

SAFETY DATA SHEET

Revision: 3.0 Date: 16 January 2017


ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

- 1.1 Product identifier**
Product Name M-Bond Curing Agent 600/610
- 1.2 Relevant identified uses of the substance or mixture and uses advised against**
Identified Use(s) Adhesives.
Uses Advised Against Anything other than the above.
- 1.3 Details of the supplier of the safety data sheet**
Company Identification VISHAY MEASUREMENTS GROUP UK LTD
Stroudley Road
Basingstoke
Hampshire
RG24 8FW
United Kingdom
Telephone +44 (0) 1256 462131
Fax +44 (0) 1256 471441
E-Mail (competent person) mm.uk@vishaypg.com
- 1.4 Emergency telephone number**
Emergency Phone No. (00-1) 703-527-3887 CHEMTREC (24 hours)
Languages spoken All official European languages.

SECTION 2: HAZARDS IDENTIFICATION

- 2.1 Classification of the substance or mixture**
- 2.1.1 Regulation (EC) No. 1272/2008 (CLP)**
Flam. Liq. 2; H225
Acute Tox. 4; H302
Skin Sens. 1; H317
Eye Dam. 1; H318
Resp. Sens. 1; H334
STOT SE 3; H335
Carc. 2; H351
- 2.2 Label elements**
Product Name M-Bond Curing Agent 600/610
Contains: Tetrahydrofuran and 1,2,4,5-Benzenetetracarboxylic Dianhydride
- Hazard Pictogram(s)
- 
- Signal Word(s) DANGER
- Hazard Statement(s)
H225: Highly flammable liquid and vapour.
H302: Harmful if swallowed.
H317: May cause an allergic skin reaction.
H318: Causes serious eye damage.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335: May cause respiratory irritation.
H351: Suspected of causing cancer.
- Precautionary Statement(s)
P210: Keep away from heat, hot surfaces, sparks, open flames and other

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
P304+P341: IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

P342 + P311: If experiencing respiratory symptoms: Call a POISON CENTER/doctor/

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310: Immediately call a POISON CENTER/doctor.

Supplemental information

EUH019: May form explosive peroxides.

2.3 Other hazards

None known.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**3.1 Substances** Not applicable**3.2 Mixtures**

EC Classification Regulation (EC) No. 1272/2008 (CLP)

Chemical identity of the substance	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard Statement(s)
Tetrahydrofuran [^]	85 - 90	109-99-9	203-726-8	Not yet assigned in the supply chain	Flam. Liq. 2; H225 Acute Tox. 4; H302 Eye Irrit. 2; H319 (SCL ≥ 25%) STOT SE 3; H335 (SCL ≥ 25%) Carc. 2; H351 EUH019
1,2,4,5-Benzenetetracarboxylic Dianhydride	<10	89-32-7	201-898-9	Not yet assigned in the supply chain	Skin Sens. 1; H317 Eye Dam. 1; H318 Resp. Sens. 1; H334

For full text of H/P Statements see section 16. [^]Substance with a national exposure limit**SECTION 4: FIRST AID MEASURES****4.1 Description of first aid measures**

Self-protection of the first aider

Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Avoid breathing vapours. Avoid all contact. Contaminated clothing should be laundered before reuse.

Inhalation

IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER/doctor.

Skin Contact

IF ON SKIN: Remove contaminated clothing and wash all affected areas with plenty of water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention.

Eye Contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Hold eye open and rinse slowly and gently with water for 15-20 minutes. If eye irritation persists: Get medical advice/attention.

Ingestion

IF SWALLOWED: Rinse mouth. Make victim drink plenty of water. Do not give

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

4.2	Most important symptoms and effects, both acute and delayed	anything by mouth to an unconscious person. Do not induce vomiting unless instructed to do so by medical personnel. Call a POISON CENTER/doctor if you feel unwell. IF exposed or concerned: Get medical advice/attention.
4.3	Indication of any immediate medical attention and special treatment needed Notes to a physician:	Harmful if swallowed. May cause an allergic skin reaction. Causes serious eye damage. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause respiratory irritation. Suspected of causing cancer. Treat symptomatically. IF INHALED: Respiratory symptoms, including pulmonary edema, may be delayed. IF IN EYES: Treatment by an ophthalmologist due to possible caustic burn of the eyes may be required.

SECTION 5: FIRE-FIGHTING MEASURES

5.1	Extinguishing media Suitable Extinguishing Media Unsuitable extinguishing Media	As appropriate for surrounding fire. Extinguish with carbon dioxide, dry chemical, foam or waterspray. Do not use water jet. Direct water jet may spread the fire.
5.2	Special hazards arising from the substance or mixture	Highly flammable liquid and vapour. May decompose in a fire giving off toxic fumes. Carbon monoxide, Carbon dioxide, Phenolic and Explosive Peroxides. Vapours are heavier than air and may travel considerable distances to a source of ignition and flashback. Prevent liquid entering sewers, basements and workpits; vapour may create explosive atmosphere. May form explosive peroxides.
5.3	Advice for fire-fighters	Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1	Personal precautions, protective equipment and emergency procedures	Ensure adequate ventilation. Stop leak if safe to do so. Eliminate all ignition sources if safe to do so. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use personal protective equipment as required. See Section: 8. Avoid breathing vapours.
6.2	Environmental precautions	Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body.
6.3	Methods and material for containment and cleaning up	Use non-sparking equipment when picking up flammable spill. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a container for disposal. Ventilate the area and wash spill site after material pick-up is complete. Dispose of this material and its container as hazardous waste
6.4	Reference to other sections	See Section: 8, 13

SECTION 7: HANDLING AND STORAGE

7.1	Precautions for safe handling	Ensure operatives are trained to minimise exposures. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid all contact. Do not breathe vapour. Ensure adequate ventilation. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. May form explosive peroxides. Take precautionary measures against static discharges. Use personal protective equipment as required. See Section: 8. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work.
7.2	Conditions for safe storage, including any incompatibilities Storage temperature	Ground/bond container and receiving equipment. Keep only in original container. Store in a well-ventilated place. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. May form explosive peroxides. Keep away from direct sunlight. Ambient. Keep at temperature not exceeding (°C): 32

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

Storage life	Stable under normal conditions.
Incompatible materials	Keep away from: Oxidizing agents, Corrosive Substances, Reducing agents, Strong Acids and Alkalis.
7.3 Specific end use(s)	See Section: 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

Users are advised to consider national Occupational Exposure Limits or other equivalent values.

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m ³)	STEL (ppm)	STEL (mg/m ³)	Note
Tetrahydrofuran	109-99-9	50	150	100	300	WEL, Sk

Source: WEL: Workplace Exposure Limit (UK HSE EH40), Sk - Can be absorbed through skin.

8.1.2 Biological limit value

None assigned.

8.1.3 PNECs and DNELs

None assigned.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Ensure operatives are trained to minimise exposures. Ensure adequate ventilation. Atmospheric levels should be controlled in compliance with the occupational exposure limit. A washing facility/water for eye and skin cleaning purposes should be present.

8.2.2 Individual protection measures, such as personal protective equipment (PPE)

General hygiene measures for the handling of chemicals are applicable. Keep good industrial hygiene. Avoid all contact. Avoid breathing vapours. Wash hands before breaks and after work. Keep work clothes separately. Do not eat, drink or smoke at the work place. IF exposed: Flush with fresh water if contact with skin or eyes.

Eye/face protection



Wear protective eye glasses for protection against liquid splashes. Wear eye protection with side protection (EN166).

Skin protection



Hand protection:

Wear impervious gloves (EN374). Protective index 6, corresponding > 480 minutes of permeation time according to EN 374 Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Suitable materials: [Polyethylene-Laminated](#) (Minimum thickness 0.1mm)

Body protection:

Wear impervious protective clothing, including boots, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection



In case of inadequate ventilation wear respiratory protection. Open system(s): Wear suitable respiratory protective equipment. A suitable mask with filter type A (EN141 or EN405) may be appropriate.

SAFETY DATA SHEET

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

Thermal hazards Not applicable

8.2.3 Environmental Exposure Controls Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Almost colourless to pale yellow / Amber Liquid
Odour	Ether-like Odour
Odour threshold	Not available.
pH	Not established.
Melting point/freezing point	Not established.
Initial boiling point and boiling range	66°C (Mixture)
Flash point	-14°C (Tetrahydrofuran) [Closed cup]
Evaporation rate	>1
Flammability (solid, gas)	Flam. Liq. 2; Highly flammable liquid and vapour.
Upper/lower flammability or explosive limits	Flammable Limits (Lower) (%v/v): 1.8, Flammable Limits (Upper) (%v/v) 11.8.
Vapour pressure	145 mmHg @ 15°C
Vapour density	2.5 (Air = 1)
Relative density	0.9 g/cm ³ (H ₂ O = 1) (Mixture)
Solubility(ies)	Soluble in: Water
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition Temperature	Not available.
Viscosity	Not available.
Explosive properties	Not available. (May form explosive peroxides.)
Oxidising properties	Not oxidising.

9.2 Other information

Volatile Organic Compound Content (%): 705 g/L

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	Stable under normal conditions. May form peroxides on prolonged storage if air is present.
10.2 Chemical stability	Stable under normal conditions.
10.3 Possibility of hazardous reactions	Highly flammable liquid and vapour. The vapour may be invisible, heavier than air and spread along ground. May form explosive peroxides. Contact with aliphatic amines will cause irreversible polymerization with considerable heat build-up. May polymerise on prolonged heating.
10.4 Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from direct sunlight. Keep at a temperature not exceeding (°C): 32. Avoid contact with air. Avoid contact with heat and ignition sources and oxidizers. Avoid distillation to dryness, which can form explosive peroxides.
10.5 Incompatible materials	Oxidizing agents, Corrosive Substances, Reducing agents, Strong Acids and Alkalis. Mild steel. Reacts violently with - Oxidizing agents and Acids.
10.6 Hazardous decomposition product(s)	May decompose in a fire giving off toxic fumes. Carbon monoxide, Carbon dioxide, Phenolic and Explosive Peroxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	All test data taken from existing ECHA registrations for the substances mentioned.
Acute toxicity - Ingestion	Acute Tox. 4; Harmful if swallowed. Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 500 mg/kg bw/day.
Tetrahydrofuran:	Test Result LD50 <1 ml/kg bw (Standard acute method)
Acute toxicity - Inhalation	Based upon the available data, the classification criteria are not met. Acute Toxicity Estimate Mixture Calculation: Estimated LC50 >20.0 mg/l.
Acute toxicity - Skin Contact	Based upon the available data, the classification criteria are not met.

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

<p>Skin corrosion/irritation Serious eye damage/irritation Tetrahydrofuran: 1,2,4,5-Benzenetetracarboxylic Dianhydride:</p> <p>Skin sensitization 1,2,4,5-Benzenetetracarboxylic Dianhydride:</p> <p>Respiratory sensitization 1,2,4,5-Benzenetetracarboxylic Dianhydride:</p> <p>Germ cell mutagenicity Carcinogenicity Tetrahydrofuran:</p> <p>Reproductive toxicity STOT - single exposure Tetrahydrofuran:</p> <p>STOT - repeated exposure Aspiration hazard</p> <p>11.2 Other information</p>	<p>Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day. Based upon the available data, the classification criteria are not met. Eye Dam. 1; Causes serious eye damage. No data. Harmonised Classification Test Result: Severe irritant to the eye. (Baur X et al, 1995) Skin. Sens. 1; May cause an allergic skin reaction. Skin sensitisation has been reported in humans. (Venables KM, 1989) Resp. Sens. 1; May cause allergy or asthma symptoms or breathing difficulties if inhaled. Severely irritating to respiratory system. (Venables KM, 1989) Based upon the available data, the classification criteria are not met. Carc. 2; Suspected of causing cancer. Test Result: NOAEC 1800 ppm Suspected carcinogen (Unnamed, 1998) Based upon the available data, the classification criteria are not met. STOT SE 3; May cause respiratory irritation. Test Result: Central nervous depression (Malley, L.A. et al, 2001) Based upon the available data, the classification criteria are not met. Based upon the available data, the classification criteria are not met. None known.</p>
--	--

SECTION 12: ECOLOGICAL INFORMATION

<p>12.1 Toxicity</p> <p>12.2 Persistence and degradability</p> <p>12.3 Bioaccumulative potential</p> <p>12.4 Mobility in soil</p> <p>12.5 Results of PBT and VPVB assessment</p> <p>12.6 Other adverse effects</p>	<p>Based upon the available data, the classification criteria are not met. Estimated Mixture LC50 >100 mg/l (Fish) This product is readily biodegradable in water. The product has low potential for bioaccumulation. The product is predicted to have high mobility in soil. (Water Soluble) Not classified as PBT or vPvB. None known.</p>
--	---

SECTION 13: DISPOSAL CONSIDERATIONS

<p>13.1 Waste treatment methods</p> <p>13.2 Additional Information</p>	<p>Dispose of this material and its container as hazardous waste. Send after pre-treatment to a appropriate hazardous waste incinerator facility according to legislation. Dispose of contents in accordance with local, state or national legislation.</p>
--	---

SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO
14.1 UN number	UN 1133	UN 1133	UN 1133
14.2 UN proper shipping name	ADHESIVES containing flammable liquid	ADHESIVES containing flammable liquid	ADHESIVES containing flammable liquid
14.3 Transport hazard class(es)	3	3	3
14.4 Packing group	II	II	II
14.5 Environmental hazards	Not classified	Not classified as a Marine Pollutant.	Not classified
14.6 Special precautions for user	See Section: 2		
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.		

SECTION 15: REGULATORY INFORMATION

<p>15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture</p> <p>15.1.1 EU regulations Authorisations and/or Restrictions On Use</p>	<p>Not restricted</p>
---	-----------------------

Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com

CoRAP Substance Evaluation

Tetrahydrofuran:

Substance evaluated in 2013; evaluating Member State has proposed to ask the registrants to provide further information

15.1.2 National regulations

Germany

Water hazard class: 1

15.2 Chemical Safety Assessment

A chemical safety assessment is not required under REACH.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: New SDS Regulation 2015/830 format, all sections have been updated to include new information. Please review SDS with care. Updated substance / mixture classification

References:

Existing Safety Data Sheet (SDS), Harmonised Classification(s) for Tetrahydrofuran (CAS No. 109-99-9), 1,2,4,5-Benzenetetracarboxylic Dianhydride (CAS No. 89-32-7). Existing ECHA registration(s) for Tetrahydrofuran (CAS No. 109-99-9).

Literature References:

1. Baur X; Czuppon AB; Rauluk I; Zimmermann FB; Schmitt B; Egen-Korthaus M; Tenkoff N; Degens PO, 1995, A Clinical and Immunological Study on 92 Workers Occupationally Exposed to Anhydrides, International Archives of Occupational and Environmental Health, Vol. 67, No. 6, pages 395-403, 32 references, 1995
2. Venables KM, 1989, Low Molecular Weight Chemicals, Hypersensitivity, and Direct Toxicity: The Acid Anhydrides, British Journal of Industrial Medicine, Vol. 46, No. 4, pages 222-232, 112 references, 1989
3. Malley, L.A., Christoph G.R., Stadler, J.C., Hansen, J.F., Biesemeir, J.A. and Jasti, S., 2001, Acute and subchronic neurotoxicology evaluation of tetrahydrofuran by inhalation in rats, Drug Chem. Toxicol., 24(3): 201-219

EU Classification: This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830.

Classification of the substance or mixture According to Regulation (EC) No. 1272/2008 (CLP)	Classification Procedure
Flam. Liq. 2; H225	Flash Point Test Result
Acute Tox. 4; H302	Acute Toxicity Estimate (ATE) Calculation.
Skin Sens. 1; H317	Threshold Calculation
Eye Dam. 1; H318	Threshold Calculation
Resp. Sens. 1; H334	Threshold Calculation
STOT SE 3; H335	Threshold Calculation
Carc. 2; H351	Threshold Calculation
EUH019	Expert judgement / Harmonised Classification

LEGEND

LTEL: Long Term Exposure Limit

DNEL: Derived No Effect Level

PBT: PBT: Persistent, Bioaccumulative and Toxic

STEL: Short Term Exposure Limit

PNEC: Predicted No Effect Concentration

vPvB: very Persistent and very Bioaccumulative

Hazard classification / Classification code:

Flam. Liq. 2; Flammable Liquid, Category 2

Acute Tox. 4; Acute toxicity, Category 4

Skin Sens. 1; Skin Sensitisation, Category 1

Eye Dam. 1; Eye damage, category 1

Eye Irrit. 2; Eye Irritation, Category 2

Resp. Sens. 1; Respiratory sensitization, Category 1

STOT SE 3; Specific target organ toxicity — single exposure, Category 3

Carc. 2; Carcinogenicity, Category 2

EUH019: May form explosive peroxides.

Hazard Statement(s)

H225: Highly flammable liquid and vapour.

H302: Harmful if swallowed.

H317: May cause an allergic skin reaction.

H318: Causes serious eye damage.

H319: Causes serious eye irritation.

H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H335: May cause respiratory irritation.

H351: Suspected of causing cancer.

Disclaimers

Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. Vishay Precision Group gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. Vishay Precision Group accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.

SAFETY DATA SHEET



Revision: 3.0 Date: 16 January 2017

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH),
1272/2008 (CLP) & 2015/830

www.vishaypg.com



Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Vishay Precision Group, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "VPG"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

The product specifications do not expand or otherwise modify VPG's terms and conditions of purchase, including but not limited to, the warranty expressed therein.

VPG makes no warranty, representation or guarantee other than as set forth in the terms and conditions of purchase. **To the maximum extent permitted by applicable law, VPG disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.**

Information provided in datasheets and/or specifications may vary from actual results in different applications and performance may vary over time. Statements regarding the suitability of products for certain types of applications are based on VPG's knowledge of typical requirements that are often placed on VPG products. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. You should ensure you have the current version of the relevant information by contacting VPG prior to performing installation or use of the product, such as on our website at vpgsensors.com.

No license, express, implied, or otherwise, to any intellectual property rights is granted by this document, or by any conduct of VPG.

The products shown herein are not designed for use in life-saving or life-sustaining applications unless otherwise expressly indicated. Customers using or selling VPG products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify VPG for any damages arising or resulting from such use or sale. Please contact authorized VPG personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Copyright Vishay Precision Group, Inc., 2014. All rights reserved.