

**Cap A****BR640-2**

Version 1.0

Issuing date 02/27/2020

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**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****Product information**

Trade name : Cap A

Number : 000000011330

Recommended use of the chemical and restrictions on use : Laboratory chemicals, Capping Reagent for DNA/RNA Synthesis

Manufacturer or supplier's details : Honeywell Specialty Chemicals Seelze GmbH  
Wunstorfer Straße 40  
Seelze, 30926

For further information, please contact: : 1-800-368-0050  
+1-231-726-3171  
(Monday-Friday, 9:00am-5:00pm)

**In case of emergency call :** **Medical: 1-800-498-5701 or +1-303-389-1414**  
**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**  
**In Japan: +(81)-345209637**  
: (24 hours/day, 7 days/week)

**2. HAZARDS IDENTIFICATION****Classification of the substance or mixture**

Classification of the substance or mixture : Flammable liquids, Category 2  
Acute toxicity, Category 4, Oral  
Skin corrosion, Category 1B  
Serious eye damage, Category 1  
Carcinogenicity, Category 2  
Specific target organ toxicity - single exposure, Category 3

**GHS Label elements, including precautionary statements**

Symbol(s)



Signal word

: Danger

Hazard statements

: Highly flammable liquid and vapour.

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Harmful if swallowed.  
Causes severe skin burns and eye damage.  
May cause respiratory irritation.  
Suspected of causing cancer.

**Precautionary statements****: Prevention:**

Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.  
Keep container tightly closed.  
Ground/bond container and receiving equipment.  
Use explosion-proof electrical/ ventilating/ lighting equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
Wash skin thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Use only outdoors or in a well-ventilated area.  
Wear protective gloves/protective clothing/eye protection/face protection.

**Response:**

IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.  
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.  
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Immediately call a POISON CENTER/ doctor.  
Wash contaminated clothing before reuse.  
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

**Storage:**

Store in a well-ventilated place. Keep container tightly closed.  
Keep cool.  
Store locked up.

**Disposal:**

Dispose of contents/ container to an approved waste disposal plant.

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical nature : Mixture

Chemical name	CAS-No.	Concentration
Tetrahydrofuran	109-99-9	80.00 %
Tetrahydrofuran		
Acetic anhydride	108-24-7	10.00 %
Acetic anhydride		
2,6-Dimethylpyridine	108-48-5	10.00 %
2,6-Dimethylpyridine		

Note: Organic Solvents Class 2

Note: Deleterious Substances - Cabinet Order

**4. FIRST AID MEASURES**

- Inhalation : Call a physician immediately.  
Remove to fresh air.  
If not breathing, give artificial respiration.  
If breathing is difficult, give oxygen.  
Use oxygen as required, provided a qualified operator is present.
- Skin contact : Wash off immediately with plenty of water for at least 15 minutes.  
Take off contaminated clothing and shoes immediately.  
Wash contaminated clothing before re-use.  
Call a physician immediately.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.  
Call a physician immediately.
- Ingestion : Do not induce vomiting without medical advice.  
Never give anything by mouth to an unconscious person.  
Call a physician immediately.
- Notes to physician : Treat symptomatically.

**5. FIREFIGHTING MEASURES**

Suitable extinguishing media : Carbon dioxide (CO2)

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- Dry chemical  
Alcohol-resistant foam  
Cool closed containers exposed to fire with water spray.
- Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.
- Specific hazards during firefighting : Extremely flammable.  
Vapours may form explosive mixtures with air.  
Vapours are heavier than air and may spread along floors.  
Vapors may travel to areas away from work site before igniting/flashing back to vapor source.  
May form explosive peroxides.  
In case of fire hazardous decomposition products may be produced such as:  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)
- Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.
- Further information : Do not use a solid water stream as it may scatter and spread fire.  
Use water spray to cool unopened containers.  
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions, protective equipment and emergency procedures : Wear personal protective equipment.  
Immediately evacuate personnel to safe areas.  
Keep people away from and upwind of spill/leak.  
Ensure adequate ventilation.  
Remove all sources of ignition.  
Do not swallow.  
Do not breathe vapours or spray mist.  
Do not get in eyes, on skin, or on clothing.
- Environmental precautions : Prevent further leakage or spillage if safe to do so.  
Prevent product from entering drains.  
Discharge into the environment must be avoided.  
Do not flush into surface water or sanitary sewer system.  
Do not allow run-off from fire fighting to enter drains or water courses.
- Methods and materials for containment and cleaning up : Ventilate the area.  
No sparking tools should be used.  
Use explosion-proof equipment.  
Contain and collect spillage with non-combustible absorbent

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materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13).

**7. HANDLING AND STORAGE****Handling**

Precautions for safe handling : Wear personal protective equipment.  
Use only in well-ventilated areas.  
Keep container tightly closed.  
Do not smoke.  
Do not swallow.  
Do not breathe vapours or spray mist.  
Do not get in eyes, on skin, or on clothing.

Advice on protection against fire and explosion : May form explosive peroxides.  
Keep away from fire, sparks and heated surfaces.  
Take precautionary measures against static discharges.  
Ensure all equipment is electrically grounded before beginning transfer operations.  
Use explosion-proof equipment.  
Keep product and empty container away from heat and sources of ignition.  
No sparking tools should be used.  
No smoking.

**Storage**

Conditions for safe storage, including any incompatibilities : Store in area designed for storage of flammable liquids.  
Protect from physical damage.  
Keep containers tightly closed in a dry, cool and well-ventilated place.  
Containers which are opened must be carefully resealed and kept upright to prevent leakage.  
Keep away from heat and sources of ignition.  
Keep away from direct sunlight.  
Store away from incompatible substances.  
Protect from exposure to air/oxygen (peroxide formation).  
Protect against light.  
Container hazardous when empty.  
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

## Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Tetrahydrofuran Tetrahydrofuran	109-99-9	TL : Threshold limits	(50 ppm)	04 2009	ISHL:Industrial Safety and Health Law OEL
		SKIN_DES : Skin designation:	Can be absorbed through the skin.	09 2015	Japan Society for Occupational Health:Japan Society for Occupational Health allowable concentration recommendation value
		TWA : Time weighted average	148 mg/m3 (50 ppm)	05 2016	Japan Society for Occupational Health:Japan Society for Occupational Health allowable concentration recommendation value
Acetic anhydride Acetic anhydride	108-24-7	TLV-C : Ceiling Limit Value	21 mg/m3 (5 ppm)	04 2007	Japan Society for Occupational Health:Japan Society for Occupational Health allowable concentration recommendation value

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**Appropriate engineering controls**

Use with local exhaust ventilation.

Prevent vapour buildup by providing adequate ventilation during and after use.

**Individual protection measures, such as personal protective equipment**

- |                          |   |   |
|--------------------------|---|---|
| Respiratory protection   | : | In case of insufficient ventilation wear suitable respiratory equipment.<br>For rescue and maintenance work in storage tanks use self-contained breathing apparatus.<br>Use NIOSH approved respiratory protection.  |
| Hand protection          | : | Solvent-resistant gloves<br>Gloves must be inspected prior to use.<br>Replace when worn.  |
| Eye protection           | : | Do not wear contact lenses.<br>Wear as appropriate:<br>Safety glasses with side-shields<br>If splashes are likely to occur, wear:<br>Goggles or face shield, giving complete protection to eyes   |
| Skin and body protection | : | Wear as appropriate:<br>Solvent-resistant apron<br>Flame retardant antistatic protective clothing.<br>If splashes are likely to occur, wear:<br>Protective suit   |
| Hygiene measures         | : | When using, do not eat, drink or smoke.<br>Wash hands before breaks and immediately after handling the product.<br>Keep working clothes separately.<br>Remove and wash contaminated clothing before re-use.<br>Do not swallow.<br>Do not breathe vapours or spray mist.<br>Do not get in eyes, on skin, or on clothing. |
| Protective measures      | : | Ensure that eyewash stations and safety showers are close to the workstation location.  |

**9. PHYSICAL AND CHEMICAL PROPERTIES**

- |                |   |               |
|----------------|---|---------------|
| Physical state | : | liquid, clear |
| Colour         | : | colourless    |
| Odour          | : | ether-like    |

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pH	: Note: Not applicable
Melting point/range	: -108.5 °C Note: The information regarding melting point/freezing point are those of the pure substance.
Boiling point/boiling range	: 66 °C Note: The physical data is that of the main component.
Flash point	: 5 °F (-15 °C) Method: closed cup
Evaporation rate	: Note: no data available
Lower explosion limit	: 2 %(V) Note: The physical data is that of the main component.
Upper explosion limit	: 11.8 %(V) Note: The physical data is that of the main component.
Vapour pressure	: 189 hPa at 20 °C(68 °F) Note: The information regarding the vapour pressure is that of the solvent.
Vapour density	: 2.5 Note: (Air = 1.0), The physical data is that of the main component.
Density	: 0.888 g/cm <sup>3</sup> at 20 °C Note: The physical data is that of the main component.
Water solubility	: Note: completely soluble
Partition coefficient: n-octanol/water	: Note: no data available



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Ignition temperature : 321 °C  
Method: The physical data is that of the main component.

Decomposition temperature : Note: no data available

Viscosity, dynamic : Note: no data available

Viscosity, kinematic : Note: no data available

**10. STABILITY AND REACTIVITY**

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : Hazardous polymerisation does not occur.

Conditions to avoid : Heat, flames and sparks.  
Keep away from direct sunlight.  
Protect against water.  
Protect from moisture.  
Protect from exposure to air/oxygen (peroxide formation).  
Protect against light.

Incompatible materials to avoid : Water  
Alcohols  
Amines  
Strong oxidizing agents  
Strong acids and strong bases  
May form explosive peroxides.  
May attack many plastics, rubbers and coatings.

Oxidizing solids  
Oxidizing liquids

Hazardous decomposition products : Peroxides  
In case of fire hazardous decomposition products may be produced such as:  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)

**11. TOXICOLOGICAL INFORMATION**

Acute oral toxicity : Acute toxicity estimate: 1,316.06 mg/kg  
Method: Calculation method

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Acute inhalation toxicity	: Acute toxicity estimate: 110 mg/l Method: Calculation method
Acute dermal toxicity Acetic anhydride	: LD50: 4,000 mg/kg Species: Rabbit
2,6-Dimethylpyridine	: LD50: > 1,000 mg/kg Species: Rabbit
Skin irritation Tetrahydrofuran	: Species: Rabbit Result: Irritating to skin.
Acetic anhydride	: Species: human Result: Corrosive
Eye irritation Tetrahydrofuran	: Species: Rabbit Result: Irritating to eyes.
Acetic anhydride	: Species: human Classification: Corrosive
Repeated dose toxicity Acetic anhydride	: Species: Rat Application Route: Inhalation Dose: Intermittent – 40 ppm or 167.2 mg/m3 Exposure time: (2 Weeks) Respiratory disorders Lachrymation Shortness of breath Fatality  Species: Rat Application Route: Inhalation Exposure time: (13 Weeks) NOEL: 1 ppm Local effects Respiratory irritation  Species: Rat Application Route: Inhalation Exposure time: (13 Weeks)

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## Systemic toxicity

No systemic toxicity was observed at 20 ppm (the highest level tested).

## Genotoxicity in vitro

Acetic anhydride

: Test Method: Ames test  
Result: negative

## Genotoxicity in vivo

Acetic anhydride

: Species: Rat  
Cell type: Micronucleus  
Application Route: Inhalation  
Result: negative

## Further information

Tetrahydrofuran

: Note:  
Confirmed animal carcinogen with unknown relevance to humans.

**12. ECOLOGICAL INFORMATION**

## Toxicity to fish

Tetrahydrofuran

: LC50: 2,160 mg/l  
Exposure time: 96 h  
Species: Pimephales promelas (fathead minnow)

LC50: 2,820 mg/l

Species: Leuciscus idus (Golden orfe)

Acetic anhydride

: LC50: 265 mg/l  
Exposure time: 48 h  
Species: Leuciscus idus (Golden orfe)

## Toxicity to daphnia and other aquatic invertebrates

Acetic anhydride

: LC50: 55 mg/l  
Exposure time: 24 h  
Species: Daphnia magna (Water flea)

## Toxicity to bacteria

Tetrahydrofuran

: LC50: > 580 mg/l  
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Exposure time: 16 h  
Species: Bacteria

**13. DISPOSAL CONSIDERATIONS**

WDPCL Waste Disposal and Public Cleansing Law : Specially Controlled Industrial Waste

Disposal methods : In accordance with local and national regulations.

**14. TRANSPORT INFORMATION****ADR**

UN/ID No. : UN 2924

Description of the goods : FLAMMABLE LIQUID, CORROSIVE, N.O.S.

(TETRAHYDROFURAN, ACETIC ANHYDRIDE)

Class : 3

Packing group : II

Classification Code : FC

Hazard Identification Number : 338

Labels : 3 (8)

**IATA**

UN/ID No. : UN 2924

Description of the goods : Flammable liquid, corrosive, n.o.s.  
(Tetrahydrofuran, Acetic anhydride)

Class : 3

Packing group : II

Labels : 3 (8)

Packing instruction (cargo aircraft) : 363

Packing instruction : 352

(passenger aircraft)

Packing instruction : Y340

(passenger aircraft)

**IMDG**

UN/ID No. : UN 2924

Description of the goods : FLAMMABLE LIQUID, CORROSIVE, N.O.S.

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(TETRAHYDROFURAN, ACETIC ANHYDRIDE)

Class	: 3
Packing group	: II
Labels	: 3 (8)
EmS Number 1	: F-E
EmS Number 2	: S-C
Marine pollutant	: no

**15. REGULATORY INFORMATION****National regulatory information**

Vessel Safety Law : Flammable liquids (Article 2 and 3 of rules on shipping and storage of dangerous goods and its Attached Table 1)  
JP VSL

Aviation Law : Flammable liquid (Article 194 of The Enforcement Rules of Aviation Law and its Attached Table 1)  
JP AVL

Fire Service Law : Type 1 petroleums  
JP FSL DS4 : Flammable liquids  
II

<b>Component</b>	:	Tetrahydrofuran	109-99-9
	:	Acetic anhydride	108-24-7
	:	2,6-Dimethylpyridine	108-48-5

Fire Service Law : Group 4 Flammable liquids  
Type 1 petroleums  
Hazardous rank II  
Water soluble  
Keep away from fire  
Not relevant

Japan. ISHL Class 2 Organic Solvents : Listed  
Tetrahydrofuran 109-99-9

Japan. ISHL Hazardous Substances Labeling Requirements (ISHL Art. 57, Enforcement Order Art. 18, Enforcement Rule Art. 30 & 31, as amended through 6 April 2018) : Listed  
Tetrahydrofuran 109-99-9  
Acetic anhydride 108-24-7

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Japan. SDS and Risk Assessment Requirements (ISHL Art. 57-2 and 57-3, Enforcement Order Art. 18-2, Enforcement Rule Art. 34-2 and 34-2-2), as amended  
Poisonous and Deleterious Substances Control Law : Listed  
Tetrahydrofuran 109-99-9  
Acetic anhydride 108-24-7

: Deleterious substance not for pharmaceutical use  
98.2  
Listed  
Acetic anhydride 108-24-7

**Other international regulations****Notification status**

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Existing Chemicals Inventory (KECI) : On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances (IECSC) : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

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**16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
Health hazard	: 3*	3
Flammability	: 3	3
Physical Hazard	: 1	
Instability	:	1

\* - Chronic health hazard

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

**Further information**

none

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group