



# FAST FACTS

Empowering people through education, standards, and a safer workplace

Disposable Gloves

NITRILE | LATEX

# Fast Facts

## HISTORY AND MARKET

### U.S. MARKET

**The U.S. market for single-use disposable gloves is worth around \$3 billion annually, making it a significant part of workplace safety and hygiene.**

This market is growing steadily, with experts predicting it will expand by about 6-7% each year over the next five years. The growth is fueled by rising demand across healthcare, food service, and industrial sectors. Disposable gloves have become essential tools for maintaining safety, meeting compliance standards, and protecting workers and consumers, especially with the heightened focus on safety and hygiene following recent public health challenges. As industries continue prioritizing safety, the demand for these gloves shows no signs of slowing down.

### KEY GROWTH

INCREASED SAFETY AWARENESS	STRICTER REGULATIONS	HYGIENE STANDARDS
Public health initiatives have emphasized the importance of personal protective equipment (PPE) in reducing contamination risks.	Organizations like OSHA and the FDA enforce requirements for glove use in healthcare, food handling, and industrial settings.	Rising expectations for cleanliness in food preparation and healthcare environments drive adoption.



### HISTORY

**1889**

Dr. William Halsted develops the first surgical glove at Johns Hopkins Hospital to protect his nurse (and future wife) Caroline Hampton from chemical irritation during surgeries. Designed with Goodyear Rubber Company, the gloves prioritized dexterity over hygiene.

**1894**

Joseph Lister introduces the sterilization of surgical gloves using carbolic acid, drastically reducing post-surgical infection rates from 50%.

**1906**

The United States Food and Drug Administration (FDA) was first created to enforce the Pure Food and Drug Act of 1906.

**1990**

FDA introduced 21 CFR 800.20, setting AQL standards to ensure reliable glove integrity and barrier protection.

**1992**

OSHA's Bloodborne Pathogens Standard mandates the use of disposable gloves in environments involving bodily fluids, driven by rising awareness of HIV.

**1996**

Nitrile gloves are introduced as a chemical-resistant and hypoallergenic alternative to latex gloves, following incidents like the mercury exposure of scientist Karen Wetterhahn.

**2016**

FDA banned powdered gloves in healthcare due to significant risks, including airway inflammation, hypersensitivity, and surgical complications

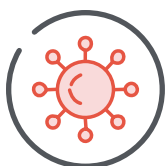
**Today**

Disposable gloves are indispensable across industries like healthcare, food service, and industrial sectors, with nitrile dominating the fastest-growing markets.

## HAZARDS AND APPLICATIONS

### What Are Gloves Protecting Against?

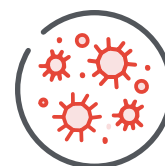
<b>USERS</b>	Protecting the user from hazards such as contaminants, chemicals, pathogens, or substances that could be harmful when coming into contact with the skin.
<b>CONSUMERS</b>	Protecting consumers or products from contamination by the user, which is especially critical in industries like food handling, healthcare, or manufacturing, where cleanliness and hygiene are paramount.



**Pathogens:**  
Viruses, bacteria, and biohazards. According to the CDC, an estimated 1.7 million hospital-associated infections occur annually in the U.S., many of which can be prevented with proper PPE.



**Chemicals:**  
Harsh substances, solvents and oils. OSHA reports that 25% of chemical-related injuries could be avoided with proper hand protection.



**Contaminants:**  
Prevent cross-contamination in food and healthcare. The FDA estimates that foodborne illnesses impact 48 million people annually, underlining the importance of hygiene protocols.

## COMMON INDUSTRIES AND APPLICATIONS

	<b>HEALTHCARE</b> Used in surgeries, examinations, and patient care. Disposable gloves prevent the spread of pathogens. An estimated 80% of healthcare workers wear gloves for routine patient contact.		<b>BEAUTY/TATTOO</b> Ensures hygiene and safety during treatments like tattoos or cosmetic procedures, reducing risks of infections.
	<b>FOOD SERVICE</b> Essential in food prep and packaging to prevent cross-contamination. The FDA mandates glove use for ready-to-eat food handling.		<b>LABORATORY/PHARMACEUTICAL</b> Vital for chemical handling, sample preparation, and sterile manufacturing. Gloves reduce risks of contamination and exposure to hazardous substances.
	<b>INDUSTRIAL</b> Protects workers from chemicals and irritants in manufacturing and assembly lines.		<b>AGRICULTURE</b> Used for handling pesticides, fertilizers, and other chemicals to prevent skin exposure and irritation.
	<b>JANITORIAL</b> Shields hands from harsh cleaning chemicals, improves hygiene, and prevents skin damage.		<b>AUTOMOTIVE</b> Protects workers from oils, greases, and solvents during vehicle maintenance and repair.

# Fast Facts

## TESTING AND AQL

### What is AQL?

AQL, or Acceptable Quality Level, is a global standard used to measure the quality and reliability of a batch of disposable gloves. It defines the maximum percentage of defects that are considered acceptable for a batch to be deemed fit for use.

### How are gloves tested to determine AQL?

To determine the AQL of disposable gloves, a predefined number of samples are selected from each batch and undergo two key tests:

- **Visual Examination:** Gloves are inspected for visible flaws as they are unpacked.
- **Leak Test:** Gloves are sealed onto a plastic tube and are filled with 1,000 ml of water. The gloves are inspected for leaks immediately after filling and again after two minutes.

### Why is AQL Important?

AQL establishes universal testing & quality requirements, which ensures quality, reliability and helps classify gloves into one of three grades.

*Once these tests are complete, the percentage of defects in the batch is calculated and reported as the AQL.*



## ADDITIONAL TESTING

	AIR INFLATION TEST	TENSILE STRENGTH TEST	CHEMICAL RESISTANCE TESTING	PATHOGEN PROTECTION TESTING
WHAT IT IS	A test to verify the glove's elasticity and puncture resistance.	A test that measures the force required to break a glove.	An evaluation of the glove's ability to block harmful chemicals.	A test to ensure the glove forms a reliable barrier against harmful pathogens.
HOW IT WORKS	Gloves are inflated with air to visually identify weak points or tears, focusing on high-stress areas like the fingers.	The glove material is stretched until it breaks, assessing strength. <b>Biggest factors:</b> • Material • Thickness	Gloves are exposed to specific chemicals, and their resistance to leaks (penetration) and seepage (permeation) is measured.	Gloves are tested using a surrogate virus under controlled laboratory conditions to evaluate resistance to penetration.
KEY STANDARDS	While not covered by a specific ASTM standard, this test aligns with general industry guidelines for material defect detection.	ASTM D412: Defines tensile properties, including ultimate strength and elongation at break.	ASTM F739: Measures chemical permeation rates. ASTM D6978: Focuses on resistance to chemotherapy drugs	ASTM F1671: Evaluates resistance to penetration by bloodborne pathogens.
WHY IT MATTERS	Ensures gloves can stretch and flex during use without breaking, reducing the risk of failure.	Confirms the glove's durability and ability to withstand stress during demanding tasks.	Provides critical protection for users in environments with chemical hazards	Protects users from exposure to bloodborne pathogens and infectious diseases

## GRADES OVERVIEW

	INDUSTRIAL GRADE	EXAMINATION GRADE	SURGICAL GRADE
AQL REQUIREMENT	3.0-4.0 most defects, lowest quality	2.5 or lower fewer defects, higher quality	1.5 or lower least defects, highest quality
STANDARDS	n/a	ASTM D3578: Latex Exam Glove ASTM D6319: Nitrile Exam Glove	ASTM D3577: Surgical Glove
FDA MEDICAL DEVICE CLASS	n/a	Class I	Class II
STERILITY	Non-Sterile	Non-Sterile	Sterile
POWDER OR POWDER FREE	Either	Powder Free Only	Powder Free Only
PURPOSE	Designed for lower risk, non-medical applications requiring higher durability & chemical resistance	Designed for non-sterile, high-risk applications such as non-invasive medical & high-hygiene environments.	Designed for sterile, extremely risky applications such as invasive medical procedures, clean room, & laboratory work
MARKET SHARE	~20%	~70%	~10%



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**Fast Facts**  
**MATERIALS**

	LATEX	NITRILE	VINYL
MARKET SHARE	35%	45%	>10%
COST	Moderate	Moderate to High	Low
DURABILITY	High	Very High	Low
PUNCTURE RESISTANCE	Moderate	Very High	Low
PROTECTIVE BARRIER	Moderate	Very High	Low
ELASTICITY	Very High	High	Low
ALLERGEN RISK	High (latex allergies)	None	None
BIO-DEGRADABLE	Yes	No	No
COLOR AVAILABILITY	Limited to neutral and medical colors	Wide range of colors	Basic colors



## PERFORMANCE PROPERTIES

### Thickness

The thickness is measured in mils, or one-thousandth of an inch. It directly impacts a glove's durability, dexterity, sensitivity, and protective barrier.

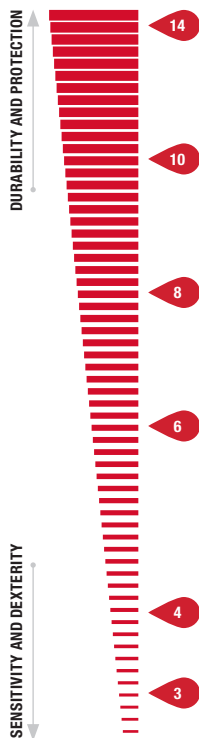
#### Range:

Disposable gloves most commonly range from 3 to 14 mils, with 3 mils being the thinnest and 14 mils being the thickest.

#### Impact:

**Thicker gloves (10-14 mils)** generally offer greater durability and protection, making them suitable for industrial and heavy-duty applications.

**Thinner gloves (3-6 mils)** prioritize dexterity and sensitivity, ideal for tasks requiring precision, such as medical examinations or laboratory work.



### Textures



**SMOOTH**  
Precision tasks.  
(e.g., medical exams)



**MICRO-ROUGH**  
General grip improvement.



**DIAMOND SANDBLAST**  
Superior grip for heavy-duty tasks.

### Colors



#### BLUE

- Most popular and versatile
- Neutral and professional in appearance
- Easy to notice contamination or punctures

- Healthcare • Food Service
- Sanitation • General Use



#### BLACK

- Hides oils, grease, inks & dyes
- Clean, professional, & sleek appearance
- Stylish for customer-facing roles

- Tattoo Parlors
- Hair and Beauty Salons • Mechanics



#### ORANGE

- Stands out, highlights contrast
- Enhances visibility
- Increases hand awareness

- Automotive • Construction
- Industrial • Manufacturing



#### CREAM

- Natural color of latex
- Classical color (first color)
- Often used in controlled environments

- Pharmaceuticals • Laboratory
- Clean Room • Surgical



## EXAMINATION NITRILE GLOVES



## INDUSTRIAL NITRILE GLOVES



## LATEX GLOVES



**RADIANS HQ**  
5305 Distriplex  
Farms Drive  
Memphis, TN 38141

**TOLL FREE**  
877-723-4267

**PHONE**  
901-388-7776

**EMAIL**  
sales@radians.com

**FAX**  
901-266-2558

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