

Material Safety Data Sheet
TOLLEN'S REAGENT KIT
(AMMONIACAL SILVER NITRATE)

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION & COMPANY

Product Name TOLLEN'S REAGENT KIT
(AMMONIACAL SILVER NITRATE)

Product Code 62068X

Supplier Clin-Tech Limited
Unit G, Perram Works
Merrow Lane
Guildford, Surrey
GU4 7BN

Telephone 01483 301902
Fax 01483 301907
e-mail / Website Info@clin-tech.co.uk / www.clin-tech.co.uk

2. COMPOSITION / INFORMATION ON INGREDIENTS

The Clin-Tech Tollen's Reagent kit is presented as a two-part kit containing the following:

62068a	10 % Silver Nitrate	10 mL	Xi, R36/37/38 R52/53
62068b	Sodium Hydroxide 0.083M Ammonium Hydroxide 0.694%	90 mL	

The MSDSs for these reagents are presented separately in the following pages along with a Kit Insert (Directions for Use).

3. HAZARDS IDENTIFICATION

CLASSIFICATION Xi; R36/37/38
R52/53

- Irritating to eyes, respiratory system and skin
- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Material Safety Data Sheet
TOLLEN'S REAGENT KIT
(AMMONIACAL SILVER NITRATE)

14. TRANSPORT INFORMATION

**RID / ADR**

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.

IMDG

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.
Marine Pollutant:	Yes

IATA

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.

15. REGULATORY INFORMATION

LABELLING



Irritant

RISK PHRASES

R36/37/38	Irritating to eyes, respiratory system and skin
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

SAFETY PHRASES

S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S45	In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/safety data sheet

STATUTORY INSTRUMENTS

Control of Substances Hazardous to Health. Chemicals (Hazard Information and Packaging) Regulations.

GUIDANCE NOTES

CHIP for everyone HSG(108). Workplace Exposure Limits EH40.

16. OTHER INFORMATION**GENERAL INFORMATION**

This safety data sheet covers all codes for this product.

REVISION COMMENTS

R-phrases reassessed

Shipping instructions reassessed

REVISION DATE 06-2009

REV. NO./REPL. SDS GENERATED 2 / 06-2009

RISK PHRASES IN FULL

R36/37/38 Irritating to eyes, respiratory system and skin

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION & COMPANY

Product Name TOLLEN'S REAGENT 'A' (SILVER NITRATE 10%)
Product Code 62068a
Supplier Clin-Tech Limited
Unit G, Perram Works
Merrow Lane
Guildford, Surrey
GU4 7BN
Telephone 01483 301902
Fax 01483 301907
e-mail / Website Info@clin-tech.co.uk / www.clin-tech.co.uk

2. COMPOSITION / INFORMATION ON INGREDIENTS

Name	EC No.	CAS-No.	Content	Classification
SILVER NITRATE	231-853-9	7761-88-8	10-25%	O; R8 C; R34 N; R50/53

The Full Text for all R-Phrases are Displayed in Section 16

3. HAZARDS IDENTIFICATION

CLASSIFICATION Xi; R36/37/38
R52/53

- Irritating to eyes, respiratory system and skin
- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. FIRST-AID MEASURES**INHALATION**

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

INGESTION

DO NOT INDUCE VOMITING! Rinse mouth thoroughly. Get medical attention.

SKIN CONTACT

Remove contaminated clothing. Wash skin thoroughly with soap and water. Call a physician.

EYE CONTACT

Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eyelids. Continue to rinse for at least 15 minutes. Get medical attention.

5. FIRE-FIGHTING MEASURES**EXTINGUISHING MEDIA**

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL FIRE FIGHTING PROCEDURES

Keep run-off water out of sewers and water sources. Dike for water control. Emits toxic fumes under combustion.

6. ACCIDENTAL RELEASE MEASURES**PERSONAL PRECAUTIONS**

Wear protective clothing as described in Section 8 of this safety data sheet.

SPILL CLEAN UP METHODS

Absorb in vermiculite, dry sand or earth and place into containers. Flush area with water. Do not let washing down water contaminate ponds or waterways.

7. HANDLING & STORAGE**HANDLING**

Avoid contact with skin and eyes. Wash hands thoroughly after using material. Contaminated clothing should be removed and decontaminated before reuse.

STORAGE PRECAUTIONS

Store in tightly closed original container in a cool, dry well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**PROTECTIVE EQUIPMENT****ENGINEERING MEASURES**

Safety shower and eye bath.

HAND PROTECTION

For prolonged or repeated skin contact use suitable protective gloves. The most suitable glove must be chosen in consultation with the glove supplier, who can inform about the breakthrough time of the glove material.

EYE PROTECTION

Wear approved, tight fitting safety glasses where splashing is probable.

HYGIENE MEASURES

DO NOT SMOKE IN WORK AREA! Wash at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes contaminated. Wash promptly with soap & water if skin becomes contaminated.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Colourless Liquid
ODOUR	No characteristic odour.
SOLUBILITY	Soluble in water
BOILING POINT	~ 100°C 760 mm Hg
RELATIVE DENSITY	~ 1.01 @ 20°C

10. STABILITY AND REACTIVITY**STABILITY**

Stable under normal temperature conditions and recommended use.

Avoid light.

Avoid alcohols, ammonia, magnesium, strong bases, strong reducing reagents.

11. TOXICOLOGICAL INFORMATION**INHALATION**

May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

INGESTION

May be harmful if swallowed. Ingestion can cause severe gastroenteritis that may be fatal.

SKIN CONTACT

May be harmful if absorbed through the skin.

EYE CONTACT

Causes burns.

12. ECOLOGICAL INFORMATION**ECOTOXICITY**

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS**DISPOSAL METHODS**

Dispose of waste and residues in accordance with local authority requirements.

14. TRANSPORT INFORMATION

**RID / ADR**

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.

IMDG

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.
Marine Pollutant:	Yes

IATA

UN#	1760
Class	8
PG	III
Proper shipping name:	Corrosive Liquid, n.o.s.

15. REGULATORY INFORMATION

LABELLING



Irritant

RISK PHRASES

R36/37/38	Irritating to eyes, respiratory system and skin
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

SAFETY PHRASES

S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S45	In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/safety data sheet

STATUTORY INSTRUMENTS

Control of Substances Hazardous to Health. Chemicals (Hazard Information and Packaging) Regulations.

GUIDANCE NOTES

CHIP for everyone HSG(108). Workplace Exposure Limits EH40.

16. OTHER INFORMATION**GENERAL INFORMATION**

This safety data sheet covers all codes for this product.

REVISION COMMENTS

R phrases reassessed

Shipping instructions reassessed

REVISION DATE

06-2009

REV. NO./REPL. SDS GENERATED

3 / 06-2009

RISK PHRASES IN FULL

R8	Contact with combustible material may cause fire
R34	Causes burns
R36/37/38	Irritating to eyes, respiratory system and skin
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION & COMPANY

Product Name TOLLEN'S REAGENT 'B'

Product Code 62068b

Supplier Clin-Tech Limited
Unit G, Perram Works
Merrow Lane
Guildford, Surrey
GU4 7BN

Telephone 01483 301902
Fax 01483 301907
e-mail / Website Info@clin-tech.co.uk / www.clin-tech.co.uk

2. COMPOSITION / INFORMATION ON INGREDIENTS

Name	EC No.	CAS-No.	Content	Classification
SODIUM HYDROXIDE	215-185-5	1310-73-2	0-0.5%	C; R35
AMMONIUM HYDROXIDE	215-647-6	1336-21-6	0-1%	C; R30 N; R50

The Full Text for all R-Phrases are Displayed in Section 16

3. HAZARDS IDENTIFICATION**CLASSIFICATION**

This product has no hazard classification.

4. FIRST-AID MEASURES**INHALATION**

Move the exposed person to fresh air at once. Get medical attention if any discomfort occurs.

INGESTION

DO NOT INDUCE VOMITING! Rinse mouth thoroughly. Get medical attention if any discomfort continues.

SKIN CONTACT

Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if symptoms occur after washing.

EYE CONTACT

Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eyelids. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.

5. FIRE-FIGHTING MEASURES**EXTINGUISHING MEDIA**

Use: Water spray, fog or mist. Dry chemicals, sand, dolomite etc.

6. ACCIDENTAL RELEASE MEASURES**PERSONAL PRECAUTIONS**

Wear protective clothing as described in Section 8 of this safety data sheet.

SPILL CLEAN UP METHODS

Absorb in vermiculite, dry sand or earth and place into containers. Flush area with water.

7. HANDLING & STORAGE**USAGE PRECAUTIONS**

Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapours. Use approved respirator if air contamination is above accepted level.

STORAGE PRECAUTIONS

Store in tightly closed original container in a cool, dry well-ventilated place.

STORAGE CLASS

Chemical storage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**PROTECTIVE EQUIPMENT****ENGINEERING MEASURES**

Well-ventilated area. Provide explosion proof ventilation for high concentrations.

RESPIRATORY EQUIPMENT

No specific recommendation made, but respiratory protection must be used if the general level exceeds the Recommended Workplace Exposure Limit.

HAND PROTECTION

For prolonged or repeated skin contact use suitable protective gloves. The most suitable glove must be chosen in consultation with the gloves supplier, who can inform about the breakthrough time of the glove material.

EYE PROTECTION

Wear approved, tight fitting safety glasses where splashing is probable.

HYGIENE MEASURES

Wash at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes contaminated. Wash promptly with soap & water if skin becomes contaminated.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Colourless Liquid
ODOUR	Faint smell of ammonia
SOLUBILITY	Soluble in water.
RELATIVE DENSITY	~ 1.0 @ 20°C

10. STABILITY AND REACTIVITY**STABILITY**

Stable under normal temperature conditions and recommended use.

11. TOXICOLOGICAL INFORMATION**INHALATION**

Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

INGESTION

May be harmful if swallowed.

SKIN CONTACT

May be harmful if absorbed through the skin.

EYE CONTACT

May cause eye irritation.

12. ECOLOGICAL INFORMATION**ECOTOXICITY**

The product is not expected to be hazardous to the environment.

13. DISPOSAL CONSIDERATIONS**DISPOSAL METHODS**

Dispose of waste and residues in accordance with local authority requirements.

14. TRANSPORT INFORMATION

GENERAL The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

15. REGULATORY INFORMATION

RISK PHRASES

NC Not Classified

SAFETY PHRASES

S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)

STATUTORY INSTRUMENTS

Control of Substances Hazardous to Health. Chemicals (Hazard Information and Packaging) Regulations.

GUIDANCE NOTES

CHIP for everyone HSG(108). Workplace Exposure Limits EH40.

16. OTHER INFORMATION

GENERAL INFORMATION

This safety data sheet covers all codes for this product.

REVISION COMMENTS

New MSDS

REVISION DATE

06-2009

REV. NO./REPL. SDS GENERATED

1 / New MSDS

RISK PHRASES IN FULL

R30	Can become highly flammable in use
R35	Causes severe burns
R50	Very toxic to aquatic organisms

CLIN-TECH LIMITED

TOLLEN'S REAGENT

IVD

Product Code 62068



INTENDED USE

The Clin-Tech Tollen's Reagent kit is designed for detecting aldehydes. It produces a 'silver mirror' in the presence of aldehydes, but not in the presence of ketones.

Silver mirror reactions are used in the Fontana-Masson argentaffin reaction test, wherein the reducing groups (such as aldehydes) in cells are stained by metallic silver deposits.

KIT PRESENTATION

<input type="checkbox"/> Reagent 'A'	10 mL
- 10 % Silver nitrate	
<input type="checkbox"/> Reagent 'B'	90 mL
- 0.694 % Ammonium Hydroxide	
- 0.083 M Sodium Hydroxide	

Do not use beyond the expiry date printed on the reagent label.

Concentrations when reconstituted 1 part 'A' to 9 parts 'B':

1 %	Silver Nitrate
0.625 %	Ammonium Hydroxide
0.075 M	Sodium Hydroxide

PROTOCOL: SILVER MIRROR TEST

Preparation

- 1) Mix together 1 part Reagent 'A' and 9 parts Reagent 'B'. Alternatively, add all of Reagent 'A' to the Reagent 'B' bottle.
- 2) Mix by inverting 3-4 times.

Method

- 3) Add a couple of drops of test solution (or crystals) to approximately 5mL reconstituted Tollen's Reagent in a glass test-tube.
- 4) Mix and allow to stand for a few minutes.

PROTOCOL: ARGENTAFFIN TEST

Also required:

0.2 % Gold Chloride solution	64121X
5% Sodium Thiosulphate solution	64131X
Nuclear Fast Red	64242X

Preparation

- 1) Reconstitute Tollen's Reagent as above. Dilute 1 part reconstituted Tollen's Reagent with 3 parts purified water.
- 2) Deparaffinise slides and hydrate.

Method

- 3) Warm diluted Tollen's Reagent to 60-70 °C. Immerse slides in warm diluted Tollen's Reagent for 5 min. Alternatively, immerse slides in unheated diluted Tollen's Reagent for 2 hours. Check slides under a microscope for silver impregnation.
- 4) Rinse slides in purified water.
- 5) Tone sections in gold chloride for 5-10 sec.
- 6) Rinse in purified water.
- 7) Immerse in sodium thiosulphate solution for 1 min.
- 8) Rinse in purified water.
- 9) Counterstain in Nuclear Fast Red (Kernechtrot) for 5 min.
- 10) Rinse in purified water, dehydrate in ethanol and mount in a synthetic medium.

RESULTS

A positive result for aldehydes gives metallic silver (or sometimes a black precipitate), which deposits on the sides of the glass test-tube and surface of the solution, resembling a silver mirror. Ketones require a stronger oxidising agent and therefore do not give this result (except in the case of alpha-hydroxy ketones).

Reducing groups in cells are stained black by the silver, as is melanin. Argentaffin granules are seen in carcinoid tumours. Non-tumour cells which secrete serotonin (i.e. GI-tract epithelial cells) also take up the stain.

Argentaffin granules	black
Serotonin-producing cells / Melanin	black
Nuclei	pink-red
Cytoplasm	pale pink

STORAGE AND STABILITY

Once reconstituted, Tollen's reagent is only stable for a matter of hours (up to 12 hours) and should therefore be made up on the day of use.

TOLLEN'S REAGENT MAY DEGRADE TO FORM POTENTIALLY EXPLOSIVE SILVER NITRIDE. EXCESS SOLUTION AND WASTE (INCLUDING SAMPLES) SHOULD BE DENATURED WITH TWO – FOUR VOLUMES OF DILUTE ACID OR SATURATED SODIUM CHLORIDE SOLUTION, THEN DISCARDED IN LINE WITH LOCAL REGULATIONS REGARDING HEAVY METAL DISPOSAL.

Bancroft, J.D. and Gamble, M. *Theory and Practice of Histological Techniques* (2008) 6th ed. pp 293-4.

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