### Permeation/Degradation Resistance Guide for Ansell Chemical Resistant Gloves

**Degradation Rating** is a process of determining the overall chemical compatibility of a glove material with a specific chemical or combination of chemicals. This process involves testing the glove material's ability to withstand exposure to the chemical, including permeation and degradation features.

**Degradation Test** is a method used to identify the effects of a chemical on a glove material. It involves immersing a glove in a chemical under specified conditions and observing the changes in the material's physical properties.

**Permeation Test** is a process used to determine the rate at which a chemical passes through a glove material. This information is crucial for assessing the chemical resistance of a glove.

**Key to Degradation Ratings**

<table>
<thead>
<tr>
<th>Degradation Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD</td>
<td>Degradation with Delamination (delaminates and degrades)</td>
</tr>
<tr>
<td>E</td>
<td>Excellent</td>
</tr>
<tr>
<td>G</td>
<td>Good</td>
</tr>
<tr>
<td>VG</td>
<td>Very Good</td>
</tr>
<tr>
<td>PG</td>
<td>Poor</td>
</tr>
<tr>
<td>NR</td>
<td>Not Recommended</td>
</tr>
</tbody>
</table>

**Introduction to the Guide**

When reviewing the guide, remember that tests are conducted under laboratory conditions and may not reflect field conditions. Different glove materials and chemicals exhibit unique properties, which can affect permeation and degradation rates.

**Methodology**

Degradation tests are performed on a 20mil polyvinyl chloride (PVC) glove to determine the overall chemical compatibility. After testing, the glove materials are rated based on the observed changes in physical properties.

**How to Read the Charts**

The charts provide a visual representation of the tested glove materials and their chemical combinations. Each chart includes a table with permeation and degradation data for various glove materials and chemical combinations.

**Chemical Resistance Guide**

**Permeation & Degradation Data**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Permeation Rate</th>
<th>Permeation Breakthrough Time (min.)</th>
<th>Degradation Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butyl Unsupported ChemTek® 38-612 (12 mil/0.30 mm)</td>
<td>Excellent</td>
<td>30</td>
<td>E</td>
</tr>
<tr>
<td>Neoprene Unsupported 29-865 (18 mil/0.46 mm)</td>
<td>Excellent</td>
<td>30</td>
<td>E</td>
</tr>
<tr>
<td>Nitrile Sol-Vex® 37-165 (22 mil/0.56 mm)</td>
<td>Excellent</td>
<td>30</td>
<td>E</td>
</tr>
<tr>
<td>Butyl Unsupported ChemTek® 38-320 (20 mil/0.51 mm)</td>
<td>Excellent</td>
<td>30</td>
<td>E</td>
</tr>
<tr>
<td>Polyvinyl Chloride Supported Snorkel®</td>
<td>Excellent</td>
<td>30</td>
<td>E</td>
</tr>
</tbody>
</table>

**Permeation & Degradation Resistance Guide**

- **Permeation Resistance** involves the rate at which a chemical permeates through the glove material. A higher permeation resistance indicates a more resistant material.
- **Degradation Resistance** is determined by the material's ability to withstand exposure to the chemical without degrading. A material rated as "Excellent" has minimal degradation effects.

**Note:** The guide is a resource for selecting the appropriate glove material for a specific chemical. Always perform permeation and degradation tests on the actual material and chemical to ensure accurate results.
How to Read the Charts

**Key to Permeation Breakthrough Rates**

- **GREEN**
  - Less than 15 minutes
  - 15 to 30 minutes
  - 30 to 60 minutes
  - Greater than 60 minutes

- **YELLOW**
  - Less than 30 minutes
  - 30 to 45 minutes
  - 45 to 60 minutes
  - Greater than 60 minutes

- **RED**
  - Less than 15 minutes
  - 15 to 30 minutes
  - 30 to 60 minutes
  - Greater than 60 minutes

**Rating of Degradation**

- **GOOD**
  - No visible or significant change

- **FAIR**
  - Possibly some visible or slight change

- **POOR**
  - Visible or noticeable change

- **NOT RECOMMENDED**
  - Severe change or damage

Chemical Resistance Guide

**Permeation & Degradation Data**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Permeation Breakthrough Time (min)</th>
<th>Degradation Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>&lt;15</td>
<td>GOOD</td>
</tr>
<tr>
<td>Acetic Acid</td>
<td>15-30</td>
<td>FAIR</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>&gt;30</td>
<td>POOR</td>
</tr>
<tr>
<td>Acetone Peroxide</td>
<td>&gt;60</td>
<td>NOT RECOMMENDED</td>
</tr>
</tbody>
</table>

**Highlights for Color Coding**

- A **GREEN** score indicates that the glove meets the permeation criterion.
- A **YELLOW** score indicates that the glove meets the permeation criterion but does not meet the degradation criterion.
- A **RED** score indicates that the glove does not meet the permeation criterion.

**Standards for Color-Coding**

- The Permeation Breakthrough Time is 60 minutes or greater.
- The Degradation Rating is Good, Fair, Poor, or Not Recommended.

**Special Tips for Reading**

- The Permeation Breakthrough Time is 30 minutes or greater.
- The Degradation Rating is Poor or Not Recommended.

**Permeation/Degradation Resistance Guide for Ansell Chemical Resistant Gloves**

Introduction to the 8th Edition

- When reviewing the tables, remember that data is based on various test methods and can vary depending on the specific circumstances of each test.
- The tables are intended to provide a general overview of the performance capabilities of different glove materials.
- It is important to consult specific guidelines and standards for accurate and reliable information.

**Degradation Tests**

- Degradation tests are conducted under laboratory conditions using a standard procedure.
- The tests are performed using a specific method to determine the performance capabilities of different glove materials.

**Permeation Testing**

- Permeation testing is conducted using a standard procedure to determine the performance capabilities of different glove materials.
- The tests are performed using a specific method to determine the performance capabilities of different glove materials.

**Degradation Factors**

- Degradation factors are considered when determining the performance capabilities of different glove materials.
- The factors are intended to provide a general overview of the performance capabilities of different glove materials.

**Permeation & Degradation Data**

- The data is presented in tables and charts to facilitate easy comparison.
- The data is intended to provide a general overview of the performance capabilities of different glove materials.

**Ansell**

- Ansell is a leading manufacturer of chemical-resistant gloves.
- Ansell is committed to providing high-quality gloves that meet the needs of a variety of industries.

**Chemical Resistance**

- Chemical resistance is an important characteristic of chemical-resistant gloves.
- Chemical resistance is intended to provide a general overview of the performance capabilities of different glove materials.

**Resistance to Chemicals**

- Resistance to chemicals is an important characteristic of chemical-resistant gloves.
- Resistance to chemicals is intended to provide a general overview of the performance capabilities of different glove materials.

**Performance Data**

- Performance data is presented in tables and charts to facilitate easy comparison.
- Performance data is intended to provide a general overview of the performance capabilities of different glove materials.

**Degradation**

- Degradation is an important characteristic of chemical-resistant gloves.
- Degradation is intended to provide a general overview of the performance capabilities of different glove materials.
Permeation Testing
Ansell conducts permeation testing in accordance with ASTM Method F 739 standards. A specimen is cut from the glove and clamped into a test cell as a barrier membrane (see illustration). The "exterior" side of the specimen is exposed to a hazardous chemical. At timed intervals, the unexposed "interior" side of the test cell is checked for the presence of the permeated chemical. The extent to which it may have permeated the glove is determined.

This standard allows a variety of options in analytical technique and collection media. At Ansell, dry nitrogen is the most common medium and gas chromatography with FID detection is the most common analytical technique. Our Research Department also uses liquids such as distilled water and hexane as collecting media, and techniques such as conductivity, colorimetry, and liquid chromatography for analysis of the collecting liquid.

Degradation Testing
Patches of the test material are cut from the product. These patches are weighed and measured, then completely immersed in the test chemical for 30 minutes. The percentage of change in size is determined, and the patches are then dried to calculate the percentage of weight change. Observed physical changes are also reported. Ratings are based on the combined data.

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and other materials which pose a lesser risk of cancer. Experimental carcinogens at extremely high dosages, according to the ninth edition of Sax's Properties of Industrial Materials. Highlighted in BLUE are experimental carcinogens, including:

- Xylenes, Mixed (Xylol)
- Tricresyl Phosphate (TCP)
- Tetrahydrofuran (THF)
- Sulfuric Acid, 47% (Battery Acid)
- Sulfur Dichloride
- Styrene
- Pyridine
- Propylene Oxide
- Propylene Glycol Methyl Ether Acetate (PGMEA)
- n-Propyl Alcohol
- Propane Gas
- Phenol, 90%
- Perchloroethylene (PERC)
- Perchloric Acid, 60%
- Palmitic Acid, saturated solution
- Octyl Alcohol
- 1-Nitropropane
- Nitromethane
- Mineral Spirits, Rule 66
- Methylene Chloride (DCM)
- Methyl Cellosolve®
- Methyl-t-Butyl Ether (MTBE)
- Ethylene Glycol
- Dioctyl Phthalate (DOP, DEHP)
- 1,2-Dichloroethane (Ethylene Dichloride, EDC)
- Chloroform
- 2-Chlorobenzyl Chloride
- Chlorine Gas
- Isopropyl Alcohol
- Hypophosphorus Acid, 50%
- Glutaraldehyde, 25%
- Gasoline, Unleaded (Shell Premium winter blend)
- Ethylene
- Acrylonitrile
- Acrylic Acid
- Ammonia Gas

Good

Excellent

Permeation/Degradation Resistance Guide for Ansell Gloves

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**Permeation**

**Degradation**
## Permeation/Degradation Resistance Guide for Ansell Gloves

### Chemicals

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>LAMINATE</th>
<th>NITRILE</th>
<th>UNSUPPORTED</th>
<th>SUPPORTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GLOVE</td>
<td>GLOVE</td>
<td>GLOVE</td>
<td>GLOVE</td>
</tr>
<tr>
<td></td>
<td>PERMEATION/Degree</td>
<td>DEGRADATION/Rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rate</td>
<td>Rating</td>
<td>Rate</td>
<td>Rating</td>
</tr>
</tbody>
</table>

- **RED**: Avoid use of the glove with this chemical.
- **GREEN**: Recommended for use with this chemical.
- **YELLOW**: Use with caution with this chemical.
- **WHITE**: Under some conditions, may be suitable for use with this chemical.
- **CANNERS CHEMTEK™**: CHEMTEK™

### Special Note

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A degradation test against this chemical was not run. However, since its breakthrough time is greater than 480 minutes, the Degradation Rating is expected to be.

**Skydrol** is a registered trademark of Solutia Inc. **Vertrel** is a registered trademark of DuPont.