1. Product Identification

<table>
<thead>
<tr>
<th>Product</th>
<th>Sales Location(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.V Highglossy Panel</td>
<td>Head Office</td>
</tr>
<tr>
<td></td>
<td>842-2, Yulam-Ri, Paltan-Myun,</td>
</tr>
<tr>
<td></td>
<td>Hwasung-Si, Kyungki-Do, Korea, 445-910</td>
</tr>
<tr>
<td></td>
<td>Tel : 82-31-352-0540</td>
</tr>
<tr>
<td></td>
<td>Fax : 82-31-352-0541</td>
</tr>
<tr>
<td></td>
<td>2nd Factory</td>
</tr>
<tr>
<td></td>
<td>195, Geumdang-Ri, Mado-Myun,</td>
</tr>
<tr>
<td></td>
<td>Hwaseong-Si, Kyungki-Do, Korea, 445-861</td>
</tr>
<tr>
<td></td>
<td>Tel : 82-31-355-7586</td>
</tr>
<tr>
<td></td>
<td>Fax : 82-31-355-7584</td>
</tr>
</tbody>
</table>

Synonyms: This MSDS is applicable for all Cratech U.V Highglossy Panel including specialty products such as Hologram, Woodgrain Pattern, Flower Pattern, Solid(Plain) Color, Pearl, and U.V Highglossy Panel made with MR grade MDF.

2. Hazardous Ingredients/Identity Information

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS#</th>
<th>PPM</th>
<th>Exposure Limits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>50-00-0</td>
<td>&lt; 1.5mg/L</td>
<td>&lt; 1.5mg/L</td>
<td>E1 Grade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 5.0mg/L</td>
<td>&lt; 5.0mg/L</td>
<td>E2 Grade</td>
</tr>
</tbody>
</table>

* Based on sensory exposure

3. Hazard Identification

**Appearance and Odor:** No distinctive odor. Moisture resistant(MR)
Products may have white, red, black, blue or purple surface color additives, with pattern, respectively.

**Primary Health Hazards:** Wood dust and formaldehyde vapor.

**Primary Route(s) of Exposure:**
- ☐ Ingestion:
- ☑ Skin:
- ☐ Inhalation:
- ☐ Eye:
Medical Conditions Generally Aggravated by Exposure: Wood dust or formaldehyde may aggravate pre-existing respiratory conditions or allergies.

Signs and Symptoms of Exposure (Wood Dust):
Acute: Wood dust can cause eye irritation. Certain species of wood dust can elicit allergic contact dermatitis in sensitized individuals. Wood dust may cause respiratory irritation, nasal dryness, coughing, sneezing, wheezing as a result of inhalation.
Chronic: Wood dust, depending on the species, may cause allergic contact dermatitis and respiratory sensitization with prolonged, repetitive contact or exposure to elevated dust levels. Prolonged exposure to wood dust has been reported by some observers to be associated with nasal cancer.

Carcinogenicity Listings (Wood Dust):
- NTP: Known Human Carcinogen
- IARC Monographs: Group 1 – Carcinogenic to Humans
- OSHA Regulated: Not listed

NTP: According to its Tenth Report on Carcinogens, NTP states, “Wood dust is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans. An association between wood dust exposure and cancer of the nose has been observed in many case reports, cohort studies, and case-control studies that specifically addressed nasal cancer. Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed in studies of people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure.”

IARC - Group 1: Carcinogenic to humans; sufficient evidence of carcinogenicity. This classification is primarily based on studies showing an association between occupational exposure to wood dust and adenocarcinoma of the nasal cavities and paranasal sinuses. IARC did not find sufficient evidence of an association between occupational exposure to wood dust and cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum.

Signs and Symptoms of Exposure (Formaldehyde):
Acute: May cause temporary irritation of skin, eyes, or respiratory system. May cause sensitization in susceptible individuals.
Chronic: Numerous epidemiological studies have failed to demonstrate a relationship between formaldehyde exposure and nasal cancer or pulmonary diseases such as emphysema or lung cancer. Universities Associated for Research and Education in Pathology Inc. (UAREP) concluded that there was no “convincing evidence” that formaldehyde exposure causes cancer in humans. Rats exposed to 14 ppm of formaldehyde for 24 months in the laboratory developed nasal cancer. Exposure of 6 ppm did not result in statistically significant levels. The NCI epidemiology study of 26,000 workers found little evidence linking formaldehyde exposure to cancer. Formaldehyde is classified by OSHA and NTP as a probable or potential carcinogen. IARC has classified formaldehyde as carcinogenic to humans.

Carcinogenicity Listings (Formaldehyde):
- NTP: Reasonably Anticipated to be a Human Carcinogen
- IARC Monographs: Group 1 – Carcinogenic to Humans
- OSHA Regulated: Formaldehyde Gas

IARC - Group 1: Carcinogenic to humans. A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries.
4. Emergency and First-Aid Procedures

**Ingestion:** NAP

**Eye Contact:** Wash material out with clean running water.

**Skin Contact:** If skin abraded, seek proper first aid or medical treatment.

**Skin Absorption:** NAP

**Inhalation:** Remove to fresh air. If irritation or other symptoms persist, consult a physician.

**Note to Physician:** None

5. Fire and Explosion Data

**Flash Point (Method Used):** NAP

**UFL (Upper flammable limit) = NAP**

**Extinguishing Media:** Water spray; carbon dioxide

**Special Firefighting Procedures:** Fire fighting procedures for wood products are well known.

**Unusual Fire and Explosion Hazards:** U.V Highglossy Panel is not an explosion hazard. Sawing, sanding, or machining PANEL could result in the by-product wood dust. Wood dust may present a strong to severe explosion hazard if a dust cloud contacts an ignition source.

6. Accidental Release Measures

**Steps to be Taken In Case Material Is Released or Spilled:** Not applicable for product in purchased form. Dust generated from sawing, sanding, drilling or routing this product may be vacuumed or shoveled for recovery or disposal. Wood dust clean-up and disposal activities should be accomplished in a manner to minimize creation of airborne dust.

7. Handling and Storage

**Precautions to be Taken In Handling and Storage:** Provide adequate ventilation to reduce the possible build-up of formaldehyde vapors.

8. Exposure Control Measures, Personal Protection

**Engineering Controls:** Due to the explosive potential of wood dust when suspended in air, precautions should be taken during sanding, sawing or machining of wood products to prevent sparks or other ignition sources in ventilation equipment. Use of totally enclosed motors is recommended. Provide local exhaust as necessary to meet OSHA requirements for formaldehyde and wood dust exposure.

**Personal Protective Equipment:**

**RESPIRATORY PROTECTION:** Wear NIOSH/MSHA approved respirator when the permissible exposure limits to formaldehyde and/or wood dust may be exceeded.

**EYE PROTECTION:** Recommend goggles or safety glasses as conditions indicate when sawing, sanding or machining wood products.

**SKIN PROTECTION:** Protective equipment such as gloves and outer garments may be needed to reduce skin contact.

9. Physical/Chemical Properties

**Physical Description:** A panel product manufactured from ligno-cellulosic fibers combined with a synthetic resin or other suitable binder.

**Boiling Point (@ 760 mm Hg):** NAP

**Evaporation Rate (Butyl acetate = 1):** NAP

**Freezing Point:** NAP
Melting Point: NAP
Molecular Formula: NAP
Molecular Weight: NAP
Oil-water distribution coefficient: NAP
Odor threshold: NAP
pH: NAP
Solubility in Water (% by weight): Insoluble
Specific Gravity (H₂O = 1): <1
Vapor Density (air = 1; 1 atm): NAP
Vapor Pressure (mm Hg): NAP
Viscosity: NAP
% Volatile by Volume [@ 70°F(21°C)]: 0

10. Stability and Reactivity
Stability: ☐ Unstable ☑ Stable

Conditions to Avoid: High relative humidity and high temperature increase the rate of emission of formaldehyde from U.V Highglossy Panel.

Incompatibility (Materials to Avoid): Strong oxidizing agents, strong acids

Hazardous Decomposition or By-Products: Thermal and/or thermal-oxidative decomposition can produce irritating and toxic fumes and gases, including carbon monoxide, aldehydes and organic acids.

Hazardous Polymerization: ☐ May occur ☒ Will not occur

Sensitivity to Mechanical Impact: NAP
Sensitivity to Static Discharge: NAP

11. Toxicological Information

Wood Dust:
Wood dust (softwood or hardwood): OSHA Hazard Rating = 3.3; moderately toxic with probable oral lethal dose to humans being 0.5-5 g/kg (about 1 pound for a 70 kg or 150 pound person). Source: OSHA Regulated Hazardous Substances, Government Institutes, Inc., February 1990.

Wood dust – generated from sawing, sanding or machining the product – may cause nasal dryness, irritation, coughing and sinusitis. NTP and IARC classify wood dust as a human carcinogen (IARC Group 1). This classification is based primarily on increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. The evaluation did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust.

Formaldehyde:
OSHA Hazard Rating = 3 for local and systemic acute and chronic exposures; highly toxic. Irritation studies: human skin, 150 ug/3 days, intermittent exposure produced mild results; human eye, 1 ppm/6 minutes produced mild results. Toxicity studies: human inhalation TCL₀ of 8 ppm reported, but response not specified; human inhalation TCₜ₁₀ of 17 mg/ m³ for 30 minutes produced eye and pulmonary results; human inhalation TCₜₙ₀ of 300 ug/ m³ produced nose and central nervous system results; LC₅₀ (rat, inhalation) = 1,000 mg/m³, 30 minutes; LC₅₀ (mice, inhalation) = 400 mg/m³, 2 hours.

Exposure to gaseous formaldehyde may cause temporary irritation to the nose and throat as well as lead to respiratory disorders. However, in a thorough review of sensory/respiratory irritation studies of formaldehyde from the standpoint of occupational exposure, an expert panel has observed exposure up to concentrations of 0.3 ppm failed to produce irritation. With regard to respiratory disorders, studies have concluded the threshold for long-term chronic pulmonary effects is between 0.4 and 3 ppm and for chronic obstructive pulmonary disease is 2 ppm. Pre-existing respiratory disorders may...
be aggravated by exposure. Epidemiology studies of workers exposed to formaldehyde have failed to consistently identify an association between formaldehyde exposure and cancer. In animal studies, rats and mice exposed to high levels of formaldehyde developed nasal cancer while hamsters did not. These exposure levels are far above those levels normally found in the workplace. Formaldehyde is classified by IARC as carcinogenic to humans (Group 1). A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries. NTP included formaldehyde in the annual report on carcinogens. OSHA regulates formaldehyde as a potential carcinogen for exposures exceeding 0.5 ppm.


12. Ecological Information
No information available at this time.

13. Transport Information
Not regulated as a hazardous material.

14. Additional Information
Date Prepared: 12/21/2009
Date Revised: -------
Prepared By: Cratech Co., Ltd.
User's Responsibility: The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user’s responsibility to determine if the product is suitable for its proposed application(s) and to follow necessary safety precautions. The user has the responsibility to make sure that this sheet is the most up-to-date issue.

Definition of Common Terms:
CAS# = Chemical Abstracts System Number
LCLo = Lowest concentration in air resulting in death
LC50 = Concentration in air resulting in death to 50% of experimental animals
LDLo = Lowest dose resulting in death
LD50 = Administered dose resulting in death to 50% of experimental animals
LEL = Lower Explosive Limit
LFL = Lower Flammable Limit
NAP = Not Applicable
NAV = Not Available
PEL = Permissible Exposure Limit
RCRA = Resource Conservation and Recovery Act
STEL = Short-Term Exposure Limit (15 minutes)
TCLo = Lowest concentration in air resulting in a toxic effect

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