

# GLOVE SELECTION GUIDELINES

When selecting gloves for use in the lab, consider all associated hazards for each task to determine the required personal protective equipment. Some tasks may have multiple applicable hazards that will require specialized gloves. Voluntary consensus technical standards developed and published by standard organizations can assist you in selecting the appropriate gloves.



HAZARDS	GLOVE REQUIREMENTS	APPLICABLE STANDARDS
<p><b>None</b> (handling optics, non-hazardous samples)</p>	<p>No applicable requirements</p>	<p>N/A</p>
<p><b>Mechanical</b> (cutting, abrasive, puncture, tearing)</p>	<p>"Cut-resistant"</p>	<p>ANSI/ISEA 105-2016, EN 388</p>
<p><b>Cryogen</b> (liquid nitrogen, liquid helium)</p>	<p>Cryogenic Safety Gloves (rated for at least -210°C)</p>	<p>EN 511 (No ASTM/ANSI standard)</p>
<p><b>Hot Surfaces</b> (autoclaves, lab furnace)</p>	<p>Resistance to water and cold (temperature is dependent on specific process)</p>	<p>EN 511 (No ASTM/ANSI standard)</p>
<p><b>Biological Materials</b> (no associated chemical hazard)</p>	<p>Medical exam gloves are acceptable</p>	<p>ANSI/ISEA 105-2016, EN 407</p>
<p><b>Splash</b> (microscale of weak chemical solutions)</p>	<p>If using medical exam gloves, <b>immediately</b> change after contamination</p>	<p>ASTM F739, EN ISO 347-1, ASTM D6319, NFPA 1999, EN ISO 374-5</p>
<p><b>Hazardous Chemicals</b> (solvents, corrosive to skin, oxidizers)</p>	<p>Tested for compatibility w/ haz. chem. (NOTE: acetonitrile will dissolve nitrile gloves)</p>	<p>ASTM F739, EN ISO 374-1</p>
<p><b>Large Volumes of Chemicals</b> (stock solutions &gt; 4L, corrosive baths)</p>	<p>Tested for compatibility with hazardous chemicals and provides forearm coverage</p>	<p>ASTM F739, EN ISO 374-1</p>
<p><b>Chem. w/ Acute Dermal Toxicity</b> (40% hydrofluoric acid, nicotine)</p>	<p>If using reusable gloves, develop and SOP for decontamination and storage</p>	<p>ASTM F739, EN ISO 374-1</p>
<p><b>Chemotherapeutics</b> (carboplatin, mitomycin)</p>	<p>Gloves must conform to ASTM D6978 and pass the test against the agent in use</p>	<p>ASTM D6978-05 (2013)</p>

# GLOVE SELECTION RESOURCES

American National Standards (ANSI)

ASTM International (ASTM)

International Organization for Standardization (ISO)

International Safety Equipment Association (ISEA)

European Standards Organization (EN)

- ANSI/ISEA 105-2016 Hand Protection Classification:
  1. Mechanical Protection: Cut Resistance, Puncture Resistance, Hypodermic Needle Puncture Resistance, and Abrasion Resistance
  2. Chemical Protection: Chemical Permeation and Chemical Degradation, based on ASTM F739.
  3. Thermal Protection: Heat and Flame Protection, Heat Degradation Resistance, and Conductive Heat Resistance
- EN 388: 2016 Protective Gloves Against Mechanical Risks
  1. Abrasion Resistance, Cut Resistance (Coup Test and TDM TEST), Tearing Strength, Puncture Resistance, and Impact Protection.
- EN 511: 2006 Protective Gloves Against Cold (exposure limit of -500C):
  1. Resistance to Convective Cold, Resistance to Against Contact Cold, and Permeability by Water.
- EN 407:2004 Protective Gloves against Thermal Risk ( temperatures between 1000C and 5000C, open flame, and molten metal):
  1. Resistance to Flammability, Contact Heat, Convective Heat, Radiant Heat, Small Splashes and Large Quantities of Molten Metal.
- ASTM D6319-10 Standard Specification for Nitrile Examination Gloves for Medical Application
  1. Defines the specification for a nitrile rubber glove used for medical examination and diagnostic and therapeutic procedures.
  2. Does not address chemical resistance.
- NFPA 1999 Standard on Protective Clothing and Ensembles for Emergency Medical Operations
  1. Section 7.2: Performance Standards for Single-Use Emergency 'Medical Examination Glove' and 'Medical Cleaning/Utility Gloves'
    - a) Chemical Penetration Resistance: 40% glutaraldehyde, 70% isopropanol, 5% sodium hypochlorite (based on ASTM F739)
- ASTM F739-12 Permeation of Liquids and Gases through Protective Clothing Materials under Conditions of Continuous Contact
  1. Breakthrough Detection Time: how many minutes between initial exposure and chemical detection inside the glove.
    - a) Expressed in the 'Chemical Compatibility Chart,' should be specific to glove manufacturer and model
  2. Only use gloves with acceptable breakthrough time (>120 minutes) for the specific chemicals in use.
- ASTM D6978-05 (2013) Assessment of Resistance of Medical Gloves to Permeation by Chemotherapy Drugs
  1. Glove must meet ASTM D6319 for Nitrile Medical Examination Gloves, other material specific ASTM standards.
  2. Tested using ASTM F739 against a minimum of nine different classes of clinical drugs.
    - a) Selected gloves must have documented breakthrough times on the packaging for the Chemotherapeutic in use.
- EN ISO 374: 2019 Protective Gloves against Dangerous Chemicals and Microorganisms
  1. Glove must meet basic safety standard EN 420 Protective Gloves-General Requirements and Test Methods
  2. Three Classification, gloves are tested against 1 to 6 of 18 chemical class standards.
    - a) EN ISO 374-1 Type A: a minimum of 30-minute exposure time until breakthrough for six chemicals.
    - b) EN ISO 374-1 Type B: a minimum of 30-minute exposure time until breakthrough for three chemicals.
    - c) EN ISO 374-1 Type C: a minimum of 10-minute exposure time until breakthrough for one chemical.
  3. Includes testing for resistance against penetration nby bacteria, fungi, and viruses (EN ISO 374-5)