to organs through prolonged or repeated exposure.
H373	: May cause damage to organs through prolonged or repeated exposure.
H411	: Toxic to aquatic life with long lasting effects.
R11	: Highly flammable.
R12	: Extremely flammable.
R36/38	: Irritating to eyes and skin.
R38	: Irritating to skin.
R45	: May cause cancer.
R46	: May cause heritable genetic damage.
R48/20	: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R48/23/24/25	: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R51/53	: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R62	: Possible risk of impaired fertility.
R63	: Possible risk of harm to the unborn child.
R65	: Harmful: may cause lung damage if swallowed.
R67	: Vapours may cause drowsiness and dizziness.
F	: Highly flammable
F+	: Extremely flammable
N	: Dangerous for the environment
T	: Toxic
Xi	: Irritant
Xn	: Harmful

Key literature references and sources for data : European Chemicals Agency
CSR

Abbreviations and acronyms : ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin
ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route
CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods Code
LEL = Lower Explosive Limit/Lower Explosion Limit
UEL = Upper Explosive Limit/Upper Explosion Limit
REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals
N = Dangerous for the environment

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TWA = time weighted average
 PBT = persistent, bioaccumulating and toxic (PBT).
 vPvB = very persistent and very bioaccumulating
 WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)
 T = Toxic
 TLV = Threshold limits
 STEL = Short term exposure limit
 DNEL = Derived No Effect Level
 CSR = Chemical Safety Report
 EC50 = Median Effective Concentration
 UVCB = Substance of unknown or variable composition, complex reaction products or biological material (UVCB)
 DMEL = Derived minimal effect level
 PNEC = Predicted No Effect Concentration
 OEL = Occupational Exposure Limits - Short Term Exposure Limits (STELs)
 LC50 = Median lethal concentration
 LD50 = Median lethal dose
 LL50 = Median lethal level
 EL50 = Median effective level
 ErC50 = EC50 in terms of reduction of growth rate
 ErL50 = EL50 in terms of reduction of growth rate
 NOEL = No-observed-effect level
 NOEC = No observed effect concentration
 NOELR = No observed effect loading rate
 NOAEC = No observed adverse effect concentration
 NOAEL = No observed adverse effect level
 EWC = European Waste Catalogue
 NA = Not applicable
 N.O.S. = Not Otherwise Specified
 VOC = Volatile organic compounds
 Quantitative structure-activity relationship (QSAR)
 ABM = Algemene beoordelingsmethodiek
 STOT = Specific Target Organ Toxicity
 BTT = Breakthrough time (maximum wearing time)

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

Material Safety Data Sheet

MSDS	Chemical Name : Heavy Alkylate	MSDS No. : 03
	Date of Revision : February 15, 2014	Revision # : 02

Section 1 – Chemical Product and Company Identification

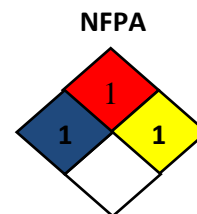
Product/Trade Name : FARALUBE Manufacturer's Name : Farabi Petrochemicals Address : PO BOX 11763, Jubail Industrial City, Jubail – 31961, KSA Chemical Formula : $C_nH_{2n}(C_6H_5)_2$; $(C_nH_{2n})_2C_6H_4$ [n = 10 to 13] CAS Number : 84961-70-6 EC # : 284-660-7	Emergency Telephone 1. 00966133565170 (Control Room) 2. 00966133565171 (Shift Supervisor)
--	--

Section 2 – Composition/Information on Ingredients

Hazardous Components (Specific Chemical Identity; common names)	OSHA PEL	ACGIH TLV	Other Limit Recommended	% Optional
Chemical Name: Heavy Alkylate % by weight : 99.9 (balance being Benzene, C10-C13 mono alkyl)	N/E	N/E	N/K	N/K

Section 3- Hazards Identification

***** Emergency Overview *****



Inhalation

Short Term : Irritation, symptoms of drunkenness, lung congestion.
Long Term Exposure : No information available.

Skin contact

Short Term Exposure : No information available.

Long Term Exposure	: Irritation
<u>Eye Contact</u>	
Short Term Exposure	: Irritation, itching, tearing.
Long Term Exposure	: No information available.
<u>Ingestion</u>	
Short Term Exposure	: Symptoms of drunkenness.
Long Term Exposure	: No information available.
<u>Carcinogen Status</u>	
OSHA	: No
IARC	: No
Section 4 – First Aid Measures	
Inhalation	: Remove to fresh air; get immediate medical attention.
Skin contact	: Wash with soap water. Seek medical attention if needed. Contaminated clothing and shoes be cleaned and dried thoroughly before reuse.
Eye contact	: Immediately flush with plenty of water for at least 15 Minutes and seek medical attention if irritation persists
Ingestion	: If large amount is swallowed, seek medical attention.
Section 5 – Fire-Fighting Measures	
Flammable Limits	: 186 °C
Flash Point (Method Used)	: Other – ASTM D93
LEL	: NA
UEL	: NA
Flammability	: May be combustible at high temperatures.
Auto Ignition temperature	: Not available.
Products of combustion	: Not available.
Extinguishing Media	: Dry chemical powder, Carbon dioxide, water, regular foam. In case of large fires use regular foam or flood with fine water sprays.
Fire fighting	: Move container from fire area if it can be done without risk. Do not scatter spilled material with high pressure water streams. Dike for disposal. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.
Section 6 – Accidental Release Measures	
Occupational release	: Arrest leak if possible without personal risk. Prevent liquid entering sewers, basements and work pits. Absorb with inert material (sand) and dispose appropriately.

Section 7 – Handling and Storage	
Precautions	: Keep away from heat, sources of ignition, and incompatibles such as oxidizing agents.
Storage	: Keep container tightly closed, in a cool, well-ventilated area.
Section 8 – Exposure Controls/Personal Protection	
Exposure limits	: No occupational exposure limits established.
Controls	: Provide exhaust ventilation system (Local).
Eye Protection	: Wear splash resistant safety goggles. Ensure eye wash and showers are in the proximity to work-station location.
Clothing and Gloves	: PVC/Rubber hand gloves, and Protective clothing.
Respirator	: Under conditions of frequent use or heavy exposure, respiratory protection may be needed.
Section 9 – Physical and Chemical Properties	
Physical state	: Liquid
Odor	: Not Available
Taste	: Not Available
Molecular Weight	: Not Available
Flash Point °C	: 186 Deg C (ASTM D93)
Color (ASTM)	: 0.8 (typical)
pH (1% sol. in water)	: Not applicable
Boiling Point	: 310-390 °C
Melting Point	: Not Available
Specific Gravity	: 0.864 @15 °C (water=1)
Vapor Pressure	: Not Available
Vapor Density	: Not Available
Water/Oil Dist. Coefficient	: Not Available
Solubility	: Insoluble in cold water
Section 10 – Stability and Reactivity	
Stability	: Stable at normal temperatures and pressures.
Conditions of to avoid	: Heat, flames, sparks and other sources of ignition;
Incompatibilities	: oxidizing agents to avoid
Polymerization	: will not Occur
Section 11 – Toxicological Information	

<u>Inhalation</u>	
Acute exposure	: Vapors may cause irritation, central nervous system depression, pulmonary edema and possibly hepatic, renal or bone marrow disorders.
Chronic exposure	: No data available
<u>Skin contact</u>	
Acute exposure	: No data available
Chronic exposure	: May cause defatting of the skin and subsequent dermatitis.
<u>Eye Contact</u>	
Acute	: Direct contact of aromatic hydrocarbons with the eye causes irritation, itching, and a burning sensation.
Chronic exposure	: No data available
<u>Ingestion</u>	
Acute exposure	: Aromatic hydrocarbons may cause central nervous system depression and possible liver and kidney injury.
Chronic exposure	: No data available
Section 12 – Ecological Information	
Ecotoxicity	: Not available
BOD5 and COD	: Not available
Biodegradation	: Not available
Section 13 – Disposal Considerations	
In accordance with applicable regulations	
Section 14 – Transportation Information	
No classification assigned for Land, Air, and Maritime transport.	
Section 15 – Regulatory Information	
Not regulated	
Section 16 – Other Information	
<p>.....</p> <p>The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.</p>	

۲: بررسی و امکان سنجی طراحی و ساخت ایزو تانک

۲-۱: انتخاب متریال

انتخاب متریال براساس فشار کاری، درجه خوردگی، استحکام مکانیکی و دیگر الزامات استاندارد ASME Sec.8 Div.1 قاعدتا می‌بایست در گروه High Alloy Steel و در گرید AISI 316/304 باشد، اما با توجه به پیشنهادات مالی کارفرما نهایتا برای بعضی از سیالات گرید Low Carbon Steel انتخاب شده است.

گروه کارخانجات صنعتی کایکو



KiCO

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سالن تولید گروه صنعتی نوین سازه فیدار زاگرس (کایکو)



واحد	ردیف	نام و نام خانوادگی	سمت	مدرک	رشته تحصیلی	سوابق کاری (سال)
واحد فنی و اجرایی	۱	محمود ادبی	مدیر عمل و رئیس هیات مدیره	کارشناسی	مهندسی عمران	۳۰
	۲	شهرام قره گزلو	مدیر اجرایی	کارشناسی ارشد	مهندسی عمران	۱۵
	۳	علی نوری	مدیر پروژه	کارشناسی	مهندسی عمران	۲۰
	۴	یزدان بیات	مشاور و مدیر پروژه	کارشناسی	مهندسی عمران	۲۰
	۵	سیامک قمشه ای	مشاور و مدیر پروژه	کارشناسی	مهندسی عمران	۲۵
	۶	مریم نیازی	مدیر پروژه و مسئول برنامه ریزی	کارشناسی ارشد	مهندسی عمران	۸
	۷	شیما فتحی	مسئول برنامه ریزی و امور قراردادهای / مسئول فناوری اطلاعات	کارشناسی ارشد	مهندسی کامپیوتر	۵
	۸	عابدین عبدی	تقچه برار	کارشناسی	مهندسی عمران	۱۵
	۹	رضا قهرمانی	سرپرست نصب	کارشناسی	مهندسی عمران	۱۰
واحد دفتر فنی و کنترل کیفی	۱۰	علی کولیوند	مشاور و مدیر فنی	کارشناسی	مهندسی عمران	۲۲
	۱۱	رامین خواجوی	مدیر دفتر فنی و کنترل کیفی	کارشناسی	مهندسی معدن	۱۷
	۱۲	علی لرزنگنه	مسئول دفتر فنی و کنترل کیفی	کارشناسی	مهندسی عمران	۱۲
	۱۳	امین کولیوند	بازرس کنترل کیفی	کارشناسی	مهندسی عمران	۱۲
	۱۴	مهدی مهدوی خوشدل	بازرس کنترل کیفی	کارشناسی	مهندسی عمران	۱۰
	۱۵	بهمن اسفندیاری	بازرس کنترل کیفی	کارشناسی	مهندسی متالورژی	۱۰
	۱۶	کیهان پویان راد	بازرس کنترل کیفی	کارشناسی	مهندسی عمران	۱۰
	۱۷	فرشاد قنبری	بازرس کنترل کیفی	کارشناسی	مهندسی عمران	۵
	۱۸	کیانوش نظری	بازرس کنترل کیفی	کارشناسی	مهندسی مکانیک	۱۰
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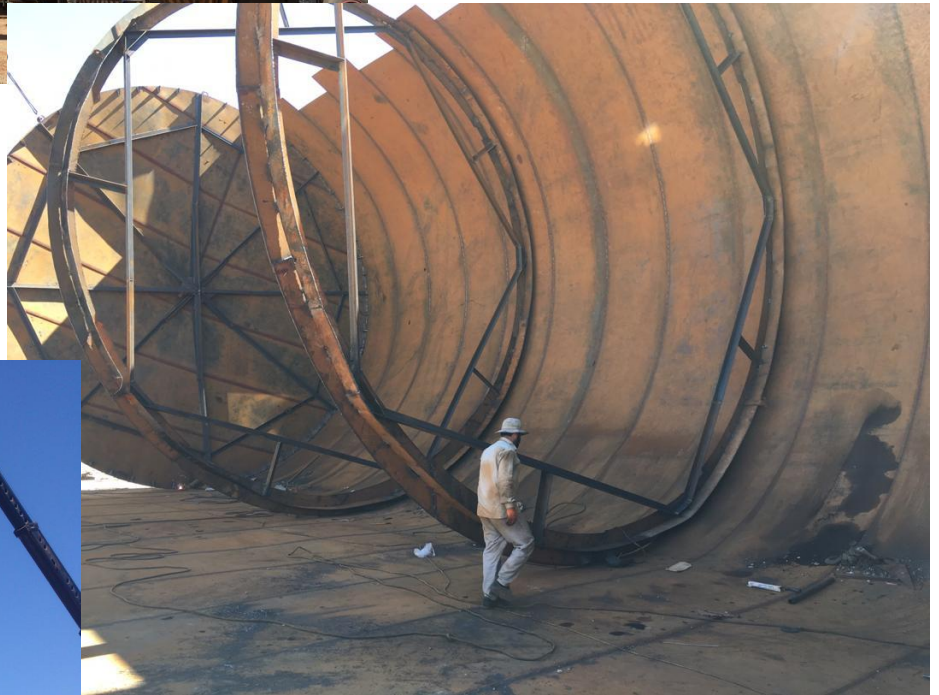
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KiCO

WWW.KICOGROUP.COM
Novinsazeh2.eng@gmail.com



KiCO

WWW.KICOGROUP.COM
Novinsazeh2.eng@gmail.com



KiCO

WWW.KICOGROUP.COM
Novinsazeh2.eng@gmail.com



KiCO

WWW.KICOGROUP.COM
Novinsazeh2.eng@gmail.com



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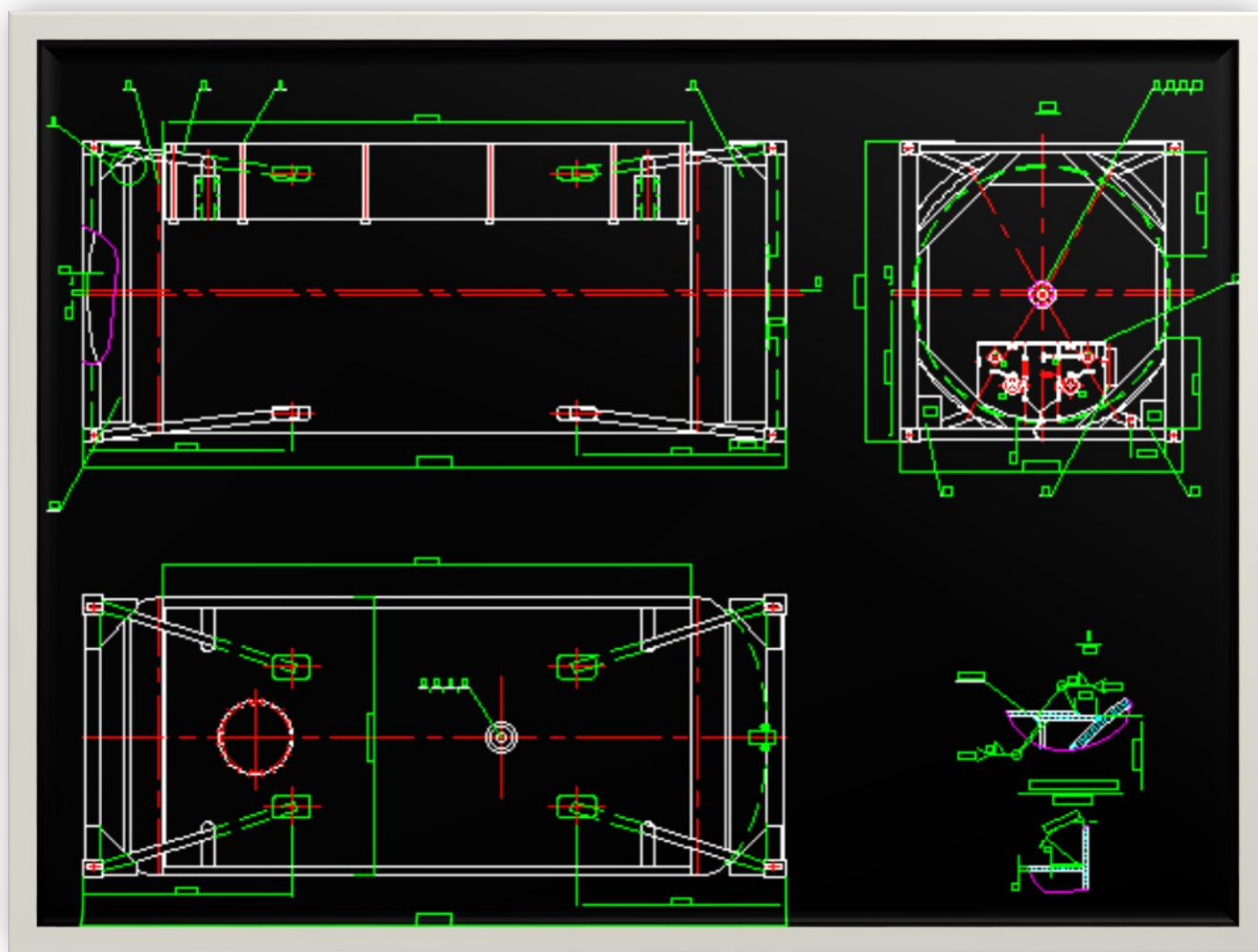
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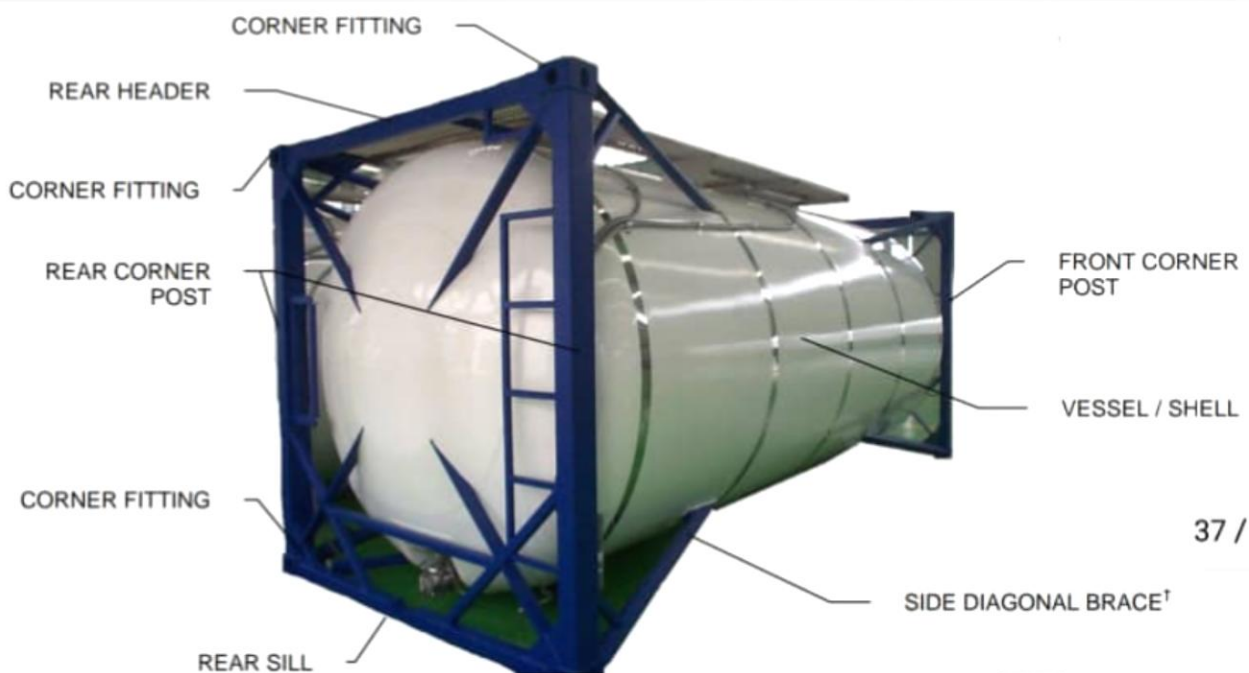
۲-۲: انتخاب شیرآلات و فیتینگ ها

لزوما انتخاب شیرآلات به دلیل محدودیت های استاندارد ی بایستی با توجه به شرایط سیال انتخاب گردد، تصمیم نهایی پس از بررسی کامل جزییات اتخاذ خواهد شد.

۲-۳: بررسی، طراحی استراکچر و شبیه سازی

براساس استاندارد ASME Sec.8 Div.1





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† Treat as corner post