GHSL30-F-8

Safety Data Sheet

Issue date:1st November 2008
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1.Product and company information

Product

Product name　Product No. 70-59 Kotelyzer Gas Net 150g (Prod code LPG20℃C0.20)
Product No. 70-60 Kotelyzer Gas Net 270g (Prod code LPG20℃C0.20)

Company information

Company name　Nakajima Doko corporation
Address　683,Kamagata,Ranzanmachi,Saitama 355-0225 Japan (LP Gas Power Products)
10-1,Maruyama,Fujimino-City,Saitama 356-0035 Japan (Headquarter)
Dept　R&D
TEL　0493-62-7295 (LP Gas Power Products) 049-261-1693(Headquarter)
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Use of the Product　Kotelyzer

2. Summary of Hazards and harmfulness

GHS classification

【Physicochemical hazard】

Combustible gas　:Category 1
High pressure gas　:Liquefied gas

【Health harmfulness】

Target organ toxicity (single exposure)　:Category 1 Circulatory system
:Category 3 Anesthetic action
Target organ toxicity (repeated exposure)　:Category 1 Central nervous system

【Environment harmfulness】　:Not applicable to Category

GHS label factor

Symbol:

Signal word　:Hazard

Hazards and harmfulness information　:Extremely combustible gas
High pressured gas: Risk of explosion if heated
Disorder of circulatory system
Risk of drowsiness and dizziness
Disorder of circulatory system caused by the long term or repeated exposure

Cautions

Safety measure　:Keep away from the ignition source like heat/spark/naked flame/hot objects— Non-smoking.
Use outside or at the place with the good ventilation.
Avoid the inhalation of gas/spray.

First aid measure	: In case of the gas leakage fire: Don't put out the fire as long as the leakage is stopped completely. Remove the ignition source if it can be handled safely. Have the doctor's diagnosis and treatment in case of feeling bad. In case of inhalation: Move the patient to the place with fresh air and get him/her in the position easy to take the breath.
Storage	:Keeping away from the sunlight and store at the place with the good ventilation and the container should be sealed. Store at the place where outsider can't enter.
Disposal	:Return the used container to the distributor immediately.
Nations/Region information	:High pressure regulated by High Pressure Gas Control Law, Article 2 and combustible gas Liquified petroleum gas regulated by Act on the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas and combustible gas Combustible gas regulated by Industrial Safety and Health Law Enforcement Ordinance, Attached table 1-5

3. Composition and ingredient information

Distinction of chemical material・mixed product: Mixed product

Chemical name	Concentration or Concentration range (Weight%)	Official gazette notification reference No	CAS No
Propane	20% or more, Less than 30%	(2)-3	74-98-6
Normal butane Isobutane	70% or more, Less than 80%	(2)-4	106-97-8 75-28-5
Normal pentane Isopentane	Less than 2.1% (Note 1)	(2)-5	109-66-0 78-78-4

(Note 1) The butane concentration is included.

4. First aid measure

In case of inhalation	: In case of the mass inhalation, take the measure for the deficiency of oxygen. And have the doctor's treatment as needed.
In case that the product gets on the skin	: Have the treatment of frostbite.
In case that the product gets into the eye	: Wash with the clean water sufficiently.
In case of ingestion	: Follow the measures for the inhalation or the skin contact.
The most important subtle	: Skin contact of liquefied petroleum gas causes the frostbite.
symptom of the acute symptom	: In case of inhaling high concentrated liquefied petroleum gas, people lose consciousness
and delayed symptom	at one breath. If this condition continues, people will die.
Cautions required for the person making the first aid measure	: At the place where liquefied petroleum gas is leaking or gushing out, wear the protective equipment in order that Liquefied petroleum gas doesn't get on the skin. At the place where liquefied petroleum gas is leaking or gushing out, there is the possibility that oxygen concentration is getting low, so the ventilation should be carried out. If the concentration of leaked liquefied petroleum gas in the air is from 1.8% to 9.5%, there is the risk that the ignition source will cause the explosion, so the good ventilation should be carried out sufficiently. At the outside, diffuse the leaked liquefied petroleum gas by sprinkling water with the spray nozzle in order to prevent the explosion.
Special caution to the doctor	: No information

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5. Firefighting measure

Proper fire extinguisher	:Small fire: Carbon dioxide, ABC or BC type powder fire extinguisher Big fire: Sprinkling water, spraying water
Fire extinguisher which should not be used	:Straight stream water
Peculiar hazard and harmfulness at fire	:Extremely inflammable/highly combustible gas Risk of catching the fire easily. If the container is heated, there is the risk that it will explode.
Specific firefighting method	:Cut off the gas supply. Cool around and try to prevent the spread of the fire by sprinkling water with spray nozzle. Put out the fire spraying water from the windward to cool the container. In case of the fire in the periphery, move the container to the safe place. The leaked gas should be diffused by water spray and prevent the explosion. If the leakage of gas can be stopped, put out the fire with the fire extinguisher. If the leakage of gas can't be stopped, don't try to put out the fire and wait for the fire extinction. People other than the concerned party should be evacuated to the safe place.

Special protective equipment and preventive measure for the fire fighter	: At the firefighting, use the air respirator and the protective cloth.

6. Leakage measure

Caution to the huma n body, protective equipment and emergency measure	: If the ignition source is laid in the concentration from 1.8% to 9.5% in the air, this product will explode, so don't come close if the safety isn't confirmed. If the leaked liquid is vaporized, the volume becomes 250 times and the oxygen concentration in the air will get lower, so the good ventilation is required to prevent the risk of suffocation. The direct body contact of liquefied petroleum gas causes the frostbite by the heat of vaporization. Use the dry leather glove as needed.
	: Use the antistatic cloth, shoes and leather gloves. Use the compressed air respirator and the protective gear as needed.
Cautions to the environment	: No confirmed environmental influence information on this material.
Containment, purification method and equipment	: Stop the leakage if it's not dangerous. If possible, rotate the leaking container in order that the content in the container can be released in air, not in liquid. Prevent the evaporation and spray water to stop the diffusion of evaporation. Ground all of the instruments used to handle the leaking stuff.
Preventive measures for the secondary disaster	: Remove the ignition source nearby. Cut off the gas supply. Stop the leaking point. Because the specific gravity of liquefied petroleum gas is heavier than air, the ventilation・diffusion should be carried out.

7. Handling and storage consideration

Handling

Technical measure	: Don't handle the container in the violent manner, such as falling, dropping, jolting or dragging. Except for the special use, don't use from the container directly and the pressure adjuster surely should be used. Use after the confirmation that there is no leakage in the joint part, hose, plumbing and instrument by using the foam liquid like soap water.
Local exhaust・whole exhaust	: Ventilate sufficiently to avoid imperfect combustion.
Safe handling cautions	: Take the proper measure in case of using at the place where there is the risk that the residence of liquid petroleum gas can be caused.
	: Liquefied petroleum gas can become the explosive compounded gas mixed with air or oxygen. Be careful about the leakage because the explosive range in the air is at1.8%～9.5%, the lower explosive limit is low and the hazard is huge.

Because of the strong inflammable gas, don't use the product near the fire.
De-touchable protective cap for the container should be attached with the container except for the time at use.
Don't consume all of gas in the container and save the residual pressure.

Avoid the direct contact : Refer to「10 Stability and Reactivity」.

Storage

Safe storage condition : The container should be kept at the good drainage, good ventilated and dry place.
Avoid the direct sunlight from the container and keep the temperature at 40℃ or below.
Store at the place where outsider can't enter.
If the container is stored at the storage area, label 'inflammable gas' and 'LP gas'.
If the container storage is prepared, avoid the contact with poisonous and oxygen gas container.
If the container storage is prepared, don't put the fire, inflammable and ignitable materials within 2 meters circumference of the container storage area except in the case that the required barrier has been prepared.
Return the used container to the distributor immediately.

Safe container package material : The container for liquefied petroleum gas regulated by High Pressure Gas Control Law is required.

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8. Exposure prevention and protective measure

Allowable concentration

Japan Society for Occupational Health (issued on May 2018) : Normal butane 500ppm (Note 1)
Isobutane 500ppm (Note 1)
Normal pentane 300ppm (Note 1)

American Industrial Hygiene Association (TLV-TWA in 2016) : Normal butane 1,000ppm (Note 2)
Isobutane 1,000ppm (Note 2)
Normal pentane 1,000ppm (Note 3)
Isopentane 1,000ppm (Note 3)
(Note 1) The exposure average concentration per day should not be over this value.
(Note 2) The average value of any exposure concentration for 15 minutes should not be over this value.
(STEL: the short-term exposure limit value)
(Note 3) The exposure average concentration per day should not be above this value.
(TWA: Time-weighted average)
The sum of cumulative number of the exposure concentration and the continuous

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hours divided by the total hours equals TWA.

Facility measurement : Ventilate well in case of using inside the room.
If liquefied petroleum gas is leaked and there is the risk of the gas residence, install the alarm system and setting the point of an alarm should be at 0.5% (one fourth of lower explosion limit) or lower.

Protective equipment

Respiratory protective equipment : Use the compressed air respirator as needed.

Hand protective equipment : Use the dry leather gloves as needed.

Eye protective equipment : Use the protective glass as needed.

Skin and body protective equipment : Use the cloth and helmet in accordance with the form of use.

9. Physical and chemical property

Appearance (physical condition, shape and color) : Under the atmospheric pressure･･･Gas, colorless transparent･no odor
Inside the pressured container･･･Liquid ･colorless transparent

Odor: : No odor

Combustibility : Combustible gas

Decomposition temperature, pH : No data

Kinematic coefficient of viscosity, particle property : Not applicable for classification (gas under the atmospheric pressure)

Other physical and chemical property : See the attached table.

10. Stability and reactivity

Reactivity and chemical stability : Stable under the normal condition

Hazard and harmfulness reactivity : Highly reactive to oxidizing agent
Propane: highly explosive to chlorine dioxide
Butane: mixed gas with Nickel carbonyl and oxygen causes the explosion.

Condition to avoid : If the ignition source is within the combustible (explosion) range, the combustion and explosion can be caused, so this condition should be avoided.

Material to avoid : This product can be solved in alcohol and ether, and can dissolve petroleum, animals & plants oil, natural rubber well.

Incompatible materials : Strong oxidizer

Hazard and harmful decomposition product : Lack of sufficient air leads to cause the imperfect combustion, which generates toxic carbon monoxide.

11. Harmfulness information

Acute toxicity (oral)	: 「Not applicable for category」 because all of the ingredients s are 「Not eligible for classification」 and 「Not applicable for category」.
Acute toxicity (inhalation: air)	: 「Not applicable for category」 because all of the components are 「Not eligible for category」 or 「Cannot be classified.
Skin corrosion/irritation	: 「Not applicable for category」 because all of the components are 「Not applicable for category」 or 「Cannot be classified」.
Serious eye injure/eye irritation	: 「Cannot be classified」 because propane is 「no information」, isopentane is 「Category 2」, normal pentane is 「Category 2B」, isobutane is 「Not applicable for category」, normal butane is 「Cannot be classified」.
Respiratory sensitization and skin sensitization	: 「Cannot be classified」 because normal pentane and isopentane are 「Not applicable for category」 regarding 「skin sensitization」 and other materials are classified as 「Cannot be classified」.
Germ cell mutagenicity	: 「Cannot be classified」.because all of the components are 「Cannot be classified」.
Carcinogenicity	: 「Cannot be classified」 because all of the components are 「Cannot be classified」.
Toxic to reproduction	: 「Cannot be classified」 because all of the components are 「Cannot be classified」.
Special target organ systemic toxicity (single exposure)	: Isobutane falls under 「Classification 1 (circulatory system)」, and 「Classification 1」 from the calculation of the concentration of all of the materials. 「Category 3」 because all of the materials fall under 「Category 3 (Anesthetic action)」. Though normal pentane and isopentane falls under 「Category 3 (respiratory tract irritation)」, 「Not applicable for category」 from the calculation of the concentration of all of the materials.

【Evidence data】

The extract from Workplace Safety Site Model SDS (JIS ZA7253: 2019 compliance)」 2-Methylpropane (isobutane).

(1) Regarding 3 out of 4 people who died of the inhalation of butane gas (the quantity was not known), the mixed product with n-butane & isobutane (this material) or the mixed product with n-butane & this product & propane were detected from the blood, brain and lung, and the concentration of the total hydrocarbon in the brain in every case was the maximum value. The authors reported that the cause of death of the above 5 cases including the other 1 case of n-butane addiction might have been the disorder of cardiac rhythm

(DFGOT Vol. 20 (2003)).

(2) The heart failure was caused after 16-year-old boy inhaled Butane gas. Though the abnormality was found from the electrocardiogram, the cause of mechanism of heart failure induction was not known. The authors reported that the ventricular flutter which could cause the deficiency of oxygen and cardiac arrest or the direct induction of cardiac arrect by butane might have been related in addition to the central inhibition (DFGOT Vol. 20 (2003)).

(3) After 2-year-old girl was exposed to the deodorant including this product, butane and propane, the ventricular tachycardia, tonic attack and hypokalemia were caused. Tachycardia was thought to be caused by the exposure to the deodorant and endogenous epinephrine (Patty (6th, 2012)).

(4) After the dog (non-anesthesia) inhaled and exposed to this material at 50,000 ppm (4-hour converted value: 7,906 ppm) for 6 minutes, epinephrine-induced arrhythmia by the cardiac arrest was caused. Besides, at the experiment using the mouse and dog preprocessed with epinephrine, there are some reports that the heart sensitization response caused by the short term inhalation of this material was found (DFGOT vol. 20 (2003)).

(5) There is the report that EC 50 of central inhibition of the rat caused by the inhalation and exposure of this material was 200,000 ppm, on the other hand, EC 50 of central inhibition of the dog caused by the inhalation and exposure of this product was 450,000 ppm (ACGIH (7th 2017), DFGOT vol 1. 20 (2003)).

(6) Based on the solubility of n-butane and this material in the olive oil and the partition coefficient between air and olive oil, the anesthetic action expression concentration of a human was presumed to be at 17,000 ppm in n-butane and at 24,000 ppm in this material. (DFGOT vol 20 (2003)).

Special target organ systemic toxicity, (repeated exposure) : 「Category 1 (central nervous system)」 because normal butane falls under 「Category 1 (central nervous system)」 and the judgment from the calculation of the concentration of all of the materials.

【Evidence data】

The extract from Workplace Safety Site Model SDS (JIS Z7253: 2019 compliance) n-butane.

(1) The serious brain damage was caused to 15-year-old girl who abused butane gas in the replacement container for the lighter for 4 weeks and the neurological complication was caused after the inpatient hospital care. At MRI scan, the collapse of the grey matter and the brain atrophy were found (PATTY (6th 2012).

(2) There are multiple reports that the nervous symptoms like hallucination and auditory hallucination were developed among the boy and girl who abused

Accidental ingestion harmfulness	butane gas (PATTY (6th 2012)). (3) Among almost all of 12 people who repeatedly inhaled butane gas, euphoria and hallucination were found. (DFGOT vol. 20 (2003)). : Normal pentane and isopentane fall under「Category 1」. But the aspiration respiratory harmfulness is the regulation of the harmfulness of the ingestion in liquid body and solid body, so Liquid petroleum gas is not applicable.

12. Ecological influence information

Aquatic environmental acute harmfulness	: 「Not applicable to category」 because of the calculation of the concentration of all of the materials though normal pentane and Isopentane fall under「Category 2」.
Aquatic environmental chronic harmfulness	: 「Not applicable to category」 because of the calculation of the concentration of all of the materials though isopentane falls under「Category 2」.
Harmfulness to ozone layer	: 「Not eligible」 because no materials regulated by Appendix A to E in Montreal Protocol are included
Bio-toxicity	: No information
Persistence・degradability	: No information
Bioaccumulation	: No information
Mobility in the soil	: No information

13. Disposal consideration

Residual waste	: Don't release in liquid in the atmosphere. If there is no choice but to release in gas, do it gradually at the place where there is no fire with the good ventilation while confirming that the ground concentration is 0.5% or less. The disposal shouldn't be carried out with the container.
Contaminated container and package	: Vacant container and not-necessary container should be returned to the distributor.

14. Transportation consideration

International regulations

UN Number	: UN 1075
Product name in English	: PETROLEUM GASES, LIQUEFIED
Class	: 2.1
Secondary class	: —
Marine pollutant	: Not applicable
Maritime regulation information	: Comply with IMO (International Maritime Organization)
Air regulation information	: Comply with ICAO (International Civil Aviation Organization) and IATA (International Air Transport Association)

Domestic regulations

Land regulation information

Sea regulation information : Comply with High Pressure Gas Control Law.

Air regulation information : Comply with Ship Safety Law.

Specific safety measures : Comply with Civil Aeronautics Law.

and conditions at transit : Avoid falling, dropping and jolting the container.

Take temperature-rise preventive measures to keep the container at 40℃ or below

If the container is transported by the vehicle, the sign of 'High Pressure Gas' should be displayed at the place easily to recognize and must carry the fire extinguisher and disaster-prevention tools. And carry 'Yellow Card'.

15. Applicable law

Law	Relevant items
Industrial Safety and Health Law	Harmful material whose product name etc. should be displayed (Law Article 57)
	Harmful material whose product name etc. should be reported (Law Article 57-2)
	Materials whose hazard and harmfulness should be examined (Law Article 57-3)
	Dangerous material・combustible gas(Ordinance Attached table Article 1-5)
High Pressure Gas Control Law	High pressure gas (Law Article 2-3)
	Combustible gas (Security Regulation for General High-Pressure Gas Article2-1)
	Container storage place and the filling container etc. (Security regulations for liquified petroleum gas Article 6-2-7)
	Transportation security measure and technical standard (Security regulations for Liquified petroleum gas Article 47, 48, 49)
Act on the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas.	Liquefied petroleum gas (Law Article 2)
Ship Safety Law	High Pressure Gas(regulations for the carriage and storage of dangerous goods in ship Article 2 & 3, Dangerous goods list Attached table 1)
Air Safety Law	High Pressure Gas (Ordinance for Enforcement of the Civil Aeronautics Act Article 194, Dangerous goods list Attached table 1)

16. Other information

References

1. Training text (revised edition) about MSDS manual for compound substance(chemical material) corresponding to GHS, Japan Industrial Safety and Health Association
2. Japan Industrial Safety and Health Association, Japan Advanced Information Center of Safety and Health http://www.jaish.gr.jp/
3. GHS classification manual issued on 10th Feb 2006, GHS concerned government agency liaison conference version
4. International Chemical Safety Card (ICSC) Japanese version, National Institute of Health Sciences(NIHS)
5. 'Workplace Safety Site' Ministry of Health, Labor and Welfare, http://anzeninfo.mhlw.go.jp/index.html
※In this SDS, the information on GHS classification by 2019 is reflected.
6. Global Harmonized System of Classification and Labeling of Chemicals (GHS) 6th revised edition, 2015. the United Nations(translated by Ministry of Economy, Trade and Industry)
7. JIS Z 7253:2019「Method of communication on chemical hazardous based on GHS—Label, display at the workplace and safety sheet SDS」, Japanese Standard Association
8. JIS Z 7252:2019「Chemical substance classification method based on GHS」, Japanese Standard Association

(Attached table) Physical and chemical properties

Chemical name	Propane	Normal butane	Isobutane	Normal pentane	Isopentane
Melting point・ freezing point	−189.7℃ (Melting point)	−138℃	−160℃	−129.67℃ (Melting point)	−159.9℃ (Melting point)
Boiling point, initial boiling point, And boiling range	−42℃ (Boiling point)	−0.5℃	−12℃	36.06℃	27.8℃
Flash point	−104℃	−60℃ (Direct vent system)	−82.99℃	＜−40℃(cc)	＜−51℃ (Direct vent system)
(Combustion range (Explosion range)	Lower limit 2.1vol% Upper limit 9.5vol%	Lower limit 1.8vol% Upper limit 8.4vol%	Lower limit 1.8vol% Upper limit 8.4vol%	Lower limit 1.4vol% Upper limit 8.0vol%	Lower 1.4vol% Upper limit 7.6vol%
Vapor pressure	840kPa (20℃)	213.7kPa (21.1℃)	304kPa (20℃)	53.3kPa (18.5℃)	79kPa (20℃)
Specific gravity of gas (Air＝1)	1.6	2.1	2.01	2.5	2.5
Specific gravity of liquid (Density)	0.5853 (−45℃/4℃)	0.5788 (20℃/4℃)	0.6	0.62638 (20℃/4℃)	0.6
Solubility	62.4mg/L (25℃, water)	61mg/L (20℃, water)	48.9mg/L (water)	360mg/L (16℃, water)	48.0mg/L (25℃, water)
n−Octanol /Water partition coefficient	log Pow=2.35	log Pow=2.89 (measured value)	log Kow=2.8	log Pow=2.36	log Pow=2.30 (estimated value)
Spontaneous ignition temperature	450℃	287℃	460℃	260℃	420℃
Other data (Molecular weight)	44.1 (ICSC)	58.1 (ICSC)	58.12	72.15	72.15
CAS No	74−98−6	106−97−8	75−28−5	109−66−0	78−78−4

(Reference) Liquefied petroleum gas can be classified as 68476−85−7 for CAS No.

Source: Workplace Safety Site, International Chemical Safety Card (ICSC).