

Issuing Date: March 31, 1993

Revision Date: Jun. 01, 2022

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	:	Vinyl Chloride Monomer
Company Name	:	KANEKA CORPORATION
Address	:	2-3-18, Nakanoshima, Kita-ku, Osaka, Japan
Responsible Division	:	Osaka head office: Vinyls and Chlor-Alkali Solutions Vehicle R&B・Technology team, Technology group
Responsible Person	:	Technology group leader
Phone Number	:	+81-6-6226-5356
Fax Number	:	+81-6-6226-5345
Latest SDS URL	:	https://www.pvc.kaneka.co.jp/ Go to SDS download page
E-mail	:	kasei-hinshitsu@kaneka.co.jp
Emergency Access	:	Takasago plant, Chemical manufacturing department, Monomer section, Management room
Emergency Phone Number	:	+81-50-3181-4497
Recommended use	:	Poly (vinyl chloride), vinyl chloride-vinyl acetate copolymer, vinylidene chloride-vinyl chloride copolymer, etc.

2. HAZARDS IDENTIFICATION

GHS Classification

Physical and chemical hazards

Explosives	Not applicable
Flammable gases	Category 1
Aerosols	Not applicable
Oxidizing gases	Classification not possible
Gases under pressure	Liquefied gas
Flammable liquids	Not applicable
Flammable solids	Not applicable
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Not applicable
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	Not applicable
Substances and mixtures, which in contact with water, emit flammable gases	Not applicable
Oxidizing liquids	Not applicable
Oxidizing solids	Not applicable

Health Hazards	Organic peroxides	Not applicable
	Corrosive to metals	Classification not possible
	Desensitized explosives	Not applicable
	Acute toxicity (Oral)	Not classified
	Acute toxicity (Dermal)	Classification not possible
	Acute toxicity (Inhalation: gas)	Not classified
	Acute toxicity (Inhalation: vapour)	Not applicable
	Acute toxicity (Inhalation: dust)	Not applicable
	Acute toxicity (Inhalation: mist)	Not applicable
	Skin corrosion/irritation	Category 2
	Serious eye damage/irritation	Category 2B
	Respiratory sensitization	Classification not possible
	Skin sensitization	Classification not possible
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 1A
	Reproductive toxicity	Category 2
	Specific target organ toxicity (Single exposure)	Category 1(central nervous system) Category 3(narcotic effects)
Specific target organ toxicity (Repeated exposure)	Category 1(liver, nervous system, respiratory organs, testicles)	
Environmental Hazards	Aspiration hazard	Classification not possible
	Hazards to aquatic environment - acute hazard	Category 3
	Hazards to aquatic environment - acute hazard	Category 3
	Hazardous to the ozone layer	Classification not possible

Label Element

Pictograms :



Signal Words : Danger

Hazard Statements : Extremely flammable gas.

Contains gas under pressure; May explode if heated.

Causes skin irritation.

Causes eye irritation.
 Suspected of causing genetic defects.
 May cause cancer.
 Suspected of damaging fertility or the unborn child.
 Causes damage to central nervous system.
 May cause drowsiness or dizziness.
 Causes damage to liver, nervous system, respiratory organ, and testicles through prolonged or repeated exposure.
 Harmful to aquatic life.
 Harmful to aquatic life with long lasting effects.

Precautionary Statements :

[Prevention]

Do not handle until all safety precautions have been read and understood.
 Do not eat, drink or smoke when using this product.
 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
 Use personal protective equipment as required and avoid exposure to product.
 Wear protective gloves/protective clothing/eye protection/face protection.
 Use only outdoors or in a well-ventilated area.
 Do not breathe gas.
 Wash hands thoroughly after handling.

[Response]

Avoid release to the environment.
 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 Eliminate all ignition sources if safe to do so.
 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
 IF IN EYES: Rinse cautiously with water for more than 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 IF ON SKIN: Wash with plenty of soap and water.
 Wash contaminated clothing before reuse.
 Immediately call a doctor.
 IF exposed or concerned: Get medical advice/attention.

[Storage]

Protect from sunlight. Store in well-ventilated place.
 Keep container tightly closed. Store locked up.

[Disposal]

Dispose of contents/container by contracting an agency for industrial waste disposal licensed by the prefectural governor.

Other hazards not related to or not classified by GHS

: Corrosion of many metals to produce hydrogen, mixed with air may cause combustion explosion.
 Reacts violently with the base to show corrosiveness. Reacts violently with oxidizing agents to produce toxic gas (chlorine).

Contact with air produces corrosive fume (hydrochloric acid).

Summary of Important Symptoms and Potential Emergencies

: Corrosive to the eyes, skin and respiratory tract. May cause emphysema if inhaled in high concentrations. This substance may affect lungs and may cause chronic bronchitis. In addition, it can erode teeth.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Distinction of Substance / Mixture

: Substance

Chemical Name or Common Name

: Vinyl chloride

Synonym

: Chloroethylene
Chloroethene
VCM

Chemical characteristic (Chemical formula)

: C_2H_3Cl ; $(CH_2=CHCl)$

The common number that identifies the chemical substance

CAS No. : 75-01-4

The concentration or the concentration range (mass fraction)

: 99.9% or more

Serial No. of government gazette in Japan (CSCL · ISHL)

: 2-102

Components contributing to GHS classification (impurities and stabilizing additives)

: Nothing special

4. FIRST AID MEASURES

If Inhaled : Blow nose and gargle immediately. If discomfort, headache, or other symptoms of discomfort occur, remove victim from exposure and provide fresh air immediately and keep victim warm with blanket. Get medical attention immediately.

If on Skin : In case of frostbite, immediately wash the attached part with a large amount of water and remove the clothes.
Remove all the contaminated clothing as quickly as possible as it may touch the skin.
If there are any changes in the appearance of the skin or feel pain, get medical attention immediately.

If in Eyes : Flush eyes immediately with a large amount of water for at least 15 minutes and get medical attention immediately.

Remove contact lenses, if present and easy to do. Continue rinsing.

If Swallowed : Rinse mouth with water and get medical attention immediately.

The Acute and Delayed Effects and Main Symptoms

: Red eyes, pains, frostbite, dizziness, headache, unconscious and anesthetic

actions.

Drowsiness from inhalation, difficulty with ambulation, headache, numbness in hands and legs. Red eyes, pain, etc. caused by eye contact.

Advice to Protect the Rescuers

: Protection mask against organic solvents, air breathing mask or air breathing device. Watch out fire.

Note to Physician

: Check regularly is necessary depending on the degree of exposure. Because added tranquilizers and inhibitors may affect the toxicity of this substance, consult experts.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

: Leaking gas fire: do not extinguish unless leak can be stopped safely.
Small Fire: Carbon dioxide, dry chemical powder.
Large Fire: Water spray, water fog.

Unsuitable Extinguishing Media

: Jet water.

Special Hazards and Risks

: Heating may cause the container to explode.
Form explosive gas mixture with the air.
The cylinder surrounded by flames may release flammable gas from the relief valve.
Irritating, corrosive or toxic gas may form during fire.

Specific Fire Fighting Method

: Do not put out the fire caused by the leaking gas when impossible to control the gas leakage due to the explosive gas mixture.
Stop the leaks and put out the fire with extinguishing medium.
Fight fire from upwind side. Wear respiratory protection.
In case of fire caused by leakage of storage tanks and containers, use water spray to cool the storage tanks and containers to prevent them from exploding.
If without risk, cut off the ignition resource.
Isolation the site and prohibit the unnecessary person to access.

Fire Fighting Notes and Protective Measures

: Wear full body protective clothing and an air respirator.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

: Wear protective clothing as per "8. EXPOSURE CONTROLS/PERSONAL PROTECTION" to avoid contact and inhalation.
Evacuate immediate area. Keep unnecessary personnel away.

Work from upwind

Keep away from lowland.

Environmental Precautions : Do not drain the product into the environment (air, water, and soil).

Methods and Materials for Containment and Cleaning Up

: Stop leaks if safe to do so.

Evacuate people downwind.

Remove all sources of ignition immediately. No fire.

Wear protective equipment and do not work downwind.

Prevention Measures for Secondary Disaster

: Stay away from dangerous areas. Do not enter until the gas has spread.

Remove all sources of ignition immediately.

Reduce the concentration of gas by ventilation, etc.

Prevent drain into drains, sewers, basements or other enclosed spaces.

Do not spray water directly to leaks and leakage sources.

7. HANDLING AND STORAGE

HANDLING

Technical Measures : Wear protective clothing as per "8. EXPOSURE CONTROLS/PERSONAL PROTECTION".

Electrical equipment shall be explosion-proof and grounded.

Work clothes and shoes should be anti-static.

Remove high temperature ignition source.

Provide local exhaust and general ventilation.

While stabilizing the vapor source, the local exhaust device is used to suppress the increase of vapor concentration.

Precautions for Safe Handling

: Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Do not fall, drop, shock or drag the container.

Do not use hot objects, sparks and open flames around.

Do not contact, inhale or swallow.

Work clothes and safety shoes should be conductive.

Use only outdoors or in a well-ventilated area.

Avoid release to the environment.

Contact Avoidance : Refer to "10. STABILITY AND REACTIVITY"

Hygiene Measures : Do not eat, drink or smoke when using this product.

Wash hands thoroughly after handling.

STORAGE

Safety Storage Conditions

: Avoid direct sunlight. Store in a ventilated, cool and dark area and the storage are shall be fireproof construction.

Store in dedicated high -pressure gas containers.

Remove all sources of ignition.

Incompatible with oxidizing agents, amines, alkali metals, alkali earth metals, and organic metal compounds.

Store in well-ventilated place.

Store locked up.

Safe Container and Packing Material

: Steels which are applicable to corresponding regulations and above conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Permissible Concentration, etc.

Controlled Concentration : 2ppm ¹⁾

Permissible Concentration (Exposure level, Biological level)

JSOH (2020) : Maximum concentration 2.5ppm (6.5mg/m³) ²⁾

ACGIH (2021) : TLV-TWA 1ppm (2.5mg/m³) ³⁾

Measures for Facilities : Use closed devices or local exhaust ventilation with explosion -proof specification to take measures against static electricity.

Provide safety shower and eye wash station identified clearly near work area.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection : Gas mask for organic gas. If the concentration is high, use air supply mask and air respirator.

Hand Protection : Soluble-resistant protective gloves.

Eye/Face Protection : Protective glasses, goggles, protection face shield.

Skin and Body Protection: Soluble-resistant boots, protective clothing.

Special Precautions : Wash hands thoroughly after handling and gargle before eat or drink.

9. PHYSICAL AND CHEMICAL PROPERTIES ⁴⁾

Physical State : Gas ⁴⁾

Color : Colorless ⁴⁾

Odor : Ether-like sweet odor ⁴⁾

Melting Point/Freezing Point : -153.7°C ⁴⁾

Boiling Point, Initial Boiling Point and Boiling Range : -13.3°C ⁴⁾

Combustibility : Combustible

Upper/Lower Flammability or Explosive Limits : Lower 3.6vol%、Upper 33vol% (in air) ⁴⁾

Flash Point : -78°C(open cup) ⁴⁾

Auto-ignition Temperature : 472°C ⁴⁾

Decomposition Temperature: No data

pH	:	No data
Kinematic Viscosity	:	No data
Solubility	:	Slightly soluble in water <the solubility in water is 8.80g/L(25°C)> ⁴⁾ ; Soluble in organic solvents such as alcohol, ether, carbon chloride, and benzene. ⁴⁾
Partition Coefficient (n-Octanol/Water)		
	:	log Pow 1.58 ⁵⁾
Vapor Pressure	:	397kPa (25°C) ⁴⁾
Density and/or Relative Density		
	:	0.9106 (20°C/4°C) ⁴⁾
Relative Vapour Density	:	2.15 (air=1) ⁴⁾
Particle Characteristics	:	Not applicable
Other Data		
	:	Volatility : Yes
	:	Oxidability : None

10. STABILITY AND REACTIVITY

Reactivity	:	Nothing special.
Chemical Stability	:	Polymerization may be carried out easily in the presence of air, sunshine, heat or catalyst. The polymerization may be accelerated explosively and generate peroxide under the specified condition.
Possibility of Hazardous Reactions		
	:	Oxidizing agents, amines, alkali metals and alkaline earth metals in contact with and reacts violently.
Condition to Avoid	:	Heating, contact with air.
Incompatible Materials	:	Oxidizing agents, amines, alkali metals, alkali earth metals, and organic metal compounds.
Hazardous Decomposition Products		
	:	When burned, toxic gases (hydrogen chloride, phosgene) are generated.
Others	:	Nothing special

11. TOXICOLOGICAL INFORMATION

Acute Toxicity		
Oral	:	Based on a LD ₅₀ value of >4000 mg/kg bw for rats (SIDS (access on May 2009)), the substance was classified into "Not classified".
Dermal	:	No data Based on the above, it is classified as "Classification not possible".
Inhalation: gas	:	Based on LC ₅₀ values of 152,880 ppm/2h (4-hour equivalence: 108,102 ppm), 200,000 - 250,000 ppm/2h (4-hour equivalence: 141,421 - 176,777 ppm) (SIDS (access on May 2009)) and 150,000 ppm/2h (4-hour equivalence:

		106,066 ppm) (Initial Risk Assessment Report (NITE, CERi, NEDO) No. 75 (2005)) for rats, the substance was classified as "Not classified".
Inhalation: vapour	:	Not applicable Based on the above, it is classified as "Not applicable".
Inhalation: dust	:	Not applicable Based on the above, it is classified as "Not applicable".
Inhalation: mist	:	Not applicable Based on the above, it is classified as "Not applicable".
Skin Corrosion/Irritation	:	Based on the description on human health effects "erythema and some second-degree burns which healed without complication." ⁸⁾ Based on the above, it is classified as "Category 2".
Serious Eye Damage/Irritation	:	Based on the assessment data on human health effects: The substance is considered to cause mild, reversible irritation to the eyes. ⁸⁾ Based on the above, it is classified as "Category 2B".
Respiratory or Skin Sensitizations	:	No data Based on the above, it is classified as "Classification not possible".
Germ Cell Mutagenicity	:	Negative on germ cell multi-generation mutagenicity tests in vivo (dominant lethal tests). Absence of data on germ cell mutagenicity tests in vivo. Positive on somatic cell mutagenicity tests in vivo (chromosome aberration tests, micronucleus tests). Absence of data on germ cell genotoxicity tests in vivo. ⁸⁾ Based on the above, it is classified as "Category 2".
Carcinogenicity	:	IARC (1992): Group 1 ACGIH (2021): A1 EPA (2000): A NTP (2005): K Japan Society for Occupational Health: Group 1 Based on the above, it is classified as "Category 1A".
Reproductive Toxicity	:	Inhalation exposure tests on male rats: Morphologic changes in the testes and a decrease in its relative weight are observed, though no description is available for general toxicity. ⁸⁾ Based on the above, it is classified as "Category 2".
Specific Target Organ Toxicity (Single Exposure)	:	In humans, confusion, headache, dizziness, euphoria, intoxication, anesthetic effect has been observed in somnolence or hypersomnia after leaving the workplace. Target organ is thought to central nervous system and anesthetic effects are also observed. Based on the above, it is classified as "Category 1 (central nervous system),

Category 3(narcotic effects)".

Specific Target Organ Toxicity (Repeated Exposure)

: In humans, enlargement of the liver, liver fibrosis, portal hypertension, enlarged spleen, dizziness, unclear vision, tingling in the limbs, coldness of the extremities, sensory - frequent neurological disorders including neuropathic motility, trigeminal sensory neuropathy, mild pyramidal syndrome, cerebral, extrapyramidal motor neuropathy may, neurasthenia, depression, emphysema, pulmonary fibrosis, Raynaud's phenomenon, the melting tip of the epiphyses of the extremities, and scleroderma observed. In experimental animals, a significant increase of polymorphism of hepatocytes, the increase in liver cyst, hepatocellular necrosis, Kupffer cell proliferation disorders of the testis tubules, necrosis of the seminiferous epithelium in the testis, with the multinucleated syncytial giant cells disruption of spermatogenesis is observed. Liver, nervous system, respiratory, testes were considered a target organ. Effects on experimental animals, in terms of the guidance range, corresponds to "Category 1". Based on the above, it is classified as "Category 1 (liver, nervous system, respiratory organs, testicles)".

Aspiration Hazards : No data
Based on the above, it is classified as "Classification not possible".

Others : No data

12. ECOLOGICAL INFORMATION

Ecological Toxicity

Hazards to aquatic environment - Short-term (acute)

: Crustacea (Daphnia magna) LC₅₀ 80.7mg/L ⁹⁾
Based on the above, it is classified as "Category 3".

Hazards to aquatic environment - Long-term (chronic)

: Although acute toxicity was Category 3 and the bio-accumulation potential was low (log Kow=1.46 (Existing Chemical Safety Inspections Data)), since there was no rapidly degrading (the decomposition by BOD: 3% (Existing Chemical Safety Inspections Data)), it was classified into Category 3.

Persistence/Degradability : It is hardly degradable. However, the results of existing Chemicals Control Law in Japan, there is no microbial degradation. In the body of the fish, (i) There is no bioaccumulation or accumulation, or low. (ii)Estimated, no property of high concentration. ⁷⁾

Bioaccumulation Potential : ·Estimated, no property of high concentration. LogKow 1.46 ⁷⁾

Mobility in Soil : No data
 Hazardous to the Ozone Layer : Does not contain substances listed in the Montreal Protocol.
 Other Hazardous Impacts : No data

13. DISPOSAL CONSIDERLATIONS

Information on safe and environmentally friendly disposal or recycling of chemicals (residual waste), contaminated containers and packaging

Method of Waste Disposal : Dispose in accordance with related regulations and local standards.
 If wastes disposal is outsourced, dispose of properly via a licensed industrial waste disposal contractor.
 Waste is processed in high temperature incinerators, toxic gases (phosgene, hydrogen chloride) occurs because, against burning waste gas treatment (cleaning process) to take.
 Wastewater generated in the incineration will be discharged after appropriate treatment such as neutralization.

Contaminated Container and Packaging : Dispose of used container properly via a licensed industrial waste disposal contractor after removing contents completely.

14. TRANSPORT INFORMATION

International Regulations

Ship Safety Law (IMO)

UN No. : UN1086
 Proper Shipping Name : VINYL CHLORIDE, STABILIZED
 Class : 2.1
 Packing Group : —
 Marine Pollutant : Not Applicable

Air Safety Law (ICAO/IATA)

UN No. : UN1086
 Proper Shipping Name : VINYL CHLORIDE, STABILIZED
 Class : 2.1
 Packing group : —

Japan Domestic Regulation

Road Traffic Law : Comply with the High Pressure Gas Safety Law.
 Ship Safety Law : Comply with the Ship Safety Act.
 UN No. : UN1086
 Proper Shipping Name : VINYL CHLORIDE, STABILIZED
 Class : 2.1
 Packing Group : —
 Marine Pollutant : Not Applicable

Air Safety Law : Comply with the Aviation Law.
 UN No. : UN1086
 Proper Shipping Name : VINYL CHLORIDE, STABILIZED
 Class : 2.1
 Packing Group : —

Specific Safety Measure and Condition of Transport

: Comply with the High Pressure Gas Safety Law.
 Move, fall, impact, friction to prevent such from happening, to fix.
 Fire, heat, direct sunlight to keep off.
 Avoid direct contact with steel parts.
 Not a heavy surcharge.
 When transported by vehicle, it is required to make a driver keep the Yellow Card during transportation in Japan.
 When transported by vehicle, it is required to make a inspect vehicle prior.
 The lorry and carrier plate were given signs, fire-fighting equipment, loading equipment to disaster.
 During loading and unloading of lorry, stop the engine, put the emergency brake and the car stop, also grounded against static electricity.

Emergency Response Guide Number

: 116P <Gas -combustible / flammable (unstable)>⁷⁾

15. REGULATORY INFORMATION

ISHL : Inflammable gas (Annex 1 of the Enforcement Ordinance, hazardous Materials)
 Category 2 material (Annex 3 of the Enforcement Ordinance, specified chemical substances)
 Should display the name of a hazardous substance (Article 57) Cabinet Order No.100 "Vinyl Chloride"
 Should display the name of a hazardous substance (Article 57-2) Cabinet Order No.100 "Vinyl Chloride"
 Hazardous substances requiring risk assessment (Article 57-2) Cabinet Order No.100 "Vinyl Chloride"
 Category 2 of specified Chemical Substance (Article 2 of ordinance on Prevention of Hazards due to Specified Chemical Substances)
 Substance under special supervision of specified Chemical Substance (Article 38 of ordinance on Prevention of Hazards due to Specified Chemical Substances)

High Pressure Gas Safety Law

: Liquid gas (Article 2)
 Inflammable gas (Article 2 of Security Regulation for General High-Pressure Gas)

Ship Safety Law	:	High pressure gas (Article 2, 3 of the Dangerous Goods Ship Transportation and Storage Rules, Annex 1 of the Public notice on Dangerous Goods)
Aviation Law	:	High pressure gas (Article 194 of the Enforcement Regulation, Annex 1 of the Public notice on Dangerous Goods)
Port Regulation Law	:	High pressure gas (Article 12 of the Enforcement Regulation, the Public notice on Dangerous Goods)
Road Law	:	Restrictions on vehicle traffic (Article 19-13 of the Enforcement Ordinance, the Japanese Road Public Corporation announcement)
Law for PRTR and Promotion of Chemical Management (PRTR)	:	Article 2 Specified type 1 designated chemical substance (Management No. 94) "Chloroethylene (Alias: Vinyl chloride)"
Marine Pollution Prevention Law	:	Substance is not liquid at room temperature (Article 3-3, Article 1-5)
Air Pollution Prevention Law	:	Harmful air pollutants (Cabinet Order: The 9th reply of the Central Environmental Protection Review Committee) "Vinyl chloride monomer (Alias: Chloroethylene, Vinyl chloride)"
Water Pollution Prevention Law	:	Harmful substance (Cabinet Order: No.2-27 of the Cabinet Order) "Vinyl Chloride Monomer"
Soil Contamination Countermeasures Law	:	Type 1 Specified harmful substance (Cabinet Order: No.1-3 of the Cabinet Order) "Chloroethylene (Alias: Vinyl chloride or Vinyl chloride monomer)"
Foreign Exchange and Foreign Trade Law	:	Exported Trade Management Ordinance Table 1, paragraph 16 (catch all regulation)
Law on the Restriction of Housewares containing Hazardous Substances	:	Home aerosol product (Cabinet Order: No.3) "Vinyl chloride"

16. OTHER INFORMATION

References

- 1) Standard on working environment (September 1, 1988 MoL Public Notice No. 79) Revised on April 22, 2022
- 2) Journal of the Japan Society for Occupational Health, vol.62 (2020)
- 3) ACGIH, TLVs and BEIs Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices (2021)
- 4) U.S.NLM:HSDB(2004)
- 5) Chemicals Evaluation and Research Institute (CERI), existing chemical safety (hazard) evaluation sheet (2002)
- 6) Safety inspection data of existing chemical substances (2004) (National Institute of Technology and

Evaluation)

7) EHC 215(1999)

8) CERH HAZARD ASSESSMENT REPORT No.75 (2006)

9) Emergency Response Guidebook (2016)

NOTE

No warranty is made with respect to contents, physico-chemical properties, etc. out of the information described.

The information on risk/hazard assessment contained in this Material Safety Data Sheet is described based on the data and information currently available to us. However, since it doesn't include all the data, handle with special care.

The latest SDS should be obtained from the URL described in section 1. In addition, please browse the homepage as appropriate and confirm whether or not to update.

The consulting address of the recorded content is the same as that of the above responsible department.

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