



**Crown Plastics**  
Continuous Pressure Press for UHMW

## Crown Plastics Thin Gauge UHMW-PE Films and Tapes

UHMW-PE is one of the most versatile materials on the market today. It has a coefficient of friction that rivals Teflon but is 30 times more abrasion resistant. It has excellent chemical and impact resistance which gives it countless applications in nearly every imaginable industry. It is ideal in handling issues concerning friction, wear, corrosion, sticking, sliding, surface protection, noise abatement and gliding.

Property	Test Method	Value
Tensile Strength (PSI)	ASTM-D 882	6000
Elongation (%)	ASTM-D 882	300
Water Absorbtion		0.01
Density (g/cc)		0.93
Heat Distortion (°F)	ISO R75 Method A	203
Deformation (%)	2000 psi,6hr.,122°F	6-8
Dielectric Strength (V/mil)	ASTM-D 149	3000
Dissipation Factor	ASTM-D 150	0.0004
Coefficient of Thermal Expansion		~1.1x10 <sup>4</sup>
Thermal Conductivity	(73°F)[(BTUin)/(ft <sup>2</sup> hr°F)]	0.44
Product Thickness	Available in .003,.005,.010,.015,.020 Custom thicknesses available upon request Call for lead times and minimums	
Product Width	1/4" out to 24"	
Adhesive Options	<p>Avery 8345 - .005 mil rubber adhesive with 175 oz/in peel strength and temp. range 120°F -175°F Standard adhesive - very aggressive, bonds well to metal, painted surfaces and many other low surface energy materials that require high tack</p> <p>Avery 1150 - .002 mil acrylic transfer adhesive with temp range of 225°F - 300°F. Excellent UV, temp. moisture and chemical resistance. Very versatile.</p>	

Call our technical reps for additional adhesive options at (800) 368-0238



www.crownplastics.com

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## Material Safety Data Sheet

Ticona

Product Name: GUR 4000 NATURAL  
 Product Code: AB4000  
 MSDS Number: GUR001  
 Revision Number: 1  
 Version Date: 11/10/1998

Page 1 of 5

Print Date 2/21/00 5:01:51 PM

**Section 1. Chemical, Product and Company Identification**

Product Name: ~~GUR 4000~~ NATURAL  
 Product Code: AB4000  
 MSDS Number: GUR001

Synonyms: POLYETHYLENE  
 ETHENE HOMOPOLYMER  
 ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE (UHMWPE)

Responsible Party: TICONA (formerly Hoechst Celanese Corporation)  
 2525 South Shore Blvd., Suite 110  
 League City, TX 77573  
 United States

Product Use: Engineering thermoplastic.  
 MSDS prepared by Barry Fink of Ticona (phone 908-522-7223)

**Section 2. Composition/Information on Ingredients**

Ingredients:	Ingredient	CAS Number
	Base Resin	9002-88-4

While this product is not classified as hazardous under OSHA Regulations, this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and made available for employees and other users of the product.

This product is not regulated by WHMIS.

**Section 3. Hazards Identification**

**Emergency Overview:** Fine white powder with slight to no odor. Fine powder may present a dust explosion hazard if suspended in air. Combustion and decomposition may produce hazardous fumes. Hot or molten material can cause thermal burns on contact with skin or eyes. Spilled powder may create a slipping hazard.

**Potential Health Effects:**

**Routes of Exposure:** Skin and eye contact, inhalation of dust and inhalation of vapors, if overheated.

**Signs and Symptoms of Exposure:** This specific product has not been tested.

**Immediate Effects:**

**Skin:** This specific product has not been tested. Hot or molten material has the potential to cause thermal burns. Polymer particles can cause mechanical irritation.



**Transportation:** Emergency: (800)424-9300 CHEMTREC - 24 hrs in USA (703)827-3887 Outside USA  
**Product Emergency:** (888)522-7818 Ticona - 24 hrs/day, toll free in the USA and Canada.

**Product Information:** (800)242-8489 - toll free in North America

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Product Name: GUR 4000 NATURAL  
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Print Date 2/21/00 5:01:51 PM

**Eyes:** This specific product has not been tested. Polymer particles can cause mechanical irritation. Degradation vapors may cause irritation.

**Inhalation:** This specific product has not been tested. In the form supplied, this material is not considered an inhalation hazard; polymer particles may be considered an inert nuisance particulate. Overheating in processing may generate hazardous, irritating vapors. Avoid breathing dust or vapor.

**Ingestion:** This specific product has not been tested; however, low toxicity by this route is expected based on the biological activity of similar materials.

**Long Term/Delayed Effects:** This specific product has not been tested.

**Medical Conditions Aggravated by Exposure:** This specific product has not been tested.

**Section 4. First Aid Measures**

**Skin:** If hot or molten polymer or hot vapors contact skin, cool rapidly with cold water. If polymer is stuck to skin, do not remove. Seek medical attention. Allow adhered polymer to come off naturally. Removal of adhered polymer may result in more tissue damage than if polymer is allowed to come off over time.

**Eyes:** Flush with plenty of water. Seek medical attention if discomfort persists, and to remove foreign body.

**Inhalation:** Remove to fresh air. Seek medical attention if breathing difficulties occur.

**Ingestion:** If a significant quantity has been swallowed, give two glasses of water to dilute. Seek medical attention.

**Note to Physicians:** This product is essentially inert and nontoxic. However, if it is heated at too high a temperature or if it is burned, gases may be released (see Sections 5 and 10 for off-gases). Patients who have been exposed to off-gases may need to have their arterial blood gases and carboxyhemoglobin levels checked. If the carboxyhemoglobin levels are normal, asphyxia (carbon dioxide replacing oxygen) is a possibility. As with any fire, irritant gases may have formed. If patients may have inhaled high concentrations of irritating fumes, they should be monitored for delayed onset pulmonary edema.

**Section 5. Fire Fighting Measures**

**Flashpoint:** Not applicable.

**Hazardous Products of Combustion:** Carbon monoxide and carbon dioxide.

**Extinguishing Media:** Water spray, foam, carbon dioxide, or dry chemical.

**Firefighting Instructions:** Firefighters should wear self-contained breathing apparatus and full fire-fighting turn-out gear (bunker gear). Keep personnel removed from and upwind of fire. Water should be used to keep fire-exposed containers cool. Water, foam and dry chemical may cause damage to electrical equipment.



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Product Name: GUR 4000 NATURAL  
 Product Code: AB4000  
 MSDS Number: GUR001  
 Revision Number: 1  
 Version Date: 11/10/1998

### Section 6. Accidental Release Measures

\*For more information, see regulatory section 15.

**Procedures in Case of Spill or Leak:** Sweep or gather up spills and place in proper container for recovery or disposal. Ticona supports SPI's Operation Clean Sweep.

### Section 7. Handling and Storage

**Handling:** Do not handle hot or molten material without appropriate protective equipment. Maintain good housekeeping in work areas. Do not exceed recommended process temperatures to minimize release of decomposition products. Do not smoke in areas where polymer dust is present. Appropriate measures should be taken to control the generation and accumulation of dust during conveying and processing operations. Electrical grounding of equipment and the minimization of ignition sources is required when handling powder to avoid possible dust explosion.

**Storage:** Store in a cool dry place.

### Section 8. Exposure Controls/Personal Protection

**Engineering Controls:** Local Exhaust: Recommended when appropriate to control employee exposure to dust or process vapors.  
 General: May not be adequate as the sole means to control employee exposure.

#### Protective Equipment:

**Skin:** When thermal or melt processing, wear long pants, long sleeves, well insulated gloves, and face shield when there is a chance of contact.

**Eyes:** Safety eyewear recommended.

**Inhalation:** A NIOSH approved respirator is recommended if there is a possibility of dust generation above permissible exposure limits or that decomposition vapors may be generated.

#### Exposure Guidelines:

Ingredient:	Agency:	Value:
Nuisance/inert dust	OSHA PEL	15 mg/cu m (total) 5 mg/cu m (respirable)
Nuisance particulates	ACGIH TLV	10 mg/cu m (total) 3 mg/cu m (respirable)

Ticona recommends the ACGIH Limit.

### Section 9. Physical and Chemical Properties

**Appearance:** White powder  
**Odor:** Slight to none  
**Physical State:** Solid  
**Vapor Pressure:** Not applicable  
**Vapor Density:** Not applicable



**Transportation:** Emergency: (800)424-8300 CHEMTREC - 24 hrs in USA (703)527-3887 Outside USA  
**Product Emergency:** (888)522-7816 Ticona - 24 hrs/day, toll free in the USA and Canada.  
**Product Information:** (800)242-8489- toll free in North America

**Product Name:** GUR 4000 NATURAL  
**Product Code:** AB4000  
**MSDS Number:** GUR001  
**Revision Number:** 1  
**Version Date:** 11/10/1998  
**Solubility:** < 0.001 Wt % (in water)  
**Specific Gravity:** 0.925-0.940 @ 25 deg C

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**Section 10. Stability and Reactivity**

**Chemical Stability:** Stable under ordinary conditions of use and storage.  
**Conditions to Avoid:** Flame; avoid prolonged heating at processing temperatures. Do not heat above 330 deg C (626 deg F). Avoid prolonged heating above 250 deg C (482 deg F). Fine powder may present a dust explosion hazard. Appropriate measures should be taken to control the generation of and accumulation of dust during conveying and processing operations. Electrical grounding of equipment and the minimization of ignition sources is required when handling powder to avoid possible dust explosion.  
**Incompatibility:** Halogens, strong oxidizers and aromatic solvents.  
**Hazardous Decomposition Products:** Aliphatic hydrocarbons.  
**Hazardous Polymerization:** Will not occur.

**Section 11. Toxicological Information**

No specific information available on the product.

**Section 12. Ecological Information**

**Ecotoxicity:** No specific information available on the product.  
**Environmental Fate/Information:** This material is considered to be non-biodegradable.

**Section 13. Disposal Considerations**

**Disposal:** Recycling is encouraged. Dispose of in accordance with federal, state, and local regulations. This product, as shipped, is not a RCRA hazardous waste under present EPA regulations.


**Section 14. Transport Information**

Not regulated under US Department of Transportation.

**Section 15. Regulatory Information**

**TSCA:** All the ingredients of this product comply with TSCA Inventory Regulations.  
**SARA:** This product does not contain any toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372.

**Section 16. Other Information**

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**Product Information:** (800)242-8469- toll free in North America

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Product Name:  
Product Code:  
MSDS Number:  
Revision Number:  
Version Date:  
Hazard Ratings:

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GUR 4000 NATURAL  
AB4000  
GUR001  
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11/10/1998

TICONA BPW

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Agency	Health	Flammability	Reactivity	Other
NFPA	1	1	0	
HMIS	1	0	0	

Note 1: NFPA and HMIS ratings are as determined by Ticona.

**Disclaimer:**

This product is not intended for use in medical or dental implants.

Refer to the appropriate Ticona bulletins for specific processing guidance and good manufacturing practices (purging, processing parameters, shutdown, etc.).

The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Ticona makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.



Transportation

Product Emergency:

Product Information:

Emergency: (800)424-9300 CHEMTREC - 24 hrs in USA (703)527-3867 Outside USA  
(888)522-7810 Ticona - 24 hrs/day, toll free in the USA and Canada.  
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## UHMW Properties

### Mechanical Properties

Property	ASTM Test	Units Metric (US)	UHMW Thickness Gauges		
			.030"	.060"	.125"
Density	D792	gm/cc	0.93	0.93	0.93
Tensile Strength @ Yield	D638	MPa(psi)	23(3300)	20(2964)	22(3227)
Tensile Strength @ Break	D638	MPa(psi)	53(7740)	49(7056)	44(6373)
Elongation @ Break	D638	%	460	463	466
Youngs "E" Modulus	D638	MPa(psi x 105)	725(1.05)	731(1.06)	672(.097)
Izod Impact Stength	D256(1)	J/m(ft-lb/in notch)	*	*	80(16.8)
Hardness Shore "D"	D2240	-	65	65	65
Water Absorbtion	D570	%	Nil	Nil	Nil
Rel. Solution Viscocity	D4020	dl/gm	2.3-3.5	2.3-3.5	2.3-3.5
Coefficient of Friction	D1894-96	Static	.16	.16	.16
Coefficient of Friction	D1894-96	Dynamic	.14	.13	.14

(1) - Izod Impact: Samples have 2(15° +/- 1/2°) notches on opposite sides to a depth of 5mm

### Thermal Properties

Crytalline Melting Range	Polarizing	°C(°F)	136(276)	134(273)	134(273)
Crystallinity	D3417-96	%	48	47	50
Coefficient of Linear Expansion					
20° - 100°C	D696	K <sup>-1</sup>	*	*	1.5 x 10 <sup>-4</sup>
-20° to -100°C	D696	K <sup>-1</sup>	*	*	9.18 x 10 <sup>-5</sup>

### Electrical Properties (1% Carbon Filled)

Volume Resistivity	D257	Ohms/cm	5.9544x10 <sup>7</sup>	1.4516x10 <sup>7</sup>	>2x10 <sup>7</sup>
Dielectric Strength	D150	Kv/cm(V/mil)	*	*	142
Dielectric Constant	D150		2.481	2.454	2.542
Surface Resistivity	D257	Ohms	10 <sup>3</sup>	10 <sup>3</sup>	10 <sup>3</sup>
Static Decay		Seconds	<.01	<.01	<.01
Dissipation Factor					
At 50Hz	D150		0.0594	0.0213	0.0082
At 10KHz	D150		0.1085	0.0690	0.0022
At 5MHz	D150		0.1035	0.2340	0.0034

\* - No reading could be taken due to material thickness

### Comparison Of Dynamic Coefficient Of Friction On Polished Steel

Material	UHMW-PE	Nylon 6	Nylon 6/6	Nylon MoS2	PTFE	Acetal Polymer
Dry	.10 - .22	.15 - .40	.15 - .40	.12 - .20	.04 - .25	.15 - .35
Water	.05 - .10	.14 - .19	.14 - .19	.10 - .12	.04 - .08	.10 - .20
Oil	.05 - .08	.02 - .11	.02 - .11	.08 - .10	.04 - .05	.05 - .08