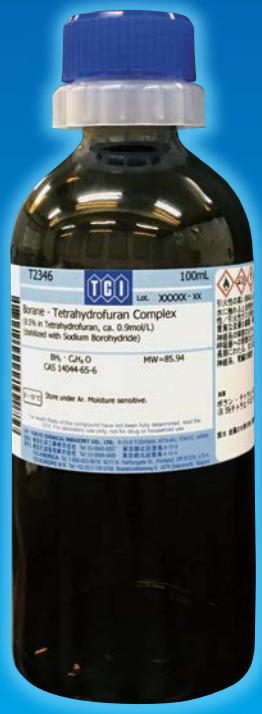
CHEMISTRY MATERIALS ANALYTICAL

DualSeal
Airtight-Double-Cap Bottled Reagents



- Volatile Solutions
- Metallic Salt Solutions
- Dehydrated Solvents
- Organometallic Reagents
- Other Reagents

DualSeal
Airtight-Double-Cap Bottled Reagents

TCI introduced our newly developed double cap system "DualSeal" for moisture/oxygen-sensitive products, allowing you to keep them in good condition until the last drop. We will continuously increase our usage of DualSeal across our product portfolio.

Features of DualSeal

- Highly airtight double cap structure.
- Air-sensitive reagents can be safely dispensed without exposure to air.
- Even after piercing the septum cap, the PTFE sheet on the blue outer cap provides sealing protection.
- Easy to dispose of caps and bottles separately.

Outer cap (Blue)

DualSeal specification

DualSeal consists of two parts: the blue outer cap and the white septum cap, both of which can be screwed on and off.

No additional sealing is required after piercing the septum cap with a needle. Just screw the outer cap back in place.

The outer cap has a convex structure on the inside. By filling the space where air and moisture stay, the material is protected from moisture and oxygen even after piercing the septum cap with a needle.

Caution

Do not dispose of the inlaid PTFE sheet! Keep it as it is during use! This PTFE sheet acts as a second layer air seal.

Septum cap (white)

The white septum cap has a wide septum surface for ease of use, and features two layers of rubber and a highly chemically resistant PTFE seal. The septum cap body is made of polypropylene and contains a screw thread allowing for easy removal from the bottle. The septum cap is closed with high torque to ensure an airtight seal. Open the septum cap only when all of the liquid has been used up and you want to prepare for the disposal of the bottle.

Caution

Do not place anything on the septum cap! This will significantly reduce seal quality. The cap and bottle can be separated for disposal. It is easy to dispose of caps and bottles separately. Highly reactive reagents may be residing inside the cap. Please take the necessary precautions to avoid accidents due to exposure to oxygen or moisture. Dispose of the bottle and the caps separately after ensuring that no chemical residue is left behind.

How to use DualSeal

In case using a needle (1):

Solvents except for Halogenated hydrocarbon solvents

1. Clamp and secure the reagent bottle before opening.
2. Carefully unscrew the blue outer cap only. Place the cap near the bottle while in use.
3. To prevent air from entering the container, insert a needle with a balloon filled with an inert gas such as argon or nitrogen. Then insert a syringe needle through the septum surface of the septum cap.
4. Fill the syringe with the required amount of liquid.
5. Remove the syringe, inject the liquid into your reaction vessel and safely dispose of the needle.
6. Take the outer cap and screw it tightly back in place.

*Repeated use can lead to increasing the number of holes or increasing the size of existing holes and will over time lead to an increase in air leakage. To prevent deterioration of the septum, reduce the number of injections as much as possible, or purchase a smaller sized bottle.

Please inquire for pricing and availability of listed products to our local sales representatives.

In case using a needle (2): Halogenated hydrocarbon solvents such as dichloromethane

1. Clamp and secure the reagent bottle before opening.
2. Carefully unscrew the blue outer cap only. Place the cap near the bottle while in use.
3. Attach a needle to the PTFE tube for liquid delivery connected to the reaction vessel filled with the inert gas. Puncture the septum with the needle so that the needle tip reaches the bottom of the reagent bottle.
4. A syringe filled with an inert gas or a needle connected to an inert gas pump punctures the septum, and the inert gas is sent into the void of the reagent bottle to send the liquid.
5. Remove the needle of the liquid feeding tube first, and then remove the needle that was feeding the inert gas.
6. Take the outer cap and screw it tightly back in place. However, it is recommended that the minimum number of removals be made, as the holes will be degraded by the vapor of the halogenated hydrocarbon solvent.

How to remove the septum cap

Open the septum cap only when all of the liquid has been used up and you want to prepare for the disposal of the bottle.

1. Clamp and secure the bottle before opening.
2. Open the septum cap by unscrewing. (The septum cap is tightly closed with high torque to ensure airtightness. Using tools such as water pump pliers is recommended.)

*Do not remove the outer cap when you remove the septum cap. Take extra care to avoid any spillage of inner liquid.

Notes on bottle disposal

The cap and bottle can be separated for disposal.

- Remove DualSeal by referring to "How to remove the septum cap".
- Highly reactive reagents may be residing inside the cap. Please take the necessary precautions to avoid accidents due to exposure to oxygen or moisture.
- Dispose of the bottle and the caps separately after ensuring that no chemical residue is left behind.

DualSeal Sealability Test: Moisture Analysis

In order to evaluate the sealability of DualSeal, we periodically measure and monitor the moisture increment by Karl Fischer method after piercing the septum of a 500 mL bottle by a needle.

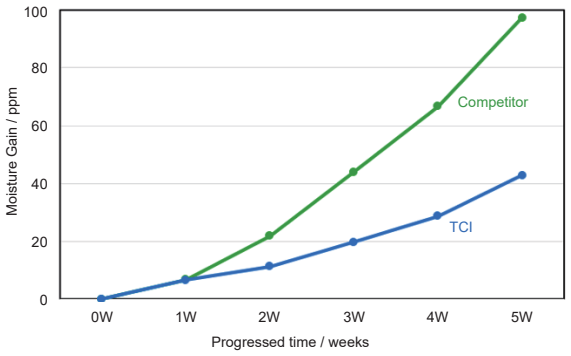
Measurement condition

500 mL anhydrous tetrahydrofuran (TCI product number: T2394) was compared with a competitor's 500 mL anhydrous tetrahydrofuran.

The septum moiety was pierced using an 18 gauge needle at 4 different positions every week (in total, 20 different positions pierced in 5 weeks).

After piercing, the sample solvent was taken and the water content was measured by the Karl Fischer method.

After sampling, the septum was sealed by an outer cap with 1.5 Nm torque and the sealed bottle was stored in a closed environment at *ca*. 24 °C, *ca*. 75 % RH (relative humidity).



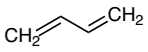
Periodical measurement to monitor moisture increment every week (5 weeks in total) showed a remarkable difference in the water content (in ppm) between TCI and the competitor's samples. This result indicates that the PTFE sheet inside the outer cap can tightly seal the septum and the outer cap.

As a result, use of the DualSeal can maintain the quality of product in a sealed bottle for a long time.

* Not available for smaller than the 100 mL or 100 g size bottles.
* We are not selling the DualSeal cap itself.
* Since the septum cap part of DualSeal contains butyl rubbers, it is not durable enough for halogenated hydrocarbon solvents such as dichloromethane. Accordingly, the minimum number of needle punctures is recommended, as it is possibly degraded by the vapor of the solvent once a hole is made.

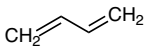
Volatile Solutions

B4358 100mL 500mL



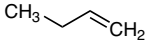
1,3-Butadiene
(*ca.* 15% in Hexane)
CAS RN: 106-99-0

B4359 100mL 500mL



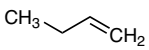
1,3-Butadiene
(*ca.* 15% in Toluene)
CAS RN: 106-99-0

B4410 500mL



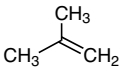
1-Butene(*ca.* 10% in Hexane)
CAS RN: 106-98-9

B4411 100mL



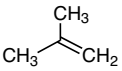
1-Butene (*ca.* 10% in Toluene)
CAS RN: 106-98-9

I0909 100mL 500mL



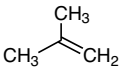
Isobutene
(*ca.* 8% in Dichloromethane)
CAS RN: 115-11-7

I0910 100mL



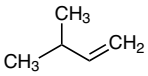
Isobutene
(*ca.* 10% in Isopropyl Ether)
CAS RN: 115-11-7

I0911 100mL 500mL



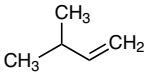
Isobutene
(*ca.* 15% in Tetrahydrofuran)
CAS RN: 115-11-7

M2563 100mL 500mL



Isoamylene
(*ca.* 15% in Dichloromethane, *ca.* 2.5mol/L)
CAS RN: 563-45-1

M2565 100mL



Isoamylene
(*ca.* 12.5% in Tetrahydrofuran, *ca.* 1.5mol/L)
CAS RN: 563-45-1

P2295 100mL 500mL

$CH_3-C\equiv CH$

Propyne (*ca.* 5% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 74-99-7

P2847 100mL 500mL

$CH_2=C=CH_2$

Allene (*ca.* 2% in Tetrahydrofuran, *ca.* 0.4 mol/L)
CAS RN: 463-49-0

M2813 100mL

CH_3Cl

Methyl Chloride (*ca.* 5.7% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 74-87-3

T3957 100mL

CF_3I

Trifluoroiodomethane (*ca.* 10% in Tetrahydrofuran, *ca.* 0.5mol/L)
CAS RN: 2314-97-8

T3958 100mL

CF_3I

Trifluoroiodomethane
(*ca.* 10% in Dimethyl Sulfoxide, *ca.* 0.6mol/L)
CAS RN: 2314-97-8

C2882 100mL

CH_3CH_2Cl

Chloroethane (*ca.* 17% in Ethyl Ether, *ca.* 2.0mol/L)
CAS RN: 75-00-3

C2883 100mL 500mL

CH_3CH_2Cl

Chloroethane (*ca.* 15% in Tetrahydrofuran, *ca.* 2.0mol/L)
CAS RN: 75-00-3

V0126 100mL

$CH_2=CHBr$

Vinyl Bromide (*ca.* 14% in Ethyl Ether, *ca.* 1.0mol/L)
CAS RN: 593-60-2

V0127 100mL

$CH_2=CHBr$

Vinyl Bromide (*ca.* 12% in Tetrahydrofuran, *ca.* 1.0mol/L)
CAS RN: 593-60-2

M1016 500mL

CH_3NH_2

Methylamine
(40% in Methanol, *ca.* 9.8mol/L)
CAS RN: 74-89-5

M2323 100mL

CH_3NH_2

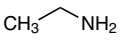
Methylamine
(*ca.* 9% in Ethanol, *ca.* 2mol/L)
CAS RN: 74-89-5

M2108 100mL 500mL

CH_3NH_2

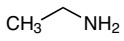
Methylamine (*ca.* 7% in Tetrahydrofuran, *ca.* 2mol/L)
CAS RN: 74-89-5

E0531 100mL



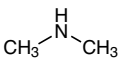
Ethylamine
(30-40% in Methanol)
CAS RN: 75-04-7

E0817 100mL



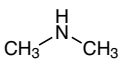
Ethylamine
(30-40% in Ethanol)
CAS RN: 75-04-7

D3948 100mL



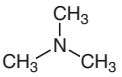
Dimethylamine (*ca.* 10% in Tetrahydrofuran, *ca.* 2mol/L)
CAS RN: 124-40-3

D4198 100mL



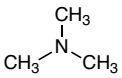
Dimethylamine (*ca.* 11% in Alcohol, *ca.* 2mol/L)
CAS RN: 124-40-3

T2704 100mL



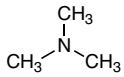
Trimethylamine (*ca.* 13% in Tetrahydrofuran, *ca.* 2mol/L)
CAS RN: 75-50-3

T3567 100mL 500mL



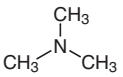
Trimethylamine (*ca.* 13% in Acetonitrile, *ca.* 2mol/L)
CAS RN: 75-50-3

T3614 100mL



Trimethylamine (*ca.* 8% in Toluene, *ca.* 1mol/L)
CAS RN: 75-50-3

T2268 100mL



Trimethylamine (*ca.* 25% in Methanol, *ca.* 3.2mol/L)
CAS RN: 75-50-3

A1884 100mL

NH_3

Ammonia (*ca.* 4% in Methanol, *ca.* 2.0mol/L)
CAS RN: 7664-41-7

A2236 100mL 500mL

NH_3

Ammonia (*ca.* 4% in Ethanol, *ca.* 2.0mol/L)
CAS RN: 7664-41-7

A2237 100mL

NH_3

Ammonia (*ca.* 4% in Isopropyl Alcohol, *ca.* 2.0mol/L)
CAS RN: 7664-41-7

H1060 500mL

HCl

Hydrogen Chloride
(*ca.* 1mol/L in Ethyl Acetate)
CAS RN: 7647-01-0

H1061 100mL

HCl

Hydrogen Chloride
(*ca.* 1mol/L in Ethyl Ether)
CAS RN: 7647-01-0

H1062 500mL

HCl

Hydrogen Chloride
(*ca.* 4mol/L in 1,4-Dioxane)
CAS RN: 7647-01-0

H1277 500mL

HCl

Hydrogen Chloride
(*ca.* 16% in Cyclopentyl Methyl Ether, *ca.* 4mol/L)
CAS RN: 7647-01-0

X0041 100mL 500mL

Hydrogen Chloride - Methanol Reagent (5-10%) [for Esterification]
CAS RN: 7647-01-0

H0959 100mL 500mL

Hydrogen Bromide - Ethanol Reagent (10-20%) [for Esterification]
CAS RN: 10035-10-6

Please inquire for pricing and availability of listed products to our local sales representatives.

U0147 100mL

SO_2

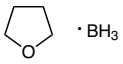
Sulfur Dioxide (*ca.* 8% in Tetrahydrofuran, *ca.* 1.2 mol/L)
CAS RN: 7446-09-5

U0148 100mL

SO_2

Sulfur Dioxide (*ca.* 2.5% in Dichloromethane, *ca.* 0.5 mol/L)
CAS RN: 7446-09-5

T2346 100mL 500mL



Tetrahydrofuran Borane (8.5% in Tetrahydrofuran, *ca.* 0.9mol/L) (stabilized with Sodium Borohydride)
CAS RN: 14044-65-6

Metallic Salt Solutions

L0186 100mL

$LiBH_4$

Lithium Borohydride (*ca.* 4mol/L in Tetrahydrofuran)
CAS RN: 16949-15-8

L0222 100mL

LiCl

Lithium Chloride (2.3% in Tetrahydrofuran, *ca.* 0.5mol/L)
CAS RN: 7447-41-8

T2052 100mL 500mL

$TiCl_4$

Titanium(IV) Chloride (14% in Dichloromethane, *ca.* 1.0mol/L)
CAS RN: 7550-45-0

T2053 100mL

$SnCl_4$

Tin(IV) Chloride (*ca.* 1.0mol/L in Dichloromethane)
CAS RN: 7646-78-8

Z0019 100mL

$ZnCl_2$

Zinc Chloride (*ca.* 7% in Tetrahydrofuran, *ca.* 0.5mol/L)
CAS RN: 7646-85-7

Z0020 100mL

$ZnCl_2$

Zinc Chloride (*ca.* 25% in 2-Methyltetrahydrofuran, *ca.* 2mol/L)
CAS RN: 7646-85-7

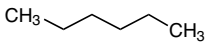
Dehydrated Solvents

D3478 500mL

CH_2Cl_2

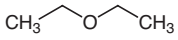
Dichloromethane Anhydrous (stabilized with 2-Methyl-2-butene)
CAS RN: 75-09-2

H1197 500mL



Hexane Anhydrous
CAS RN: 110-54-3

D3479 500mL



Diethyl Ether Anhydrous (stabilized with BHT)
CAS RN: 60-29-7

T2394 500mL

Tetrahydrofuran Anhydrous (stabilized with BHT)
CAS RN: 109-99-9

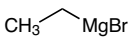
Organometallic Reagents

M0362 250g

CH_3MgBr

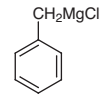
Methylmagnesium Bromide (12% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 75-16-1

E0134 250g



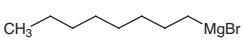
Ethylmagnesium Bromide (39% in Ethyl Ether, *ca.* 3mol/L)
CAS RN: 925-90-6

B1933 250g



Benzylmagnesium Chloride (*ca.* 16% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 6921-34-2

O0240 250g



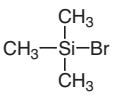
n-Octylmagnesium Bromide (*ca.* 22% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 17049-49-9

S0467 100g 500g

$NaAl(OCH_2CH_2OCH_3)_2H_2$

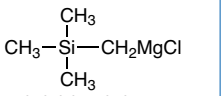
Sodium Bis(2-methoxyethoxy)-aluminum Dihydride (70% in Toluene, *ca.* 3.6mol/L)
CAS RN: 22722-98-1

B1087 250mL



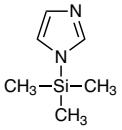
Bromotrimethylsilane
CAS RN: 2857-97-8

T1451 100mL



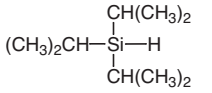
Trimethylsilylmethylmagnesium Chloride (20% in Ethyl Ether, *ca.* 1mol/L)
CAS RN: 13170-43-9

T0585 100g



N-Trimethylsilylimidazole
CAS RN: 18156-74-6

T1533 100mL



Triisopropylsilane
CAS RN: 6485-79-6

D3214 100mL 500mL

$Zn(CH_2CH_3)_2$

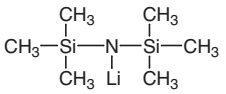
Diethylzinc (*ca.* 15% in Hexane, *ca.* 1mol/L)
CAS RN: 557-20-0

D3902 100mL

$Zn(CH_2CH_3)_2$

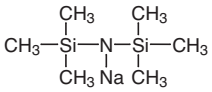
Diethylzinc (*ca.* 15% in Toluene, *ca.* 1mol/L)
CAS RN: 557-20-0

H0915 100mL 500mL



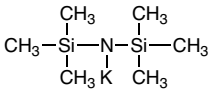
LiHMDS (*ca.* 26% in Tetrahydrofuran, *ca.* 1.3mol/L)
CAS RN: 4039-32-1

H0894 100mL 500mL



NaHMDS (contains 2-Methyl-2-butene) (38% in Tetrahydrofuran, *ca.* 1.9mol/L)
CAS RN: 1070-89-9

P2730 100mL



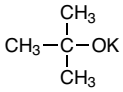
KHMDS
(14% in Toluene, *ca.* 0.6mol/L)
CAS RN: 40949-94-8

S0486 100mL 500mL

CH_3ONa

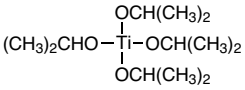
Sodium Methoxide
(*ca.* 5mol/L in Methanol)
CAS RN: 124-41-4

P1619 100mL 500mL



Potassium *tert*-Butoxide
(12% in Tetrahydrofuran, *ca.* 1mol/L)
CAS RN: 865-47-4

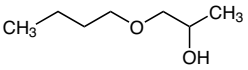
T0133 500g



Tetraisopropyl Orthotitanate
CAS RN: 546-68-9

Other Reagents

B0864 500mL



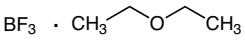
1-Butoxy-2-propanol
CAS RN: 5131-66-8

D1843 100mL

$CH_3SCH_3 \cdot BH_3$

Dimethyl Sulfide Borane
CAS RN: 13292-87-0

B0527 100mL 500mL



Boron Trifluoride - Ethyl Ether Complex
CAS RN: 109-63-7

B2074 500mL

$BF_3 \cdot [CH_3(CH_2)_3]_2O$

Boron Trifluoride - Butyl Ether Complex (BF_3 *ca.* 30%)
CAS RN: 593-04-4

* Not available for smaller than the 100 mL or 100 g size bottles.
* We are not selling the DualSeal cap itself.
* Since the septum cap part of DualSeal contains butyl rubbers, it is not durable enough for halogenated hydrocarbon solvents such as dichloromethane. Accordingly, the minimum number of needle punctures is recommended, as it is possibly degraded by the vapor of the solvent once a hole is made.

Please inquire for pricing and availability of listed products to our local sales representatives.

Ordering and Customer Service

TCI AMERICA
Tel : 800-423-8616 / 503-283-1681
Fax : 888-520-1075 / 503-283-1987
E-mail : Sales-US@TCIchemicals.com

TCI EUROPE N.V.
Tel : +32 (0)3 735 07 00
Fax : +32 (0)3 735 07 01
E-mail : Sales-EU@TCIchemicals.com

TCI Deutschland GmbH
Tel : +49 (0)6196 64053-00
Fax : +49 (0)6196 64053-01
E-mail : Sales-DE@TCIchemicals.com

Tokyo Chemical Industry UK Ltd.
Tel : +44 (0)1865 784560
E-mail : Sales-UK@TCIchemicals.com

TCI Chemicals (India) Pvt. Ltd.
Tel : 1800 425 7889 / 044-2262 0909
Fax : 044-2262 8902
E-mail : Sales-IN@TCIchemicals.com

梯希爱(上海)化成工业发展有限公司
Tel : 800-988-0390 / 021-67121386
Fax : 021-6712-1385
E-mail : Sales-CN@TCIchemicals.com

TOKYO CHEMICAL INDUSTRY CO., LTD.
Tel : +81 (0)3-5640-8878
E-mail : globalbusiness@TCIchemicals.com