

Ergon Armor      **Revision Number:** 4.000  
**Issue Date:** 01/17/2012

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name:** FURALAC® MEMBRANE RESIN      **ID(s):**

**Product type:** Resin component of a two-part furan resin based laminate lining system.      **Region:** United States

**Company address:** Ergon Armor  
Corrosion Engineering  
300 Stevens Drive, Suite 310  
Lester, PA 19113

**Contact information:**  
Telephone: 610.833.4000  
Emergency: Call CHEMTREC at 800.424.9300  
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**2. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

|                        |                     |                      |                    |
|------------------------|---------------------|----------------------|--------------------|
| <b>Physical state:</b> | Viscous liquid      | <b>HMIS:</b>         |                    |
| <b>Color:</b>          | Dark reddish brown  | HEALTH:              | 2                  |
| <b>Odor:</b>           | Mildly pungent odor | FLAMMABILITY:        | 2                  |
|                        |                     | PHYSICAL HAZARD:     | 1                  |
|                        |                     | Personal Protection: | See MSDS section 8 |

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe  
\* = Chronic Health Hazard

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES EYE IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. PROLONGED EXPOSURE TO HIGH VAPOR CONCENTRATIONS CAN CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION INCLUDING HEADACHE, DIZZINESS, WEAKNESS, CONFUSION, NAUSEA, AND LOSS OF CONSCIOUSNESS.

**Relevant routes of exposure:** Eye and skin contact, inhalation

**Potential Health Effects**

**Furfuryl alcohol** Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Vapor concentrations of 15.8 ppm have been reported to cause eye and upper respiratory irritation with coughing, reddening of the eyes and blurred vision. Exposure to high vapor concentrations may result in central nervous system (CNS) depression with possible effects such as nausea, headache, drowsiness, dizziness and loss of coordination. This material can be absorbed through the skin. Contact with liquid may be severely irritating to the eyes and repeated contact may cause skin irritation. Although this material has not been reported to produce an allergic response, information from animal studies indicates that repeated contact with furfuryl alcohol may cause allergic skin reaction in susceptible individuals. This material is also considered, on the basis of single exposure animal tests, to be moderately toxic after ingestion (swallowing), skin contact and inhalation.

**Furfural**

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Overexposure to furfural vapors has been reported to cause eye and upper respiratory irritation, numbness of the tongue and mucous membranes of the mouth, coughing and breathing difficulty. Exposure to high vapor concentrations may result in central nervous system (CNS) depression with possible effects such as nausea, headache, drowsiness, dizziness, loss of coordination and behavioral changes. Contact with liquid may be severely irritating to the eyes and repeated contact may cause skin irritation. Sensitization studies carried out with human volunteers produced no allergic skin responses, but allergic skin reactions have been infrequently reported in workers. While swallowing of this material is unlikely in the industrial setting, if swallowed this material may cause digestive tract irritation, nausea, vomiting and diarrhea. This material is considered, on the basis of single exposure (acute) animal tests, to be moderately toxic if ingested (swallowed), inhaled or absorbed through skin.

**Existing conditions aggravated by exposure:** NE

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).  
**See Section 11 for additional toxicological information.**

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

| <b>Hazardous components</b>  | <b>CAS-No.</b> | <b>%</b> |
|------------------------------|----------------|----------|
| Furfuryl alcohol homopolymer | 25212-86-6     | 70-80    |
| Furfural                     | 98-01-1        | 15-25    |
| Furfuryl alcohol             | 98-00-0        | 3-10     |

**4. FIRST AID MEASURES**

- Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
- Skin contact:** Immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Destroy contaminated shoes.
- Eye contact:** Immediately flush with plenty of water for at least 15 minutes. Get medical attention.
- Ingestion:** Get medical help. If conscious and medical help not available, give plenty of water. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

**5. FIRE FIGHTING MEASURES**

- Flash point:** 168°F, 76°C (Pensky-Martens)
- Autoignition temperature:** NE
- Flammable/Explosive limits - lower:** NE
- Flammable/Explosive limits - upper:** NE
- Extinguishing media:** "Alcohol" foam, carbon dioxide, dry chemical -- Use water spray to cool containers exposed to fire.
- Special firefighting procedures:** *Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.*
- Unusual fire or explosion hazards:** Acid contamination can cause violent, exothermic polymerization.

**Hazardous combustion products:** Carbon dioxide, carbon monoxide.

**6. ACCIDENTAL RELEASE MEASURES**

**Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.**

**Environmental precautions:** Shut off sources of ignition. Remove nonessential personnel from area. Ventilate area.

**Clean-up methods:** Contain spill, stop leak at source if safe to do so. Pump liquid into DOT-approved drums for disposal. Absorb remaining material with sand, earth or other non-combustible, absorbent material and place into DOT-approved drums for disposal. Place covers on all drums. Flush area with water to remove last traces.

*Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.*

**7. HANDLING AND STORAGE**

**Handling:** Avoid acid contamination and skin contact. Keep containers tightly closed. No smoking or eating in handling area.

**Storage:** Store in a cool, dry, well ventilated location. Outside or detached storage is preferred. Separate from oxidizers, acids, and acidic catalysts.

**For information on product shelf life, please review labels on container or check the Technical Data Sheet.**

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.**

| Hazardous components         | ACGIH TLV   | OSHA PEL                              | AIHA WEEL | OTHER  |
|------------------------------|---|---------------------------------------|-----------|--|
| Furfuryl alcohol homopolymer | NE  | NE                                    | NE        | NE   |
| Furfural                     | 2 ppm, 7.9 mg/m <sup>3</sup> TWA; Skin                                    | 5 ppm, 20 mg/m <sup>3</sup> TWA; Skin | NE        | NE   |
| Furfuryl alcohol             | 10 ppm, 40 mg/m <sup>3</sup> TWA; 15 ppm, 60 mg/m <sup>3</sup> STEL; Skin | 50 ppm, 200 mg/m <sup>3</sup> TWA     | NE        | NIOSH REL: 10 ppm, 40 mg/m <sup>3</sup> TWA; 15 ppm, 60 mg/m <sup>3</sup> STEL; Skin |

**Engineering controls:** Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (listed above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

- Respiratory protection:** Avoid breathing vapor. When airborne exposure limits are exceeded (see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.
- Eye/face protection:** Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.
- Skin protection:** Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|   |                              |
|---|------------------------------|
| <b>Physical state:</b>                          | Viscous liquid               |
| <b>Color:</b>                                   | Dark reddish brown           |
| <b>Odor:</b>                                    | Mildly pungent odor          |
| <b>Odor threshold:</b>                          | NE                           |
| <b>pH:</b>                                      | NE                           |
| <b>Vapor pressure (mm Hg):</b>                  | < 1 @ 68°F, 20°C             |
| <b>Boiling point/range:</b>                     | NE                           |
| <b>Melting point/ range:</b>                    | NE                           |
| <b>Specific gravity (H<sub>2</sub>O=1):</b>     | 1.24                         |
| <b>Vapor density:</b>                           | NE                           |
| <b>Flash point:</b>                             | 168°F, 76°C (Pensky-Martens) |
| <b>Flammable/Explosive limits - lower:</b>      | NE                           |
| <b>Flammable/Explosive limits - upper:</b>      | NE                           |
| <b>Autoignition temperature:</b>                | NE                           |
| <b>Evaporation rate:</b>                        | NE                           |
| <b>Solubility in water:</b>                     | Slightly soluble             |
| <b>Partition coefficient (n-octanol/water):</b> | NE                           |
| <b>VOC content:</b>                             | NE                           |

## 10. STABILITY AND REACTIVITY

|  |   |
|--|---|
| <b>Stability:</b>                        | Normally stable.  |
| <b>Hazardous polymerization:</b>         | Can occur on mixing with acids or acidic catalysts.                                 |
| <b>Hazardous decomposition products:</b> | Combustion produces carbon dioxide and carbon monoxide.                             |
| <b>Incompatibility:</b>                  | Oxidizers. Acids. Contact with acids can cause violent eruptions and/or explosions. |
| <b>Conditions to avoid:</b>              | See warnings above.   |

## 11. TOXICOLOGICAL INFORMATION

### Toxicological Information

Data available for this material and/or its components are summarized below:

#### General Product Information:

Not available for the product.

**Component Data:**

**Furfural**

**LD50/LC50:**

Because of its low vapor pressure, overexposure to furfural is unlikely if adequate ventilation is provided; however, in a manufacturing plant for this material with inadequate ventilation, workers experienced eye and upper respiratory irritation and numbness of the tongue and mucous membrane of the mouth. Subchronic inhalation exposure of hamsters to vapor of this material caused hyperplasia of the nasal epithelium and eye irritation. Repeated inhalation exposure of rats resulted in lung congestion. Studies in animals with oral or intraperitoneal routes of exposure have shown liver and kidney effects with high-dose administration of this material. Single exposure (acute) studies indicate: Oral - Moderately Toxic to Rats (LD50 65-175 mg/kg), Dermal - Moderately Toxic to Rabbits (LD50 Estimated to be between 310 and 620 mg/kg), Inhalation - Moderately Toxic to Rats (1-hr and 4-hr LC50s 1,037 ppm and 235 ppm, respectively), Eye Irritation - Severely Irritating to Rabbits Skin Irritation - Slightly Irritating to Rabbits.

**MUTAGENICITY:**

This material has generally produced no genetic changes in standard tests using bacterial cells, but has caused chromosomal changes in animal cells and increased sister chromatid exchange in human lymphocytes. Generally, this material has not caused chromosomal damage in whole animal tests; some effects have been observed in fruit flies.

**CARCINOGENICITY (see cancer lists below):**

Several studies have been conducted to evaluate the potential carcinogenicity of this material. The International Agency for Research on Cancer (IARC) has reviewed this material and determined that it is "not classifiable as to its carcinogenicity to humans" (IARC Monographs, Vol. 63). Exposure of hamsters to this material by inhalation or intratracheal instillation did not result in any increased incidence of cancer. Dietary administration of this material also produced no excess of tumors. Repeated application to the skin of mice for 5-weeks produced some skin tumors. In life-time cancer bioassays conducted by the National Toxicology Program in mice and rats, animals were given this material orally in corn oil at levels up to 60 or 175 mg/kg per day. Some evidence for carcinogenicity was found in male rats, but female rats showed no increased evidence of cancer. In mice, both males and females had increased numbers of liver tumors.

**Furfuryl alcohol**

**LD50/LC50:**

The acute data suggests that this material is absorbed through the skin and that death in laboratory animals results from central nervous system depression with respiratory arrest. Sensitization studies in guinea pigs indicated a weak allergenic response to this material, but reports from workplace exposures have not shown allergic skin responses. Subchronic inhalation studies in rats and mice up to 32 ppm of this material resulted in lesions of the upper respiratory epithelium. Exposure up to 100 ppm resulted in decreased weight gain and biochemical changes indicative of nerve cell changes. Single exposure (acute) studies indicate: Oral - Moderately Toxic to Rats (LD50 132 mg/kg) Dermal - Moderately Toxic to Rabbits (LD50 657 mg/kg), Inhalation - Moderately Toxic to Rats (1-hr and 4-hr LC50s 592 ppm and 233 ppm, respectively), Eye Irritation - Severely Irritating to Rabbits, Skin Irritation - Slightly Irritating to Rabbits.

**MUTAGENICITY:**

This material does not show the ability to damage DNA in standard bacterial assays, but can cause chromosomal changes in cultured animal cells. This material does not cause chromosomal damage in whole animal assays in mammals.

**Cancer Lists**

| <b>Hazardous components</b>  | <b>NTP Carcinogen</b> | <b>IARC Carcinogen</b>    | <b>OSHA Carcinogen</b> |
|------------------------------|-----------------------|---------------------------|------------------------|
| Furfuryl alcohol homopolymer | No                    | No                        | No                     |
| Furfural                     | No                    | Group 3, not classifiable | No                     |
| Furfuryl alcohol             | No                    | No                        | No                     |

**Health Effects**

| <b>Hazardous components</b>  | <b>Health Effects / Target Organs</b>  |
|------------------------------|--|
| Furfuryl alcohol homopolymer | NE   |
| Furfural                     | Irritation- Eyes---Marked (HE14); Irritation-Nose, Throat, Skin---Mild (HE16) / Eyes, skin, respiratory system |
| Furfuryl alcohol             | Irritation- Eyes, Nose, Throat, Skin ---Marked (HE14); CNS effects (HE7). / Eyes, skin, respiratory system     |

**12. ECOLOGICAL INFORMATION**

**Ecotoxicological Information**

Data available for this material and/or its components are summarized below:

**General Product Information:**

Not available

**Component Data:**

**Furfural**

This material is slightly toxic to Daphnia magna (24-hr LC50 33 mg/l; 72-hr LC50 13 mg/l), harlequin fish (48-hr LC50 23 ppm), fathead minnow (96-hr LC50 32 ppm) and gambusia (96-hr LC50 24 ppm).

**Furfuryl alcohol**

24-hr LC50 Daphnia magna: 115 mg/l, Practically Non-toxic, 96-hr LC50 Daphnia magna: 328 mg/l, Practically Non-toxic.

**13. DISPOSAL CONSIDERATIONS**

**Information provided is for unused product only.**

**Recommended method of disposal:**

Dispose of in an approved landfill if allowed locally. Dispose of in a permitted waste management facility if landfill is not practical.

*Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state and local regulations. Empty containers retain product residue. Note: Chemical additions to, processing of, or otherwise altering this material may render information in this document to be incomplete, inaccurate or otherwise inappropriate for waste management purposes. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.*

**Disposal Regulatory**

No EPA Waste Numbers are applicable for this product's components.

*It is the responsibility of the waste generator to determine if the waste meets the definition of a hazardous waste as promulgated at 40 CFR Part 261 subpart C.*

**14. TRANSPORT INFORMATION**

**U.S. Department of Transportation Ground (49 CFR)**

**Proper shipping name:** Toxic, liquids, organic, N.O.S., (Furfural Solution)  
**Hazard class or division:** 6.1  
**Identification number:** UN2810  
**Packing group:** PG III

**15. REGULATORY INFORMATION**

**United States Regulatory Information**

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

**SARA 311/312:** Acute hazard  
 Chronic hazard  
 Reactive hazard

**Applicable component data listed below:**

**TSCA 12(b) Export Notification** None listed

**CERCLA/SARA Section 302 EHS** None listed

**Section 304 EHS RQ** None listed

**CLCRA RQ**  
 Furfural 5000 LBS

**Section 313** None listed

**RCRA CODE**  
 Furfuryl alcohol U125

**CAA 1129(r) TQ** None listed

**State Regulations**

| <b>State Lists (Components on one or more lists)</b> | <b>CA</b> | <b>NJ</b> | <b>PA</b> | <b>RI</b> | <b>NY</b> | <b>MA</b> | <b>MN</b> |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Furfuryl alcohol homopolymer                         | No        | No        | No        | No        | No        | No        | No        |
| Furfural   | Yes       | Yes       | Yes       | Yes       | Yes       | Yes       | Yes       |
| Furfuryl alcohol                                     | Yes       | Yes       | Yes       | Yes       | No        | Yes       | Yes       |

**California Proposition 65**

This product contains the following chemicals known to the State of California to cause cancer or reproductive toxicity:

None listed

**Canada Regulatory Information**

|                              | <b>WHMIS Status</b> | <b>Hazard class(s)</b> |
|------------------------------|---------------------|------------------------|
| Furfuryl alcohol homopolymer | NE                  |                        |
| Furfural                     | Disclosure (1%)     | B3, D1B, D2B           |
| Furfuryl alcohol             | Disclosure (1%)     | B3, D1A, D2B           |

**16. OTHER INFORMATION**

**Revision Information**

**Revision Date:** 4/22/2011  
**Supersedes Revision Dated:** 9/1/2009  
**Revision Number:** 4.000  
**Revision Summary:** New format

**Key:** NE = Not Established, NA = Not Applicable

**State Lists reviewed (Sec. 15):**

CA Title 8, §339. The Hazardous Substances List  
NJ Right to Know Hazardous Substance List  
PA Chapter 323. Hazardous Substance List  
RI Rhode Island Hazardous Substance List  
NY Part 597: List of Hazardous Substances  
MA Massachusetts Oil and Hazardous Material List  
MN 5206.400 Hazardous Substances

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