Technical Data Sheet

EnCap™ 3555

incure™
ADHESIVES, EPOXIES AND COATINGS

UV/Visible Light/LED Curable Low Stress Encapsulant for Electronics

PRODUCT DESCRIPTION

Incure EnCap™ 3555 UV/Visible Light/LED curable adhesive is an acid-free, low stress and low shrinkage optical encapsulant used in the opto-electronics industry. Specifically designed for longer staging times on sensitive flexible circuits, it cures in seconds to form a tough and sleek protective coating on components and PCBAs. Formulated with enhanced moisture and temperature resistance, Incure 3555 exhibits very low water absorption. A 100% solids formulation, it contains no volatiles and it is ideal for product requiring thermal cycling.

UNCURED PROPERTIES

Chemical Type	Urethane Acrylate, 100% Solids, No Solvents			
Appearance	Single Component, Clear Transparent			
Density, g/ml	1.04	Refractive Index	1.48	@20°C
Flash Point, °C	> 93	Toxicity	Low (Refer to MSDS)	
Viscosity, cP	2,300 - 3,700 @20rpm		Spindle	4
Other viscosities are available upon request. If the viscosity range requested is not our standard offering, this product may be produced with a small lab fee. Email us at: support@uv-incure.com or your nearest local distributor for more information.				ASTM D2556

[1] Viscosity (cP) taken at 25°C - Call to enquiry for other viscosities.

CURED PROPERTIES

Shore Hardness, Durometer		D72 to D82	ASTM 2240
Linear Shrinkage / Expansion (-ve)		1.10%	ASTM D2566
Water Absorption at 24hrs		0.60%	[2] ISTM D570
Tensile (PSI) * PC-PC / SS-SS / S-S / AL-AL ^ PC Substrate Failure	PC-PC / PC-SS	1,300 / 1,100	ASTM 638
	PC-S / PC-AL	2,700 / 2,900	
Surface After Full Cure		Sleek	[2] ISTM D189
Elongation at Break		32%	ASTM 638
Thermal Range (Brittleness / Degrades) °C		-55 to 150	[2] ISTM D366
Young's Modulus of Elasticity, MPa (PSI)		Not Available	[3] ASTM 638
Linear CTE (α1 & α2), ppm/°C		α1=45 , α2=62	[2] ISTM D696
Glass Transition Temperature (Tg), °C		N.A.	[2] ISTM D696

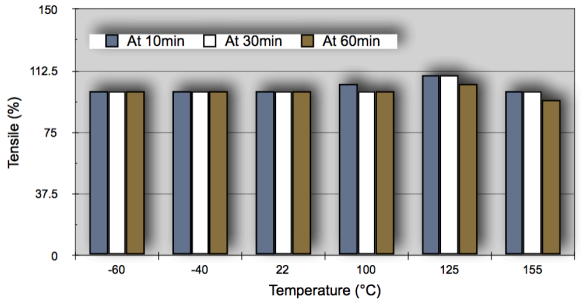
[2] ISTM - refers to Incure Standard Test Method.
[3] ASTM 638 Young's Modulus test speed @5mm/min for rigid and semi-rigid materials, @50mm/min for non-rigid materials, unless otherwise specified.

RECOMMENDED UV CURE SCHEDULE (FULL CURE)

Full Cure Exposure Time			UVA	UVB	UVC	UVV
Fixture Time between glass slides		mW/cm²	223	56	4	215
Exposure Time (s)	1.0	mJ/cm²	223	56	4	215
F200P™ @3.75" Dist	8.0	mW/cm²	223	56	4	215
Belt Speed (ft/min)	7.0	mJ/cm²	1,784	448	30	1,720
F500™ @3.0" Dist	4.0	mW/cm²	436	127	12	390
Belt Speed (ft/min)	4.8	mJ/cm²	1,744	508	46	1,560
S20™ Spot (4-Pole LG) 0.4" Dist		mW/cm²	3,000	530	50	3,400
Exposure Time (s)	2.0	mJ/cm²	6,000	1,060	100	6,800
L9000™ LED Spot @ 0.67" Dist		mW/cm²	2,800	42	12	102
Exposure Time (s)	4.0	mJ/cm²	11,200	168	48	408

Cure times on 8mm ø adhesive sample. Belt speeds using C9000-F200Px1AB (Flood) and C9000-F500x1AC (Focused Beam) conveyors for area curing. Please consult IncureLab™ for any other requirements.

TENSILE STRENGTH VS TEMPERATURE

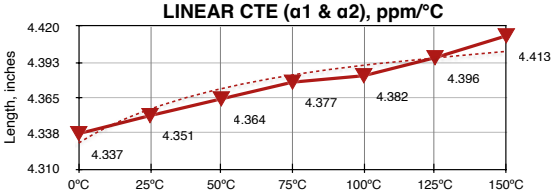


UV INTENSITY REFERENCE TABLE

Incure UV Curing Lamp Model	[4] Curing Distance vs UV Intensity					
Spot Curing (Diameter)	0.5" (12.6)	1" (25.4)	1.5" (38)	2" (50.8)	2.5" (63.5)	3" (76.2)
S20™ ARC (mW/cm²) / (ø mm)	1,400 (3)	1,500 (4)	650 (6)	360 (8)	240 (10)	175 (12)
L9000™ LED (mW/cm²) / (ø mm)	7,500 (9)	5,000 (10)	2,300 (17)	1,200 (20)	700 (25)	450 (30)
Flood/Focus Beam (Area)	UV Intensity (mW/cm²)					
F200™ ARC Flood (6" x 8")	325	280	245	215	190	165
F400™ ARC Flood (4" x 4")	860	570	440	345	270	215
F500™ ARC Focused (3" x 5")	1,040	685	530	415	325	260
L1044-365™ LED Flood (4" x 4")	2,675	2,380	1,900	1,625	1,430	1,280
L1044-405™ LED Flood (4" x 4")	2,950	2,625	2,150	1,900	1,650	1,450

[4] Curing Distance is defined by the tip of light-guide or base of lamp housing to the bond area. All values are nominal with ±10% variation, with LED Flood Static Uniformity at ±78% and Dynamic Uniformity at ±90%. Recommended curing parameters in grey.

LINEAR CTE (α1 & α2), ppm/°C



SECONDARY HEAT CURE (Not Applicable)

Continuous Oven Bake	Duration
95°C (203°F)	120 mins
110°C (230°F)	60 mins
125°C (257°F)	30 mins

UV CURING SCHEDULE FOR THIS PRODUCT

Wavength λ	UVA (320 - 400nm)	UVB (290–320nm)	UVC (290-220nm)	VUV (400-700nm)
Minimum Intensity	223 mW/cm²	56 mW/cm²	4 mW/cm²	215 mW/cm²
Total Energy Required	1,784 mJ/cm²	448 mJ/cm²	30 mJ/cm²	1,720 mJ/cm²

Note: This product has been thoroughly tested to cure with F200P™ UV Flood Lamp. Intensity wavelengths (shaded) are crucial for curing this product. All measurements are made with EIT UV PowerPuck II. If you are unable to fully cure this product for some reasons, pls email us for assistance with your curing information.

SHELF-LIFE, STORAGE, USE AND HANDLING OF THIS PRODUCT

Shelf–Life of this unopened product is a minimum of ONE (1) year from date of manufacture. Avoid direct exposure of bottle to visible light at all times. Containers should remained covered when not in use. Product should be stored in a dark cool place of 10°C to 32°C. Transfer of product into other packages void all warranties. Users should ensure all bonding surfaces are free of grease, mold release, or any contaminants, as bonding performance will be compromised. All tests for cured bonds should be carried out at ambient temperature. For safe handling of this product, please read Material Safety Data–sheet (MSDS) prior to use. Organic solvents, such as IPA, may be used to wipe away uncured material from surfaces.

EtO and GAMMA STERILIZATION (Not Applicable for this Product)

All Incure medical products are formulated to subject to standard sterilization methods, such as EtO and Gamma Radiation of 25 to 50 kGrays (cumulative). Enhanced moisture and thermal resistance of this product show excellent adhesion and bonding strength after one cycle of steam auto-clave test. Depending on bond design and structure of the application, users should test specific assemblies after subjecting them to sterilisation. Consult Incure Support Team for assistance, if your devices are subjected to more than one sterilization cycles.

NOTE

The data contained in this document are furnished for information only. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein. INCURE will not be liable for any indirect, special, incidental or consequential loss or damage arising from this INCURE product, regardless of the legal theory asserted. INCURE recommends that each user adequately test its proposed use and application before repetitive use, using this data as a guide.

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RoHS COMPLIANT | Pb LEAD FREE | HF HALOGEN FREE

Material Safety Data Sheet (MSDS)

Released On: Oct 25, 2015
Version: 3555-05

Section 1 - Product and Company Identification

Product Name
Technical Data Sheet

Product Code
3555

DECLARATION: The information furnished here is to the best of our knowledge. INCURE Incorporation does not assume any liability whatsoever for the accuracy or completeness of information contained herein. Final determination of suitability of any material is the sole responsibility of the end-user. All materials may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exists.

Company / Supplier Name	Incure Inc. 1 Hartford Square, Box 16 West, Suite C-3 West Gate, Door 18, New Britain, CT 06052, USA	Incure Adhesives Manufacturing Pte Ltd 33 Ubi Avenue 3 #04-23, Vertex Tower B Singapore 408868
Emergency Contact Information:	Tel: (860) 748-2979	Tel: (65) 62702188
Product Category	Urethane Acrylate, 100% Solids, No Solvents	

Section 2 - Hazards Identification

GHS Pictogram

Signal Word	GHS07 Warning	
GHS Hazard Phrases:	H315	Causes skin irritation.
	H317	May cause an allergic skin reaction.
	H319	Causes serious eye irritation.
	H335	May cause respiratory irritation.
	H412	Harmful to aquatic life with long lasting effects.
GHS Precautionary Phrases:	P271	Use in a well-ventilated area.
	P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
	P102	Keep out of reach of children.
	P262	Do not get in eyes, on skin or on clothing.
GHS Response Phrases:	P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P333+P313	If skin irritation or rash occurs: Get medical advice/ attention.
	P234	Keep only in original container.
GHS Storage and Disposal Phrases:	P501	Dispose of contents/ container in accordance with local regulations.
GHS Classification:	Physical and Chemical Hazards	Not Classified.
	Human Health	H315, H317, H319, H335
	Environment	H412

Section 3 - Material Composition / Safety Data on Product

CAS No.	% Composition	Description	GHS Classification
Proprietary	30 - 50	Specialty Urethane Acrylate Oligomer Blend	H315, H319, H335
5888-33-5	25 - 50	Isobornyl Acrylate	H315, H319, H335
868-77-9	0 - 5	2-Hydroxyethyl Methacrylate	H315, H319, H335
79-10-7	N.A.	Acrylic Acid	H226, H302, H313, H314, H315, H319, H332, H335, H400
Proprietary	1 - 5	Photo-Initiator	H315, H319, H335
2680-03-7	0 - 5	N,N-Dimethylacrylamide	H315, H319, H335
2235-00-9	0 - 5	1-Vinylhexahydro-2H-Azepin-2-one	H315, H319, H335
Proprietary	0 - 5	Specialty Urethane Acrylate Oligomer Blend	H315, H319, H335
Proprietary	5 - 10	Specialty Co-Monomer Blend	H315, H319, H335
7631-86-9	N.A.	Silicon Dioxide	H315, H319, H335

Section 4 - First-Aid Measures

After Inhalation:	Provide ample fresh air. Provide artificial respiration, give oxygen if experience difficulties in breathing. Consult doctor if symptoms persists.
After eye contact:	Rinse eye for up to 15 minutes under running water. If symptoms persists, consult an eye doctor.
After skin contact:	Immediately wash with water and soap thoroughly. Remove contaminated clothings.
After Swallowing:	Seek medical attention and treatment.

Section 5 - Fire-Fighting Measures

Suitable Extinguishing Agents	Water spray, dry chemical or carbon dioxide will be useful. Fight larger fires with water spray or alcohol resistant foam.
Protective Equipment	Mouth respiratory protective device (face mask) is necessary in the event of fire.
Unusual fire or Explosion Hazards	Uncontrolled polymerization may occur at high temperatures due to explosions or rupture. Toxic fumes and irritating organic vapors may be present.

Section 6 - Accidental Release Measures

Person-related Safety Precautions	Not Required
Measures for environmental protection:	Inform respective authority in case of seepage into water course or sewage system. Do not allow to enter sewers or waterways.
Measures for cleaning / collecting:	Soak up with absorbent inert materials (sand, silica gel, sawdust). Dike area to prevent spreading. Dispose of as a chemical waste in accordance with current local, state and federal regulations. Please refer to Section 8 prior to clean-up.

Section 7 - Handling and Storage

Handling:		Storage:	
Information for safe handling at workplace	Keep away from heat and direct sunlight. Use product with good ventilation/exhaust.	Requirements to be met by storerooms	Avoid exposure to sunlight.
		Information about storage in one common storage facility	Not required. Keep bottle cap / receptacle tightly sealed.
Information about protection against explosions and fire	No special measures required	Maximum Storage Temperature	< 35˚C (95˚F)

Section 8 - Exposure Controls and Personal Protection

Additional information about design of technical systems	No additional data, please refer to Section 7
Components with limit values that require monitoring	Product does not contain any relevant quantities of materials with critical values needing monitoring at workplace
Additional information	N.A.
General protective and hygienic measures	Keep away from foodstuffs, beverages such as drinking water. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Avoid contact with eyes and skin.
Breathing equipment	Use respiratory filter device in case of brief exposure resulting in discomfort. For prolonged exposure, use respiratory protective device that is independent of circulating air.

Material Safety Data Sheet (MSDS)

Released On: Oct 25, 2015 (05)
Reprinted On: Mar 19, 2025

Protection of hands	Use protective impermeable gloves that are resistant to the product. Selection of glove material should consider penetration times, rates of diffusion and degradation.
Protection of eyes	Use tightly sealed googles for best protection in a poorly ventilated area.

Section 9 - Physical and Chemical Properties

Form / Color / Odor	Fluid / According to Technical Data Sheet / Characteristics	Flash Point	> 93℃ (200℉)
Change in condition beyond melting point	Undetermined	Auto-Igniting	Does not self-ignite
Change in condition beyond boiling point	115℃ (240℉)	Danger of Explosion	None

Section 10 - Stability and Reactivity

Thermal decomposition / conditions to be avoided	No decomposition if used according to specification
Incompatible materials	Strong oxidizing and reducing agents. Strong acids and bases. Free radical initiators.
Dangerous reactions	None
Dangerous products of decompositions	Some Oxides of following chemicals may be formed - Carbon, Nitrogen, Silicon, Phosphorous, Amines.
Additional Information	Smoke and toxic fumes may evolve as a result of uncontrolled exothermic chemical reactions caused by large masses of materials interacting with curing agents (peroxides, amines, etc) and / or exposure to UV light / sunlight.

Section 11 - Toxicological Information

Acute Toxicity - LD/LC50 values that are relevant for classification	Oral LD50	Dermal LD50	Inhalative LD50/4hr
5888-33-5 Isobornyl acrylate	-	> 5000 mg/kg (rabbit)	-
24650-42-8 Photo-initiator	>2000 mg/kg (rat)	>2000 mg/kg (rat)	-

Primary irritant effect on skin/eye	Irritant to skin and mucous and membranes. Danger of severe eye injury.
Additional toxicological information	Product shows following dangers according to internally approved calculation methods of preparations: Harmful, Irritant.

Section 12 - Ecological Information

Ecotoxical Effects:
Aquatic Toxicity 24650-42-8 Photo-Initiator - EC50/48hr 26mg/L (daphnia)
5888–33–5 Isobornyl acrylate – EC50/48hr 0.9mg/L (daphnia)
Remarks Toxic for aquatic organisms

General Notes: Water hazard class 3 (self-assessment) - extremely hazardous for water. Do not allow produce tot reach ground water, water course or sewage system, even in small quantities. Danger to drinking water if even extremely small quantities leak into the ground. Also poisonous for fish and plankton in water bodies.

Section 13 - Disposal Considerations

Disposal of Product	Must not be disposed with household garbage and do not allow product to reach sewage system.
Disposal of Uncleaned Packagings	Disposal must be made according to official regulations

Section 14 - Transport Information

DOT Regulations: -
Hazard Class: -

Land Transport ADR/RID (cross-border)		Air Transport ICAO-TI and IATA-DGR		Maritime Transport IMDG	
ADR/RID Class	Not Restricted	ICAO/IATA Class	Not Restricted	IMDG Class	Not Restricted
Danger Code		Label		Label	
UN Number		UN Number		UN Number	
Packaging Group		Packaging Group		Packaging Group	
Label		Label		Label	
Description of Goods		Description of Goods		Marine Pollutant	

Section 15 - Regulatory Information

Section 355 (Extremely hazardous substances)	None
Section 313 (Specific toxic chemical listings)	Acrylic Acid (79–10–7)
TSCA (Toxic Substances Control Act)	All ingredients are listed
California Proposition 65	No California Proposition 65 listed chemicals are known to be present.
Chemicals known to cause reproductive toxicity for females	None
Chemicals known to cause reproductive toxicity for males	None
Chemicals known to cause developmental toxicity	None
Cancerogenity Categories	EPA - None , IARC - Acrylic Acid , NTP - None , TLV - Acrylic Acid , NIOSH-Ca - None , OSHA-Ca - None
Product related hazard information	Product has been classified and marked in accordance with directives on hazardous materials
Hazard Symbol	Harmful - Dangerous for the environment
Hazard-determining components of labelling	None
Risk phrases	Harmful by inhalation. Irritating to eyes, respiratory system and skin. Taxi to aquatic organisms.
Safety phrases	Keep container in a well-ventilated place. Do not breath gas/fumes/vapor/spray. In cases of contact with eyes, rinse immediately with plenty of water and seek medical advice. Use appropriate container to avoid environmental contamination.

Section 16 - Other Information

Information provided is based on our best and present knowledge. This, however, shall not constitute a guarantee for any specific product features and shall not establish a legally said contractual relationship.

Department issuing MSDS	Incure Inc. / Incure Adhesives Manufacturing Pte Ltd
Contact	support@uv-incure.com