

SAFETY DATA SHEET

Ink cartridge (Yellow)

IP5-311

OKI DATA INFOTECH CORPORATION

or doctor/ physician.

P308 + P313 IF exposed or concerned: Get medical ad-vice/
attention.

Hazardous components which must be listed on the label:

bis(2-(2-methoxyethoxy)ethyl) ether
γ-butyrolactone

2.3 Other hazards

Vapours may form explosive mixture with air.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Main Ingredients	Content (%)	CAS-No.	EC-No.	Classification (67/548/EEC)	Classification (REGULATION (EC) No 1272/2008)
bis(2-(2-methoxyethoxy)ethyl) ether	15-25	143-24-8	205-594-7	Repr.Cat.2; R61 Repr.Cat.3; R62	Repr. 1B; H360Df
Propylene carbonate	10-15	108-32-7	203-572-1	Xi; R36	Eye Irrit. 2; H319
γ-butyrolactone	5-10	96-48-0	202-509-5	Xn; R22 Xi; R41 R67	Acute Tox. 4; H302 Eye Dam. 1; H318 STOT SE 3; H336

Other components (listed on EINECS, NLP or ELINCS) are not hazardous according to the directives mentioned above.

4. FIRST-AID MEASURES

4.1 Description of first aid measures

General advice:	In the case of accident or if you feel unwell, seek medical ad-vice immediately. When symptoms persist or in all cases of doubt seek medical advice.
Protection of first-aiders:	If First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
If inhaled:	If inhaled, remove to fresh air. Get medical attention if symptoms occur.
In case of skin contact:	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately
If swallowed:	If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. Get medical attention. Rinse mouth thoroughly with water.

4.2 Most important symptoms and effects, both acute and delayed

Risks:	Causes serious eye damage. May damage the unborn child. Suspected of damaging fertility.
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4.3 Indication of any immediate medical attention and special treatment needed

Treatment: Treat symptomatically and supportively

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Water spray
Alcohol-resistant foam
Dry chemical
Carbon dioxide (CO₂)

Unsuitable Extinguishing Media

High volume water jet

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting: Do not use a solid water stream as it may scatter and spread fire.
Flash back possible over considerable distance.
Vapours may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health.

Hazardous combustion products: Carbon oxides

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

Specific extinguishing methods: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Cool containers/tanks with water spray.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Remove all sources of ignition.
Use personal protective equipment.
Follow safe handling advice and personal protective equipment recommendations.

6.2 Environmental precautions

Environmental precautions: Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g. by containment or oil barriers).
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Non-sparking tools should be used.
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Suppress (knock down) gases/vapours/mists with a water spray jet.
For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.

Local or national regulations may apply to releases and dis-posal of this material, as well as those materials and items employed in the cleanup of releases. You will need to deter-mine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Technical measures:	See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
Local/Total ventilation:	Use with local exhaust ventilation. Use only in an area equipped with explosion proof exhaust ventilation.
Advice on safe handling:	Do not get on skin or clothing. Do not breathe vapours or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice. Keep container tightly closed. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment.
Hygiene measures:	Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers:	Keep in properly labelled containers. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations. Keep away from heat and sources of ignition.
Advice on common storage:	Do not store with the following product types: Strong oxidizing agents Explosives Gases

7.3 Specific end use(s)

Specific use(s):	No data available
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

γ-butyrolactone:	End Use: Workers
	Exposure routes: Inhalation
	Potential health effects: Long-term systemic effects
	Value: 130 mg/m ³
	End Use: Workers
	Exposure routes: Inhalation
	Potential health effects: Acute systemic effects
	Value: 958 mg/m ³
	End Use: Workers
	Exposure routes: Skin contact

Potential health effects: Long-term systemic effects
Value: 19 mg/kg
End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 28 mg/m³
End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Acute systemic effects
Value: 340 mg/m³
End Use: Consumers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 8 mg/kg
End Use: Consumers
Exposure routes: Ingestion
Potential health effects: Long-term systemic effects
Value: 8 mg/kg
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 176 mg/m³
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term local effects
Value: 20 mg/m³
End Use: Workers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 50 mg/kg
End Use: Consumers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 25 mg/kg
End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term local effects
Value: 10 mg/m³
End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 43.5 mg/m³
End Use: Consumers
Exposure routes: Ingestion
Potential health effects: Long-term systemic effects
Value: 25 mg/kg
End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 22 mg/m³
End Use: Workers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 3 mg/kg bw/day
End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 0.5 mg/m³
End Use: Consumers

Propylene carbonate

bis(2-(2-methoxyethoxy)ethyl) ether

Exposure routes: Skin contact
 Potential health effects: Long-term systemic effects
 Value: 0.001 mg/kg bw/day
 End Use: Consumers
 Exposure routes: Ingestion
 Potential health effects: Long-term systemic effects
 Value: 0.001 mg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

γ -butyrolactone:
 Fresh water
 Value: 0.056 mg/l
 Marine water
 Value: 0.0056 mg/l
 Intermittent use/release
 Value: 0.56 mg/l
 Sewage treatment plant
 Value: 452 mg/l
 Fresh water sediment
 Value: 0.24 mg/kg
 Marine sediment
 Value: 0.02 mg/kg
 Soil
 Value: 0.0147 mg/kg

Propylene carbonate
 Sewage treatment plant
 Value: 7400 mg/l
 Fresh water
 Value: 0.9 mg/l
 Marine water
 Value: 0.09 mg/l
 Intermittent use/release
 Value: 9 mg/l
 Soil
 Value: 0.81 mg/kg

bis(2-(2-methoxyethoxy)ethyl) ether
 Fresh water
 Value: 32 mg/l
 Marine water
 Value: 3.2 mg/l
 Intermittent use/release
 Value: 50 mg/l
 Sewage treatment plant
 Value: 500 mg/l
 Fresh water sediment
 Value: 127 mg/kg
 Marine sediment
 Value: 12.7 mg/kg
 Soil
 Value: 6.7 mg/kg
 Oral
 Value: 8.32 mg/kg

8.2 Exposure controls

Engineering measures: Minimize workplace exposure concentrations.
 Use only in an area equipped with explosion proof exhaust ventilation.
 Use with local exhaust ventilation

Personal protective equipment

Eye protection: Wear the following personal protective equipment:
 Chemical resistant goggles must be worn.
 If splashes are likely to occur, wear Face-shield

Hand protection	
Material:	Impervious gloves Flame retardant gloves
Remarks:	Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous sub-stance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.
Skin and body protection:	Select appropriate protective clothing based on chemical re-sistance data and an assessment of the local exposure poten-tial. Wear the following personal protective equipment: Flame retardant antistatic protective clothing. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
Respiratory protection	Use respiratory protection unless adequate local exhaust ven-tilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
Filter type:	Organic vapour type (A)

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	liquid
Colour:	yellow
Odour	solvent-like
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:	71 °C Method: Seta closed cup
Evaporation rate:	No data available
Flammability (solid, gas)	Not applicable
Upper explosion limit:	No data available
Lower explosion limit:	No data available
Vapour pressure:	No data available
Relative vapour density:	No data available
Density:	1.00 - 1.02 g/cm ³
Water solubility:	soluble
Solubility in other solvents	insoluble
Partition coefficient: n-octanol/water:	Not applicable
Auto-ignition temperature:	No data available
Thermal decomposition:	No data available
Viscosity, dynamic:	No data available
Explosive properties:	Not explosive

Oxidizing properties: The substance or mixture is not classified as oxidizing.

9.2 Other information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

Not classified as a reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions: Combustible liquid.
Vapours may form explosive mixture with air.
Can react with strong oxidizing agents.

10.4 Conditions to avoid

Conditions to avoid: Heat, flames and sparks.

10.5 Incompatible materials

Materials to avoid: Oxidizing agents

10.6 Hazardous decomposition products

No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Information on likely routes of exposure: Inhalation, Skin contact, Ingestion, Eye contact

Acute toxicity: Not classified based on available information.

< bis(2-(2-methoxyethoxy)ethyl)ether >

Acute oral toxicity: LD50 (Rat): 3,850 mg/kg

Acute dermal toxicity: LD50 (Rat): > 6,900 mg/kg
Remarks: Based on data from similar materials

<Propylene carbonate>

Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg

Acute dermal toxicity: LD50 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

<γ-butyrolactone>

Acute oral toxicity: LD50 (Rat): 1,582 mg/kg

Acute dermal toxicity: LC50 (Rat): > 5.1 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Skin corrosion/irritation: Causes skin irritation.

< bis(2-(2-methoxyethoxy)ethyl)ether >

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

<Propylene carbonate>

Species: Rabbit

Result: No skin irritation

<γ-butyrolactone>

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation: Causes serious eye damage.

< bis(2-(2-methoxyethoxy)ethyl)ether >

Species: Rabbit

Method: OECD Test Guideline 405

Result: No eye irritation

<Propylene carbonate>

Species: Rabbit

Method: OECD Test Guideline 405

Result: Irritation to eyes, reversing within 21 days

<γ-butyrolactone>

Species: Rabbit

Method: OECD Test Guideline 405

Result: Irreversible effects on the eye

Respiratory or skin sensitisation

Skin sensitization: Not classified based on available information.

Respiratory sensitisation: Not classified based on available information.

< bis(2-(2-methoxyethoxy)ethyl)ether >

Test Type: Local lymph node assay (LLNA)

Exposure routes: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: negative

Remarks: Based on data from similar materials

<γ-butyrolactone>

Test Type: Local lymph node assay (LLNA)

Exposure routes: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: negative

Germ cell mutagenicity Not classified based on available information.

< bis(2-(2-methoxyethoxy)ethyl)ether >

Genotoxicity in vitro Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

<Propylene carbonate>

Genotoxicity in vitro Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

<γ-butyrolactone>

Genotoxicity in vitro Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Carcinogenicity Not classified based on available information.

<Propylene carbonate>

Species: Mouse

Application Route: Skin contact

Exposure time:	2 Years
Result:	negative
<γ-butyrolactone>	
Species:	Rat
Application Route:	Ingestion
Exposure time:	103 weeks
Result:	negative
Reproductive toxicity	Not classified based on available information.
< bis(2-(2-methoxyethoxy)ethyl)ether >	
Effects on fertility	Test Type: Reproduction/Developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 421 Result: positive
Effects on foetal development	Test Type: Embryo-foetal development Species: Rabbit Application Route: Ingestion Method: OECD Test Guideline 414 Result: positive
Reproductive toxicity - Assessment	Clear evidence of adverse effects on development, based on animal experiments., Some evidence of adverse effects on sexual function and fertility, based on animal experiments.
<Propylene carbonate>	
Effects on foetal development	Test Type: Embryo-foetal development Species: Rat, female Application Route: Ingestion Result: negative
<γ-butyrolactone>	
Effects on fertility	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials
Effects on foetal development	Test Type: Embryo-foetal development Species: Rat Application Route: Ingestion Result: negative
STOT - single exposure:	Not classified based on available information.
<γ-butyrolactone>	
Assessment:	May cause drowsiness or dizziness.
STOT - repeated exposure:	Not classified based on available information.
Repeated dose toxicity	
< bis(2-(2-methoxyethoxy)ethyl)ether >	
Species:	Rat
NOAEL:	250 mg/kg
Application Route:	inhalation
Exposure time:	28 d

Method: OECD Test Guideline 407
 Remarks: Based on data from similar materials

<Propylene carbonate>

Species: Rat
 NOAEL: > 5,000 mg/kg
 Application Route: Ingestion
 Exposure time: 90 d

<γ-butyrolactone>

Species: Rat
 NOAEL: 225 mg/kg
 Application Route: Ingestion
 Exposure time: 13 w

Aspiration toxicity: Not classified based on available information.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

< bis(2-(2-methoxyethoxy)ethyl)ether >

Toxicity to fish: LC50 (Danio rerio (zebra fish)): > 5,000 mg/l
 Exposure time: 96 h
 Method: OECD Test Guideline 203
 Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 7,467 mg/l
 Exposure time: 48 h
 Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Pseudokirchneriella subcapitata (green algae)): 2,814 mg/l
 Exposure time: 72 h
 Method: OECD Test Guideline 201
 NOEC (Pseudokirchneriella subcapitata (green algae)): 625mg/l
 Exposure time: 72 h
 Method: OECD Test Guideline 201

Toxicity to bacteria: EC10 : >= 5,000 mg/l
 Exposure time: 3 h
 Method: OECD Test Guideline 209
 Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chron-ic toxicity): NOEC: 320 mg/l
 Exposure time: 21 d
 Species: Daphnia magna (Water flea)
 Method: OECD Test Guideline 211

<Propylene carbonate>

Toxicity to fish: LC50 (Cyprinus carpio (Carp)): > 1,000 mg/l
 Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 1,000 mg/l
 Exposure time: 48 h

Toxicity to algae: ErC50 (Desmodesmus subspicatus (green algae)): > 900 mg/l
 Exposure time: 72 h

Toxicity to bacteria: EC50 (Pseudomonas putida): 25,619 mg/l
 Exposure time: 16 h

<γ-butyrolactone>

Toxicity to fish: LC50 (Lepomis macrochirus (Bluegill sunfish)): 56 mg/l

	Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates:	EC50 (Daphnia magna (Water flea)): > 500 mg/l Exposure time: 48 h
Toxicity to algae:	EC50 (Desmodesmus subspicatus (green algae)): > 500 mg/l Exposure time: 72 h NOEC (Desmodesmus subspicatus (green algae)): 31.25 mg/l Exposure time: 72 h
Toxicity to bacteria:	IC50 : 4,518 mg/l Exposure time: 40 h

12.2 Persistence and degradability

< bis(2-(2-methoxyethoxy)ethyl)ether >

Biodegradability:	Result: Inherently biodegradable. Biodegradation: > 70 % Exposure time: 28 d Method: OECD Test Guideline 302B Remarks: Based on data from similar materials
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<Propylene carbonate>

Biodegradability:	Result: Readily biodegradable Biodegradation: 87.7 % Exposure time: 29 d Method: OECD Test Guideline 301B
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<γ-butyrolactone>

Biodegradability:	Result: Readily biodegradable. Biodegradation: 77 % Exposure time: 14 d Method: OECD Test Guideline 301C
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12.3 Bioaccumulative potential

< bis(2-(2-methoxyethoxy)ethyl)ether >

Partition coefficient: n-octanol/water: log Pow: -0.84

<Propylene carbonate>

Partition coefficient: n-octanol/water: log Pow: -0.41

<γ-butyrolactone>

Partition coefficient: n-octanol/water: log Pow: -0.566

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Not relevant

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product:	Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
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Contaminated packaging:	Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not burn, or use a cutting torch on, the empty drum.
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14. TRANSPORT INFORMATION

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

15. REGULATORY INFORMATION

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

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals: Not applicable

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).: Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer: Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants: Not applicable

Seveso II - Directive 2003/105/EC amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances: Not applicable

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out.

16. OTHER INFORMATION

Full text of R-Phrases

R22:Harmful if swallowed.

R36:Irritating to eyes.

R41:Risk of serious damage to eyes.

R61:May cause harm to the unborn child.

R62:Possible risk of impaired fertility.

R67:Vapours may cause drowsiness and dizziness.

Full text of H-Statements

H302: Harmful if swallowed.

H318: Causes serious eye damage.

H319: Causes serious eye irritation.

H336:May cause drowsiness or dizziness.

H360Df:May damage the unborn child. Suspected of damaging fertility.

Full text of other abbreviations

Acute Tox. :	Acute toxicity.
Eye Dam.:	Serious eye damage.
Eye Irrit.	Eye irritation
Repr.	Reproductive toxicity
STOT SE:	Specific target organ toxicity - single exposure.

Further information

Sources of key data used to compile the Safety Data Sheet:

Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.