Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product Name: Duralay II Liquid
Company Identification:
Reliance Dental Mfg., Co.
5805 W. 117th Place
P.O. Box 38
Worth, IL 60482
For Product Information, call: 708-597-6694 **For Medical Information, call:** 800-535-5053

Section 2 - Composition, Information on Ingredients

ITEM	CHEMICAL NAME	CAS NUMBER:	WT/WT %
01	Methyl Methacrylate Monomer	80-62-6	60.0-100.0
02	2-Hydroxyethyl Methacrylate	868-77-9	0.0-10.0
03	Ethyl Methacrylate Monomer	97-63-2	0.0-10.0
04	Triethylene Glycol Dimethacrylate	109-16-0	0.0-10.0
05	N,N-Dimethyl-p-Toluidine	99-97-8	0.0-5.0

	ACGIH		SHA		Company	
ITEM	TLV-TWA	TLV-STEL	PEL TWA	PEL CEILING	Recommendation	SKIN
01	00 ppm	NE	100 ppm	NE	100 ppm	NE
02	NE	NE	NE	NE	NE	NE
03	NE	NE	NE	NE	100 ppm	NE
04	NE	NE	NE	NE	100 ppm	NE
05	NE	NE	NE	NE	NE	NE

Note this material contains an inhibitor (HQ, MEHQ, etc) at <1%. The type and amount meet product specifications. Contact manufacturer for exact concentration and details on inhibitor level maintenance.
See Section 16 for Abbreviations.

Section 3 - Hazards Identification

EMERGENCY OVERVIEW:
WARNING:
For Monomer:

Physical Hazards: Unstable/Reactive upon depletion of inhibitor. **Check inhibitor levels periodically.**

Acute Hazards:

Ingestion: Causes irritation, a burning sensation of the mouth, throat and respiratory tract and abdominal pain.

Eyes: Liquid and vapors can cause moderate irritation. Symptoms may include tears, blurred vision and redness.

Inhalation: High concentrations irritant to the respiratory tract and may cause dizziness, headache and anesthetic effects.

Skin: May cause skin irritation. Can cause skin sensitization. Extensive/prolonged or repeated exposure to this material may result in a more severe skin response. Symptoms may be delayed.

Chronic Hazards: Prolonged and/or repeated exposure may lead to kidney, lung, liver, and heart damage. Unlikely to present a cancer hazard to man.

Note to Physicians:
This product contains N,N-Dimethyl-p-Toluidine at a low concentration (Refer to Section 2). While complications

from this component are not expected, absorption leads to formation of methemoglobin, which in sufficient concentration causes cyanosis. Symptoms may include headaches, weakness and dizziness, and can be recognized by the blue color of the lips, fingernails, nose and earlobes. Reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degree of cyanosis need to be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body is of utmost importance. If cyanosis is severe, intravenous injection of methylene blue, 1-2 mg/kg body weight over a 5 minute period as a 1 % solution may be of value. If elevated methemoglobin persists after an hour, the treatment may be repeated, but the total dose should not exceed 7 mg/kg body weight. Cyanocobalmin (Vitamin B-12), 1 mg intramuscularly is reported to speed recovery. Intravenous fluids and blood transfusions may be indicated in very severe exposures.

CARCINOGENICITY: Hydroxyethyl Methacrylate contains trace amounts of Ethylene Oxide, a substances known to the state of California to cause cancer and/or reproductive toxicity. Triethylene Glycol Dimethacrylate may contain trace quantities of substances known to the state of California to cause cancer and/or reproductive toxicity. All carcinogen studies for all types of cancers were negative. None of the other components of this material are listed by IARC, NTP, OSHA, or ACGIH as carcinogens.

PRIMARY ROUTES OF ENTRY: Inhalation, Skin or Eyes.

Section 4 - First Aid Measures

EMERGENCY AND FIRST AID PROCEDURES:

EYES: If product gets in the eyes, flush with copious amounts of lukewarm water for at least 15 minutes. If irritation occurs, contact a physician.

INGESTION: If ingested, do not induce vomiting. If product has been swallowed, drink plenty of water or milk IMMEDIATELY. If the patient is vomiting, continue to offer water or milk. Never give anything by mouth to an unconscious person. Provide an estimate of the time at which the material was ingested and the amount of the substance that was swallowed. Get medical attention immediately.

INHALATION: Remove to fresh air. Seek immediate medical attention.

SKIN: If irritation occurs and product is on the skin, rinse thoroughly with lukewarm water, followed by a thorough washing of the effected area with soap and water. If irritation, redness or swelling persists, contact a physician immediately.

CLOTHING: Remove contaminated clothing, wash thoroughly before reuse.

TREATMENT: Treat symptoms conventionally, after thorough decontamination.

Section 5 - Fire Fighting Measures

For MMA:

FLASH POINT: 11.5 °C, 52.7 °F

FLAMMABLE LIMIT, AIR VOL% LOWER: 2.12
UPPER: 12.5

AUTOIGNITION TEMPERATURE: 421 °C, 790 °F

EXTINGUISHER METHOD: Chemical foam, carbon dioxide, dry chemical, water spray.

FIRE AND EXPLOSION HAZARDS: High temperatures, inhibitor depletion, accidental impurities, or exposure to radiation or oxidizers may cause spontaneous polymerizing reaction generating heat/pressure. Closed containers may rupture or explode during a runaway polymerization. Use a water spray or fog to reduce or direct vapors. Water may not be effective in actually extinguishing a fire involving this product.

SPECIAL FIRE FIGHTING PROCEDURES: This product is a flammable liquid. When involved in a fire, this product may ignite readily and decompose to produce carbon oxides. Vapors of this product are heavier than air and may travel to a source of ignition and flash back to a leaking or open container. Do not enter fire area without proper protection. Fight fire from a safe location.

Heat/impurities may cause pressure to build and/or rupture closed containers, spreading fire, increasing risk of burns/injuries. Structural firefighters must wear SCBAs and full protective equipment.

SENSITIVE TO MECHANICAL IMPACT: No.

SENSITIVE TO STATIC DISCHARGE: Yes.

Section 6 - Accidental Release Measures

ACCIDENTAL RELEASE:

Before cleaning any spill or leak, individuals involved must wear appropriate Personal Protective Equipment (e.g., goggles, gloves). Deny entry to all unprotected individuals. Dike and contain spill with inert material (e.g. sand or earth). Use ONLY non-sparking tools for recovery and cleanup. Maximize ventilation (open doors and windows) and secure all sources of ignition. Place into appropriate closed container(s) for disposal in accordance with local, state and federal regulations.

Wash all affected areas with plenty of warm water and soap. Remove any contaminated clothing and wash thoroughly before reuse. Keep spills and cleaning runoffs out of municipal sewers and open bodies of water.

Section 7 - Handling and Storage

PRECAUTIONS FOR HANDLING: Use local explosion-proof ventilation with a minimum capture velocity of 100 ft/min (30 m/min) at point of material release. Refer to Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Hygienist. Observe precautions found on label.

PRECAUTIONS FOR STORAGE: Store containers in a cool, dry location, away from direct sunlight, heat, sparks, flame, other light sources, or sources of intense heat. Keep container closed after each use. Ground and bond all containers when transferring. **Check inhibitor levels periodically,** add to the bulk material if needed. Maintain at a minimum, the original 2-inch headspace in the product container. Do not blanket or mix with oxygen-free gas as it renders the inhibitor ineffective.

INDUSTRIAL HYGIENE PRACTICES: Avoid contact with skin, eyes, clothing, and prolonged contact with the product. Use good personal hygiene and housekeeping. After use, wash hands and exposed skin with soap and water. Do not eat, drink or smoke while handling product.

Section 8 - Exposure Controls, Personal Protection

VENTILATION: Refer to Section 7 regarding the ventilation requirements for working with this product. Use explosion-proof local exhaust at processing equipment, including buffers, sanders, grinders and polishers. High temperature processing equipment should be well ventilated.

RESPIRATORY PROTECTION: A respirator should be worn whenever workplace conditions warrant a respirators use. None required if airborne concentrations are maintained below the exposure limit listed in Section 2. If necessary, use only respiratory protection authorized per U.S. OSHA's requirement in 29 CFR §1910.134 or other appropriate governing standard.

EYE PROTECTION: Depending on the use of this product, splash or safety glasses may be worn. If necessary, refer to U.S. OSHA 29 CFR §1910.133, or other appropriate governing standard. Ensure that an eyewash station, sink or washbasin is available in case of exposure to eyes.

PROTECTIVE GLOVES: If anticipated that prolonged & repeated skin contact will occur During use of this product, wear chemical resistant gloves for

	routine industrial use. If necessary, refer to U.S. OSHA 29 CFR §1910.138, or other appropriate governing standards.
OTHER PROTECTIVE EQUIPMENT:	No special body protection is required under typical circumstances of use and handling. If necessary, refer to appropriate governing standards. An eyewash station and a safety shower are recommended.

Section 9 - Physical and Chemical Properties

For MMA:

APPEARANCE:	Clear liquid.
ODOR:	Acrid odor.
pH:	NA
ODOR THRESHOLD:	ND
BOILING POINT:	101 °C, 214 °F
FREEZING POINT:	-48 °C
VISCOSITY:	Like water
DENSITY:	0.949 g/ml @ 15.5°C
VAPOR PRESSURE:	28 mm Hg @ 20 °C, 68 °F
PERCENT VOLATILE	W/W%: 99+
VAPOR DENSITY (AIR=1):	3.5 @ 15.5 °C, 60 °F
EVAPORATION RATE (BuAc =1):	3.1
SOLUBILITY IN WATER:	Moderate, 1.6 WT% @ 20 °C, 68 °F
COEFFICIENT OF WATER/OIL DISTRIBUTION:	ND

Section 10 - Stability and Reactivity

CONDITIONS TO AVOID:	Temperatures above 21°C, 70°F, localized heat sources (example drum or band heaters) oxidizing conditions, freezing conditions, direct sunlight, ultraviolet radiation, inert gas blanketing.
INCOMPATIBILITY (MATERIALS TO AVOID):	Strong oxidizers, strong reducers, free radical initiators, inert gases, oxygen scavengers. Material has strong solvent properties and can soften paint and rubber.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxides of Carbon when burned.
HAZARDOUS POLYMERIZATION:	MAY OCCUR: X WILL NOT OCCUR:
STABILITY:	Unstable/Reactive upon depletion of inhibitor

Section 11 - Toxicological Information

TARGET ORGANS:

For Methyl Methacrylate:	Nose, Liver and Kidneys (long term to high levels).
For Ethyl Methacrylate:	None Listed.
For Triethylene Glycol Dimethacrylate:	None Listed.
For N,N-Dimethyl-p-Toluidine:	Liver, Central Nervous System, Blood and Skin.

MUTAGENICITY DATA:

For Methyl Methacrylate:	There is no reason to believe that methyl methacrylate represents a carcinogenic or mutagenic hazard to man based upon evidence from well-conducted studies in relevant cohorts.

REPRODUCTIVE TOXICITY DATA:

For Methyl Methacrylate:	Recent studies in animals have shown that high exposures do not have reproductive effects. Similarly, none of these effects are likely to occur in humans provided exposure is maintained at or below the occupational exposure limit.
TOXICITY DATA:	This product has NOT been tested on animals to obtain toxicology data.

There is toxicology data for the components of the product, which is found in scientific literature. Some of this data is presented below.

For Methyl Methacrylate:

Acute Oral Rat	LD_{50}:	>7900 mg/kg.
Acute Dermal Rabbit	LD_{50}:	>35,500 mg/kg.
Inhalation Human	TC_{Lo}:	125 ppm.
Inhalation Human	TC_{Lo}:	60 mg/m_3.
Inhalation Rat	LC_{50}:	7094 ppm/4H.

For 2-Hydroxyethyl Methacrylate:

Oral Mouse	LD_{50}:	3275 mg/kg.
Oral Rat	LD_{50}:	5050 mg/kg.
Oral Guinea Pig	LD_{50}:	4680mg/kg.
Intraperitoneal mouse	LD_{50}:	497 mg/kg.
Intraperitoneal Rat	LD_{50}:	1250 mg/kg.

For Ethyl Methacrylate:

Dermal Rabbit	LD_{50}:	>10,000 mg/kg.
Inhalation Rat	LC_{50}:	8300 ppm/4H.
Intraperitoneal Mouse	LD_{50}:	1369 mg/kg.
Intraperitoneal Rat	LD_{50}:	1223 mg/kg.
Oral Rat	LD_{50}:	13468 mg/kg.
Intraperitoneal Mouse	LD_{50}:	212 mg/kg.

For Triethylene Glycol Dimethacrylate:

Oral Mouse	LD_{50}:	10750 mg/kg.
Oral Rat	LD_{50}:	10837 mg/kg.

For N,N-Dimethyl-p-Toluidine:

Inhalation Rat	LC_{50}:	1,400 mg/m_3/4 h.

Section 12 - Ecological Information

AQUATIC TOXICITY:

For Monomer: There is no specific data available for this product; however, very large releases of this product may be harmful or fatal to overexposed aquatic life. There is ecological data for the components of the product, which is found in scientific literature. Some of this data is presented below.

For Methyl Methacrylate:

Flathead Minnows	LC_{50}:	130 mg/L, 96H.
Daphnia Magna	EC_{50}:	69 mg/L, 48H.
Algae	LC_{50}:	170 mg/L, 96H.

For Ethyl Methacrylate:

Daphnia Magna	EC_{50}:	> 66 mg/L/48H.
Rainbow Trout	LC_{50}:	100 mg/l/96H.
Algae	EC_{50}:	>0.70 mg/L/72H.

ENVIRONMENTAL FATE:

For Methyl Methacrylate:

28 Day Biodegradation Study:	Not readily biodegradable. COD 88% within 28 days
Inherent Biodegradation:	DOC Removal >95% within 28 days
Adsorption/Desorption:	High mobility in soil.

For Ethyl Methacrylate:

Biodegradation:	Inherently biodegradable 79% in 28 days.

Section 13 - Disposal Considerations

WASTE DISPOSAL METHOD: When discarded it is a characteristic hazardous waste by the EPA under RCRA with the reportable quantity (RQ) of 1000 pounds (40 CFR Part

302) for the ethyl Methacrylate monomer. After addition of excess inhibitor, dispose waste material in accordance with Federal, State, and Local regulations.

DISPOSAL OF EMPTY CONTAINERS: Reuse of empty drums or containers is not recommended. Employees should be advised of the potential hazards, due to residual flammable material, associated with empty containers. Dispose of all empty containers properly, in accordance with Federal, State and Local regulations.

Section 14 - Transport Information

DOT/UN SHIPPING NAME:	FLAMMABLE LIQUID, NOS (Methyl Methacrylate Monomer, Stabilized, Ethyl Methacrylate, Stabilized)
DOT/UN CLASS:	3
SUBSIDIARY RISK:	
NA/UN NUMBER:	UN 1993
PACKING GROUP:	II
LABEL:	Flammable Liquid
IMDG CLASS:	3
EmS:	
CERCLA RQ:	For Methyl Methacrylate: 1000 lb.

Section 15 - Regulatory Information

SARA Reporting Requirements:	Yes
SARA Threshold Planning Quantity:	There are specific Threshold Planning Quantities for the components of this product.
TSCA Inventory Status:	The components of this product are listed on the TSCA Inventory.
CERCLA Reportable Quantity (RQ):	Yes
Other Federal Requirements:	This product complies with the appropriate sections of the Food and Drug Administration's 21 CFR.
Other Canadian Regulations:	This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR. The components of this product are listed on the DSL/NDSL. None of the components of this product are listed on the Priorities Substances List.
State Regulatory Information:	This product may contain components that are covered under specific state criteria.
RISK STATEMENTS:	R11 – Highly Flammable R36/37/38 – Irritating to eyes, respiratory system and skin. R43 – May cause sensitization by skin contact
SAFETY STATEMENTS:	S3 – Keep in a cool place. S7 – Keep container tightly closed. S9 – Keep container in a well ventilated place. S16 – Keep away from sources of ignition – No Smoking. S20 – When using do not eat or drink. S 29 – Do not empty into drains. S33 – Take precautionary measures against static discharges. S37/39 – Wear suitable gloves and eye/face protection.

Section 16 - Additional Information

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM (HMIS) RATING:

HEALTH:	2
FLAMMABILITY:	3
REACTIVITY:	2
PERSONAL PROTECTIVE EQUIPMENT:	Gloves and Safety Glasses or Chemical Splash Goggles.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD IDENTIFICATION RATING:

HEALTH:	2
FLAMMABILITY:	3
REACTIVITY:	2

ABBREVIATIONS:

NA	Not Applicable	ND	Not Determined
NE	Not Established	ppm	parts per million
G	Gallon	mg	Milligram
L	Liter	gm	Gram
mol	Mole	kg	Kilogram
µ	Micro	mm	Millimeter
p	Pico	Pa	Pascals
c	cento	LC	Lethal Concentration
LD	Lethal Dose	TC	Toxic Concentration
TD	Toxic Dose	BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand	Lo	Lowest
ThOD	Theoretical Oxygen Demand	TLm	Threshold Limit
IC	Inhibitory Concentration	DOC	Dissolved Organic Carbon
H	Hours	M	Months
D	Days	Y	Years
W	Weeks		

ACGIH	American Conference of Governmental Industrial Hygienist
CPR	Controlled Product's Regulation
DSL	Canadian Domestic Substances List
NDSL	Canadian Non-domestic Substance List
IARC	International Agency for Research for Cancer
NOEL	No Observed Effect Level
NOAEL	No Observed Adverse Effect Level
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
TLV	Threshold

THIS MATERIAL SAFETY DATA SHEET IS PREPARED IN COMPLIANCE WITH FEDERAL REGULATIONS (29 CFR 1910.1200), THE COMMONWEALTH OF PENNSYLVANIA REGULATIONS (TITLE 34. CHAPTERS 301-323) AND CANADIAN WHMIS REGULATIONS, ANY APPLICABLE STATE AND LOCAL REGULATIONS SHOULD BE CONSULTED. THE ABOVE INFORMATION MAY BE BASED IN PART ON INFORMATION PROVIDED BY COMPONENT SUPPLIERS AND IS BELIEVED TO BE CORRECT AS OF THE DATE HEREOF. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY USE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OF THESE DATA, THE RESULTS TO BE OBTAINED FROM THE USE OF THE MATERIAL, OR THE HAZARDS CONNECTED WITH SUCH USE. SINCE THE INFORMATION CONTAINED HEREIN MAY BE APPLIED UNDER CONDITIONS BEYOND OUR CONTROL AND WITH WHICH WE MAY BE UNFAMILIAR, AND SINCE DATA MADE AVAILABLE SUBSEQUENT TO THE DATE HEREOF MAY SUGGEST MODIFICATION OF THE INFORMATION, WE ASSUME NO RESPONSIBILITY FOR THE RESULT OF ITS USE. THIS INFORMATION AND MATERIAL IS FURNISHED ON THE CONDITION THAT THE PERSON RECEIVING IT SHALL MAKE HIS/HER OWN DETERMINATION AS TO THE SUITABILITY OF THE MATERIAL FOR HIS/HER PARTICULAR PURPOSE AND ON THE CONDITION THAT HE/SHE ASSUME THE RISK OF HIS/HER USE THEREOF.