



# MACH POLYMER SHEET (UHMWPE) SAFETY DATA SHEET

REVISED: Sep 15, 2022

## 1) MATERIAL IDENTIFICATION

PRODUCT NAME:	UHMWPE
CHEMICAL NAME:	ETHYLENE HOMOPOLYMER AND COPOLYMER AND MODIFIED FORMS THEREOF
CAS REGISTRY NUMBER:	9002-88-4 (BASE POLYMER)
DOT HAZARD CLASS:	NOT REGULATED
SHIPPING NAME:	POLYMERIC MATERIAL

## 2) HAZARDOUS COMPONENTS & IDENTIFICATION

CAS NO:	NA
CONCENTRATION %:	NA
OSHA PEL:	NA
ACGIH TLV:	NA
ACGIH STEL:	NA

**\*FORMALDEHYDE CAN BE PRODUCED AT ELEVATED TEMPERATURE\***

**RECOMMENDED EXPOSURE LIMITS:** CONTROL AS PARTICULATE NOT OTHERWISE CLASSIFIED (PNOC) OR REGULATED:

	OSHA
	PEL
RESPIRABLE FRACTION	5MG/M3
TOTAL DUST	15MG/M3

\* THE VALUE IS FOR INHALABLE (TOTAL) PARTICULATE MATTER CONTAINING NO ASBESTOS AND <1% CRYSTALLINE SILICA.

\* BASED ON INFORMATION PRESENTLY AVAILABLE, THIS PRODUCT DOES NOT MEET ANY OF THE HAZARD DEFINITIONS OF 29 CFR SECTION 1910.1200.

SPECIFY: NO KNOWN APPLICABLE INFORMATION FOR CANADIAN "HEALTH HAZARD CATEGORIES".

OTHER: THERMAL DECOMPOSITION PRODUCTS FORMED DURING THERMAL PROCESSING ARE EXPECTED TO BE IRRITATING TO THE EYES. FORMALDEHYDE, A PROBABLE HUMAN CARCINOGEN, MAY BE FORMED AT EXTRUSION TEMPERATURES.

### 3) PHYSICAL/CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:	OPAQUE, TRANSLUCENT, COLORLESS PELLETS
PH:	NA
VAPOR PRESSURE:	NA
VAPOR DENSITY (AIR=1)	NA
ODOR:	MILD HYDROCARBON
BOILING POINT:	NA
MELTING POINT:	100-135C
SOLUBILITY:	INSOLUBLE IN WATER
SPECIFIC GRAVITY	0.915 - 0.980
DENSITY:	0.910 - 0.970 G/CM3
VOLATILE CONTENT	0.01%
EVAPORATION RATE:	NA

### 4) HEALTH HAZARD

**INGESTION:** NOT EXPECTED TO BE HARMFUL IF SWALLOWED.

**SKIN:** CONTACT WITH THE SKIN IS NOT EXPECTED TO CAUSE PROLONGED OR SIGNIFICANT IRRITATION. NOT EXPECTED TO BE HARMFUL TO INTERNAL ORGANS IF ABSORBED THROUGH THE SKIN. IF THIS MATERIAL IS HEATED, THERMAL BURNS MAY RESULT FROM SKIN CONTACT.

**EYE:** NOT EXPECTED TO CAUSE PROLONGED OR SIGNIFICANT EYE IRRITATION. DUST MAY CAUSE MECHANICAL IRRITATION. IF THIS MATERIAL IS HEATED, THERMAL BURNS MAY RESULT FROM EYE CONTACT.

**INHALATION:** NOT EXPECTED TO BE HARMFUL IF INHALED. IF THIS MATERIAL IS HEATED, FUMES MAY BE UNPLEASANT AND PRODUCE NAUSEA AND IRRITATION OF THE UPPER RESPIRATORY TRACT. INHALATION: DUST MAY PRODUCE MECHANICAL IRRITATION TO THE MUCOUS MEMBRANES OF THE NOSE, THROAT AND UPPER RESPIRATORY TRACT. LONG TERM EXPOSURE TO HIGH DUST CONCENTRATIONS MAY CAUSE NON-DEBILITATING LUNG CHANGES.

**SIGNS AND SYMPTOMS OF EXPOSURE:** THERMAL BURNS TO THE EYE: MAY INCLUDE PAIN, TEARING, REDDENING, SWELLING, AND IMPAIRED VISION. THERMAL BURNS TO THE SKIN: MAY INCLUDE PAIN OR FEELING OF HEAT, DISCOLORATION, SWELLING, AND BLISTERING. RESPIRATORY IRRITATION: MAY INCLUDE COUGHING AND DIFFICULTY BREATHING.

AT EXTRUSION TEMPERATURES (>350F, >177C), POLYETHYLENES CAN RELEASE VAPORS AND GASES WHICH ARE IRRITATING TO THE MUCOUS MEMBRANES OF THE EYES, MOUTH, THROAT, AND LUNGS. THESE SUBSTANCES MAY INCLUDE ACETALDEHYDE, ACETONE, ACETIC ACID, FORMIC ACID, FORMALDEHYDE AND ACROLEIN. GENERALLY THESE IRRITANT EFFECTS ARE ALL TRANSITORY. HOWEVER, PROLONGED EXPOSURE TO IRRITATING OFF GASES CAN LEAD TO PULMONARY EDEMA. ADEQUATE VENTILATION SHOULD PREVENT SENSORY DISCOMFORT. BASED ON ANIMAL DATA AND LIMITED EPIDEMIOLOGICAL EVIDENCE, NTP, IARC, AND OSHA HAVE LISTED FORMALDEHYDE AS A PROBABLE HUMAN CARCINOGEN.

## 5) EMERGENCY FIRST AID

**EYE:** IF HEATED MATERIAL SHOULD SPLASH INTO EYES, FLUSH EYES IMMEDIATELY WITH FRESH WATER FOR 15 MINUTES WHILE HOLDING THE EYELIDS OPEN. REMOVE CONTACT LENSES, IF WORN. GET IMMEDIATE MEDICAL ATTENTION.

**SKIN:** IF HOT MATERIAL GETS ON SKIN, QUICKLY COOL IN WATER. SEE A DOCTOR FOR EXTENSIVE BURNS. DO NOT TRY TO PEEL THE SOLIDIFIED MATERIAL FROM THE SKIN OR USE SOLVENTS OR THINNERS TO DISSOLVE IT. THE USE OF VEGETABLE OIL OR MINERAL OIL IS RECOMMENDED FOR REMOVAL OF THIS MATERIAL FROM THE SKIN.

**INGESTION:** NO SPECIFIC FIRST AID MEASURES ARE REQUIRED BECAUSE THIS MATERIAL IS NOT EXPECTED TO BE HARMFUL IF SWALLOWED.

**INHALATION:** MOVE THE EXPOSED PERSON TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL ATTENTION IF BREATHING DIFFICULTIES CONTINUE.

## 6) FIRE AND EXPLOSION HAZARD DATA

**FIRE CLASSIFICATION:** (29 CFR 1910.1200): NOT FLAMMABLE OR COMBUSTIBLE.

**FLASH POINT:** 645F (340C) ASTM (D1929)

**AUTOIGNITION:** 716F (380C)

**FLAMMABILITY LIMITS:** (% BY VOLUME IN AIR): LOWER:NA UPPER:NA

**EXTINGUISHING MEDIA:** CO2, DRY CHEMICAL, FOAM AND WATER FOG

**NFPA RATINGS: HEALTH 1; FLAMMABILITY 1, REACTIVITY 0**

**FIRE FIGHTING INSTRUCTIONS:**

THIS MATERIAL WILL BURN ALTHOUGH IT IS NOT EASILY IGNITED. FOR FIRES INVOLVING THIS MATERIAL, DO NOT ENTER ANY ENCLOSED OR CONFINED FIRE SPACES WITHOUT PROPER PROTECTIVE EQUIPMENT, INCLUDING SELF-CONTAINED BREATHING APPARATUS (NIOSH SCBA).

IF POSSIBLE, WATER SHOULD BE APPLIED AS A SPRAY FROM A FOGGING NOZZLE SINCE THIS IS A SURFACE BURNING MATERIAL. THE APPLICATION OF HIGH VELOCITY WATER WILL SPREAD THE BURNING SURFACE LAYER.

**COMBUSTION PRODUCTS:**

NORMAL COMBUSTION FORMS CARBON DIOXIDE, WATER VAPOR AND MAY PRODUCE CARBON MONOXIDE, ORIGINAL MONOMER, OTHER HYDROCARBONS AND HYDROCARBON OXIDATION PRODUCTS, DEPENDING ON TEMPERATURE AND AIR AVAILABILITY.

## 7) ACCIDENTAL RELEASE MEASURES

SWEEP UP MATERIAL AND PLACE IN A DISPOSABLE CONTAINER. IF LIQUID MATERIAL IS SPILLED, ALLOW IT TO COOL AND SOLIDIFY BEFORE PROCEEDING WITH DISPOSAL METHODS. CONTAIN SPILL AND CONTROL DUSTS. KEEP OUT OF WATER SOURCES AND SEWERS. SPILLED PELLETS CAN CREATE SLIPPING HAZARD. SWEEP OR VACUUM UP SPILL AND PLACE IN DRUMS FOR RECOVERY OR DISPOSAL.

**8) HANDLING AND STORAGE**

AVOID CONTACT OF HEATED MATERIAL WITH EYES, SKIN, AND CLOTHING. AVOID BREATHING VAPOR OR FUMES FROM HEATED MATERIAL.

STORE IN SPRINKLER PROTECTED WAREHOUSE. SINCE MACH POLYMER SHEET IS POOLYETHYLENE, THEY WILL BURN WITH A HOT FLAME IF IGNITED. STORE AWAY FROM HEAT OR FLAMES.

AIRBORNE DUST CONCENTRATIONS ABOVE 20MG/L MAY CREATE A DUST EXPLOSION HAZARD. AVOID INHALATION OF PRODUCT DUST (FINES). AVOID EYE CONTACT WITH PRODUCT DUST. AVOID INHALATION OF, AND EYE CONTACT WITH, OFF GASES WHICH MAY BE PRODUCED DURING THERMAL PROCESSING. DO NOT GET MOLTEN MATERIAL IN EYES, ON SKIN OR ON CLOTHING. PROCESS ONLY WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. LAUNDER EXPOSED CLOTHING BEFORE REUSE.

THERMAL DECOMPOSITION PROCESSING OFF GAS CONDENSATE MAY FORM ON SURROUNDING EQUIPMENT. IMPERVIOUS GLOVES AND APRON SHOULD BE USED WHEN CLEANING CONDENSATE FROM EQUIPMENT.

MOLTEN POLYMER MAY CAUSE SEVERE THERMAL BURNS. THE INTERIOR OF MOLTEN MASSES MAY REMAIN HOT FOR SOME TIME BECAUSE OF LOW THERMAL CONDUCTIVITY OF THE POLYMER. USE CARE WHEN DISPOSING OF OR HANDLING SUCH MASSES.

SPILLED PELLETS MAY CREATE A SLIPPING HAZARD.

AVIOD CONTAMINATING SOIL OR RELEASING THIS MATERIAL INTO SEWAGE AND DRAINAGE SYSTEMS AND BODIES OF WATER.

BOND AND GROUND ALL CONTAINERS AND EQUIPMENT BEFORE TRANSFER OPERATIONS TO PREVENT ELECTROSTATIC ACCUMULATION HAZARD.

**9) EXPOSURE CONTROLS/PERSONAL PROTECTION**

**GENERAL CONSIDERATIONS**

CONSIDER THE POTENTIAL HAZARDS OF THIS MATERIAL, APPLICABLE EXPOSURE LIMITS, JOB ACTIVITIES, AND OTHER SUBSTANCES IN THE WORK PLACE WHEN DESIGNING ENGINEERING CONTROLS AND SELECTING PERSONAL PROTECTIVE EQUIPMENT. IF ENGINEERING CONTROLS OR WORK PRACTICES ARE NOT ADEQUATE TO PREVENT EXPOSURE TO HARMFUL LEVELS OF THIS MATERIAL, THE PERSONAL PROTECTIVE EQUIPMENT LISTED BELOW IS RECOMMENDED. THE USER SHOULD READ AND UNDERSTAND ALL INSTRUCTIONS AND LIMITATIONS SUPPLIED WITH THE EQUIPMENT SINCE PROTECTION IS USUALLY PROVIDED FOR A LIMITED TIME OR UNDER CERTAIN CIRCUMSTANCES.

**ENGINEERING CONTROLS**

USE IN A WELL-VENTILATED AREA. IF HEATED MATERIAL GENERATES VAPOR, OR FUMES, USE PROCESS ENCLOSURES, LOCAL EXHAUST VENTILATION, OR OTHER ENGINEERING CONTROLS TO CONTROL EXPOSURE. VENTILATION REQUIREMENTS MUST BE LOCALLY DETERMINED. IF HANDLING RESULTS IN DUST GENERATION,

SPECIAL VENTILATION MAY BE NEEDED TO ENSURE THAT DUST EXPOSURE DOES NOT EXCEED THE OSHA PEL FOR NUISANCE DUST.

## 10) PERSONAL PROTECTIVE EQUIPMENT

**VENTILATION:** USE ADEQUATE VENTILATION TO CONTROL BELOW RECOMMENDED EXPOSURE LEVELS. SUPPLEMENTAL VENTILATION MAY BE NEEDED TO CONTROL OFF GASES WHICH MAY BE PRODUCED DURING THERMAL PROCESSING.

**EYE/FACE PROTECTION:** WEAR SAFETY GLASSES WITH SIDE SHIELDS WHEN WORKING WITH THIS MATERIAL AS A GOOD SAFETY PRACTICE. IF THIS MATERIAL IS HEATED, WEAR CHEMICAL GOGLES OR SAFETY GLASSES AND A FACE SHEILD.

**SKIN PROTECTION:** WEAR PROTECTIVE CLOTHING TO MINIMIZE SKIN CONTACT AS A GOOD INDUSTRIAL HYGIENE PRACTICE. SELECTION OF PROTECTIVE CLOTHING WILL DEPEND ON OPERATIONS CONDUCTED. USE HEAT RESISTANT GLOVES WHEN HANDLING HOT MATERIAL. USE IMPERVIOUS GLOVES AND APRON WHEN CLEANING THERMAL DECOMPOSITION PROCESSING OFF GAS CONDENSATE FROM EQUIPMENT. CONSIDER PHYSICAL REQUIREMENTS AND OTHER SUBSTANCES WHEN SELECTING PROTECTIVE CLOTHING.

**RESPIRATORY PROTECTION:** NO SPECIAL RESPIRATORY PROTECTION IS NORMALLY REQUIRED. WHEN CUTTING OR ABRADING THESE MATERIALS USE A RESPIRATOR APPROVED BY IOSH FOR PROTECTION AGAINST DUST, MISTS AND FUMES HAVING AN EXPOSURE LIMIT MEASURED AS A TIME WEIGHTED AVERAGE (TWA) OF NOT LESS THAN 0.05MG/M3. WHEN VAPORS OR FUMES FROM THE HEATED MATERIAL ARE NOT ADEQUATELY CONTROLLED, WEAR A NIOSH/MSHA APPROVED RESPIRATOR. USE THE FOLLOWING ELEMENTS FOR AIR-PURIFYING RESPIRATORS: ORGANIC VAPOR AND FORMALDEHYDE.

NOTE: PERSONAL PROTECTION INFORMATION IS BASED UPON GENERAL INFORMATION AS TO NORMAL USES AND CONDITIONS. WHERE SPECIAL OR UNUSUAL USES OR CONDITIONS EXIST, IT IS SUGGESTED THAT THE EXPERT ASSISTANCE OF AN INDUSTRIAL HYGIENIST OR OTHER QUALIFIED PROFESSIONAL BE SOUGHT.

## 11) STABILITY AND REACTIVITY

**HAZARDOUS DECOMPOSITION PRODUCTS:** LOW MOLECULAR WEIGHT HYDROCARBONS, ALCOHOLS, ALDEHYDES, ACIDS, CARBON OXIDES AND KETONES CAN BE FORMED DURING THERMAL PROCESSING.

**CHEMICAL STABILITY:** STABLE

**CONDITIONS TO AVOID:** AVOID HEATING ABOVE THE RECOMMENDED PROCESSING TEMPERATURE. DO NOT HEAT ABOVE THE AUTOIGNITION TEMPERATURE. DO NOT HEAT WITHOUT ADEQUATE VENTILATION.

**INCOMPATIBILITY WITH OTHER MATERIALS:** MAY REACT WITH STRONG OXIDIZING AGENTS, SUCH AS CHLORATES, NITRATES, PEROXIDES, ETC. MAY REACT WITH FREE HALOGENS.

**POLYMERIZATION:** WILL NOT OCCUR.

## 12) TOXICOLOGICAL INFORMATION

**EYE EFFECTS:** THE EYE IRRITATION HAZARD IS BASED ON DATA FOR A SIMILAR MATERIAL.

**SKIN EFFECTS:** THE SKIN IRRITATION HAZARD IS BASED ON DATA FOR A SIMILAR MATERIAL. THE ACUTE DERMAL TOXICITY IS BASED ON DATA FOR A SIMILAR MATERIAL.

**ACUTE ORAL EFFECTS:** THE ACUTE ORAL TOXICITY IS BASED ON DATA FOR A SIMILAR MATERIAL.

**ADDITIONAL TOXICOLOGY INFORMATION:** A SIMILAR MATERIAL DID NOT CAUSE SKIN SENSITIZATION IN A PATCH TEST STUDY WITH HUMAN SUBJECTS.

THIS PRODUCT CONTAINS POLYMERIZED ETHYLENE. DURING THERMAL PROCESSING, THIS POLYMER CAN DEGRADE. THE THREE VARIABLES WHICH CONTROL ITS DEGRADATION ARE THE TEMPERATURE, THE LENGTH OF TIME AT THAT TEMPERATURE, AND THE AMOUNT OF OXYGEN AVAILABLE. DEPENDING ON THE LOCAL PROCESSING CONDITIONS, A VARIETY OF LOW MOLECULAR WEIGHT HYDROCARBONS, ALCOHOLS, ALDEHYDES, ACIDS, AND KETONES CAN BE FORMED. THESE MATERIALS ARE RESPIRATORY IRRITANTS. PROLONGED AND REPEATED BREATHING OF FUME COMPONENTS HAS BEEN SHOWN TO CAUSE OTHER ADVERSE HEALTH EFFECTS. EXPOSURE TO PROCESSING EMISSIONS SHOULD BE MINIMIZED BY FOLLOWING ALL RECOMMENDATIONS IN THIS MSDS.

## 13) ECOLOGICAL INFORMATION

**ECOTOXICITY:** FISH OR BIRDS MAY EAT PELLETS WHICH MAY OBSTRUCT THEIR DIGESTIVE TRACTS.

**ENVIRONMENTAL FATE:** THIS MATERIAL IS NOT EXPECTED TO BE READILY BIODEGRADABLE.

## 14) DISPOSAL CONSIDERATIONS

PLACE CONTAMINATED MATERIALS IN DISPOSABLE CONTAINERS AND DISPOSE OF IN A MANNER CONSISTENT WITH APPLICABLE REGULATIONS. CONTACT LOCAL ENVIRONMENTAL OR HEALTH AUTHORITIES FOR APPROVED DISPOSAL OF THIS MATERIAL. RECOVER FOR REUSE, RECYCLE, INCINERATE FOR ENERGY OR PLACE IN WASTE MANAGEMENT FACILITY. PRIOR TO DISPOSAL, CONSULT YOUR ENVIRONMENTAL CONTACT TO DETERMINE IF THE TCLP (TOXICITY CHARACTERISTIC LEACHING PROCEDURE, EPA TEST METHOD 1311) IS REQUIRED.

## 15) REGULATORY INFORMATION

SARA 311 CATEGORIES:

1. IMMEDIATE (ACUTE) HEALTH EFFECTS:	NO
2. DELAYED (CHRONIC) HEALTH EFFECTS:	NO
3. FIRE HAZARD:	NO
4. SUDDEN RELEASE OF PRESSURE HAZARD:	NO
5. REACTIVITY HAZARD:	NO

**16) OTHER INFORMATION**

**NFPA RATINGS: HEALTH 1; FLAMMABILITY 1; REACTIVITY: 0;**

**HMIS RATINGS: HEALTH 0; FLAMMABILITY 1; REACTIVITY: 0;**

(0-LEAST, 1-SLIGHT, 2-MODERATE, 3-HIGH, 4-EXTREME, PPE:-PERSONAL PROTECTION EQUIPMENT INDEX RECOMMENDATION, \*-CHRONIC EFFECT INDICATOR). THESE VALUES ARE OBTAINED USING THE GUIDELINES OR PUBLISHED EVALUATIONS PREPARED BY THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) OR THE NATIONAL PAINT AND COATING ASSOCIATION (FOR HMIS RATINGS).

**ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:**

TLV	- THRESHOLD LIMIT VALUE	TWA	- TIME WEIGHTED AVERAGE
STEL	- SHORT-TERM EXPOSURE LIMIT	TPQ	- THRESHOLD PLANNING QANTITY
RQ	- REPORTABLE QANTITY	PEL	- PERMISSIBLE EXPOSURE LIMIT
C	- CEILING LIMIT	CAS	- CHEMICAL ABSTRACT SERVICE NUMBER
NDA	- NO DATA AVAILABLE	NA	- NOT APPLICABLE

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