



Designation: E3212 – 19

Standard Guide for Selection and Procurement of Protective Gloves Worn by Law Enforcement and Corrections¹

This standard is issued under the fixed designation E3212; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide addresses selection and procurement of protective gloves worn by law enforcement and corrections officers.

1.2 This guide explains to end users the content and value of the two below listed standards and how to procure gloves that meet their requirements.

1.2.1 Specification E3109:

1.2.1.1 The purpose of Specification E3109 is to provide performance requirements, performance ratings, and test methods for the evaluation of protective gloves used in law enforcement and corrections applications.

1.2.1.2 Test methods and performance ratings are included to aid glove purchasers and end users in their evaluation of whether a protective glove meets their needs. It is not required that a glove meet every performance requirement specified in this specification.

1.2.2 Practice E3108:

1.2.2.1 Practice E3108 establishes the conformity assessment requirements for protective gloves worn by law enforcement and corrections officers and provides two options for verifying that protective gloves meet requirements: (1) supplier's declaration of conformity (SDOC) and (2) certification.

1.2.2.2 The practice is intended to be used by purchasers and suppliers in the procurement of gloves that meet Specification E3109, and the purchaser is responsible for selecting either SDOC or certification.

1.3 This guide and the aforementioned standards were developed based on a survey of end users regarding hazards of concern and operational requirements of officers. (See Section 5.)

1.4 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

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2. Referenced Documents

2.1 ASTM Standards:²

E3108 Practice for Conformity Assessment of Protective Gloves Worn by Law Enforcement and Corrections Officers

E3109 Specification for Protective Gloves Worn by Law Enforcement and Corrections Officers

F2010 Test Method for Evaluation of Glove Effects on Wearer Finger Dexterity Using a Modified Pegboard Test

2.2 ISO Standards:³

ISO/IEC 17000 Conformity Assessment – Vocabulary and General Principles

ISO/IEC 17050-1 Conformity Assessment – Supplier's Declaration of Conformity – Part 1: General Requirements

ISO/IEC 17050-2 Conformity Assessment – Supplier's Declaration of Conformity – Part 2: Supporting Documentation

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *conformity assessment, n*—demonstration that specified requirements relating to a product, process, system, person, or body are fulfilled. **ISO/IEC 17000**

3.1.2 *dexterity, n*—a hand function referring to the ability of the individual to manipulate objects with their hands. **E3109**

3.1.2.1 *Discussion*—Dexterity may be classified as requiring fine motor skills in which relatively small objects are manipulated, or those involving gross motor skills in which relatively large objects are handled.

3.1.3 *supplier's declaration of conformity (SDOC), n*—the declaration by which a first party or supplier conveys assurance

¹ This guide is under the jurisdiction of ASTM Committee E54 on Homeland Security Applications and is the direct responsibility of Subcommittee E54.04 on Personal Protective Equipment (PPE).

Current edition approved May 1, 2019. Published May 2019. DOI: 10.1520/E3212-19.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

that the object of conformity fulfills specified requirements.
ISO/IEC 17000

4. Significance and Use

4.1 This guide is intended to assist law enforcement and corrections officers in selecting and purchasing protective gloves that both meet their needs and have been demonstrated to meet relevant performance requirements of Specification **E3109**.

4.2 The guide explains the performance requirements, performance ratings, and test methods for assessing performance.

5. Understanding Officer Needs Related to Protective Gloves

5.1 To determine the protection needs and hazards of concern to law enforcement and corrections personnel, a survey was developed and released to US agencies through multiple channels including:

5.1.1 Interagency Board for Emergency Preparedness and Response

5.1.2 National Tactical Officers Association

5.1.3 National Sheriffs Association

5.1.4 International Association of Chiefs of Police

5.1.5 International Association of Women Police

5.1.6 FBI National Academy Associates

5.1.7 American Jail Association

5.1.8 American Correctional Association

5.1.9 United States Marshal Service

5.2 More than 700 responses were received from officers across the United States, and details and results from the survey are provided in **Appendix X1**.

5.3 The survey revealed needlesticks, puncture, and dexterity to be the highest priorities for the surveyed officers.

5.3.1 Specification **E3109** includes performance requirements, protection levels, and test methods for needlesticks and puncture but not for dexterity. The reason for not including dexterity requirements in Specification **E3109** is that existing dexterity tests are completed by performing tasks that do not directly relate to officer activities.

5.3.1.1 To understand how gloves may impact an officer's dexterity and ability to perform expected tasks, a set of practical evaluation procedures was developed and validated by multiple end users from different agencies. The dexterity evaluation procedures are provided in **Appendix X2**, and it is recommended that these procedures be done using candidate gloves prior to purchase.

5.4 Other hazards of concern identified in the survey are not addressed in Specification **E3109** are listed below along with the reason for excluding them from the specification:

5.4.1 Protection against stabbing or slashing, because of the reduction in dexterity associated with such protection, which in turn reduces the officer's ability to manipulate weapons (including firearm operations of trigger press, clearing malfunctions, and reloading), to detect small objects, and to pick up small objects.

5.4.2 Protection against chemicals (for example, illicit drugs, chemical warfare agents, or toxic industrial chemicals), because no single glove is resistant to all types of chemicals.

5.4.3 Protection against biohazards, because officers are issued medical gloves for this purpose.

5.4.4 Protection against flame or heat from pyrotechnic or distraction devices, because officers are trained on safe operation of those devices.

6. Explanation of Hazards Identified by Officers

6.1 The specification addresses protection against five hazards identified by end users as important: 28-gauge hypodermic needle puncture resistance, puncture resistance, cut resistance, abrasion resistance, and tear resistance.

6.2 Protection against Needle-stick:

6.2.1 It is not uncommon for an officer to come into contact with an illicit drug user; therefore, the risk of a needle stick is a major concern, not only because of the risk of sustaining an injury but also the possibility of infection or the transference of a disease. This is especially true during the search of a suspect.

6.3 Protection against Puncture:

6.3.1 Puncture wounds, although not overly common, are always a concern for officers mainly because of the risk of infection. Officers respond daily to a variety of scenes and are constantly moving around in unknown and unpredictable environments. Simple things, such as the handling of an item which contains nails or manipulating barb wire fencing when trying to access a secured piece of property, all pose a potential puncture risk for the officer.

6.4 Protection against Cut:

6.4.1 This is a common hazard for the law enforcement/correctional officer. The risk of being cut is more likely on scenes and in situations where sharp objects exist. An example of this is when an officer must search a vehicle, structure, or confinement cell. In addition, the risk of being cut typically increases when these search locations are cluttered and in disarray. Another example is an officer attempting to gain entry into a vehicle or structure by breaching an access point. The combination of the forceful action of the breaching motion, the type of breaching tool (such as, halligan bar or battering ram), and the material of the intended target breach point (such as, a glass window or a wooden door) greatly increases the likelihood of an officer being cut during this task after repeated attempts to breach.

6.5 Protection against Stabbing or Slashing:

6.5.1 Although not addressed in Specification **E3109** because of the reduction in dexterity associated with such protection, the risk of sustaining an injury from a stab wound is a concern for officers. There are times when an officer's encounter with a suspect may become confrontational and potentially violent. If the suspect's weapon is a knife, edged blade, or similar sharp item, the officer faces the potential risk of being slashed or stabbed. A stabbing/slashing injury (depending on the severity and location of the wound), has the potential to be life threatening. At very least, the officer faces the potential risk of infection, scarring, or disfigurement, or combinations thereof, from an injury of this type so protection is paramount.

6.6 *Protection against Toxic Chemicals:*

6.6.1 There is a wide range of chemicals, including illicit drugs, chemical warfare agents, and toxic industrial chemicals, that an officer may encounter and need protection against. Because no single glove is resistant to all chemicals and not all chemicals are immediately identifiable, Specification E3109 does not include this type of protection. Officers must be very cautious when responding to a scene where a chemical exposure is likely, such as in a civil disturbance or evidence collection where it is likely that the officer will be exposed to a harmful drug or chemical agent. Officers should select and wear gloves that provide the appropriate chemical protection.

6.7 *Protection against Biohazards:*

6.7.1 Officers may be involved in incidents where contact with either a victim, suspect, or the scene itself results in the exposure to biohazards in blood, saliva, urine, or feces. Many times, this contact is unforeseen and unavoidable. Latex gloves, alone or in conjunction with a duty glove, are sufficient and recommended for the protection against this type of hazard. Therefore, Specification E3109 does not address protection against biohazards.

6.8 *Protection against Flame or Heat from Pyrotechnic or Distraction Devices:*

6.8.1 Flame or heat from pyrotechnic or distraction devices is a concern for officers who deploy these devices. Specification E3109 does not include this protection because the users of such devices are properly trained and provided with gloves to protect against those hazards.

NOTE 1—There are times when an officer may be exposed to flame or heat hazards, such as when on the scene of an active fire. Officers should not assume their gloves will protect against flame or heat unless this has been verified with the supplier.

6.9 *Durability Requirements for Protective Gloves:*

6.9.1 *Resistance to Abrasion:*

6.9.1.1 Law enforcement and corrections officers require many “hands on” activities, in terms of the equipment used and the individuals they encounter. Fights occur, falls happen, and rugged tools are used. In addition, officers many times are on the move, climbing, grabbing, or steadying themselves with their hands, during regular activities. This type of wear and tear on their gloves is expected to occur, and resistance to abrasion is required.

6.9.2 *Resistance to Tearing:*

6.9.2.1 The occupation of an officer involves a variety of tasks, such as opening a damaged vehicle door to access the victim of a collision, pulling on a secured gate to enter a residential property, or simply grasping objects when searching a crime scene. These tasks are all actions that could present a tear risk, and resistance to tearing without compromising dexterity or tactility is required for protective gloves.

6.9.3 *Resistance to Chemicals that Could Damage or Degrade the Gloves:*

6.9.3.1 For many officers, gloves are worn on a daily basis and are an integral part of the uniform. Gloves are likely to become soiled or contaminated by the environment or tools used by the officer, such as less-lethal aerosol sprays. Gloves need to be cleaned on a regular basis and must be capable of

being routinely cleaned without the fear of damage or degradation caused by cleaning methods or products. Specification E3109 does not address this need, and it is recommended that supplier guidance on appropriate cleaning methods be followed.

7. Understanding Specification E3109

7.1 Specification E3109 includes five performance requirements for gloves, performance ratings for each performance requirement, and test methods for assessing whether requirements are met.

7.2 Law enforcement gloves are complex with many different seaming and material designs, both inside and outside a glove. Adding to the complexity is the fact that a glove is not uniform in terms of the protection it provides, and different portions or areas of a glove (for example, palm, fingertip) may offer different protection. Fig. 1, taken from Specification E3109, provides a graphical representation to aid understanding.

7.3 *Protection Ratings:*

7.3.1 The specification uses a three-tier rating system that increases in protection from low to moderate to high for each of the five performance requirements.

7.3.2 Following the testing of a glove model against one of the five performance criteria, the test laboratory or supplier will rate the glove based on the test data documentation. No rating may be claimed if the tested performance is less than the lowest rating value.

7.3.3 An example of how the rating system may be used is shown below:

7.3.3.1 Glove Model A is tested for cut resistance using the method outlined in Specification E3109. The test data collected shows Glove Model A provides 1500 g of cut resistance in the palm area of the glove. Using Table 1, Glove Model A is rated as “Moderate” in the cut resistance criteria for that part of the glove. Any area of the glove with the same material layout as the palm side is also rated as “Moderate.”

8. Procurement Guidance

8.1 This section is provided to give purchasers guidance to help ensure that public safety agency needs are met when selecting and purchasing protective gloves worn by law enforcement and corrections officers.

8.2 Specification E3109 addresses performance requirements, performance ratings, and test methods for whole gloves and for glove components (for example, materials, layers). It is important to recognize that a glove is not uniform in terms of the protection it provides, and different portions or areas of a glove (for example, palm, fingertip) may offer different protection. A single glove may not meet all specified performance requirements within the standard.

8.3 Consider and identify the hazards or threats of concern.

8.4 Recognize that more than one pair of gloves may be required to address multiple hazards or threats.

8.5 Select gloves that are claimed to protect against the hazards of concern and that meet the relevant portions of Specification E3109 and other standards.

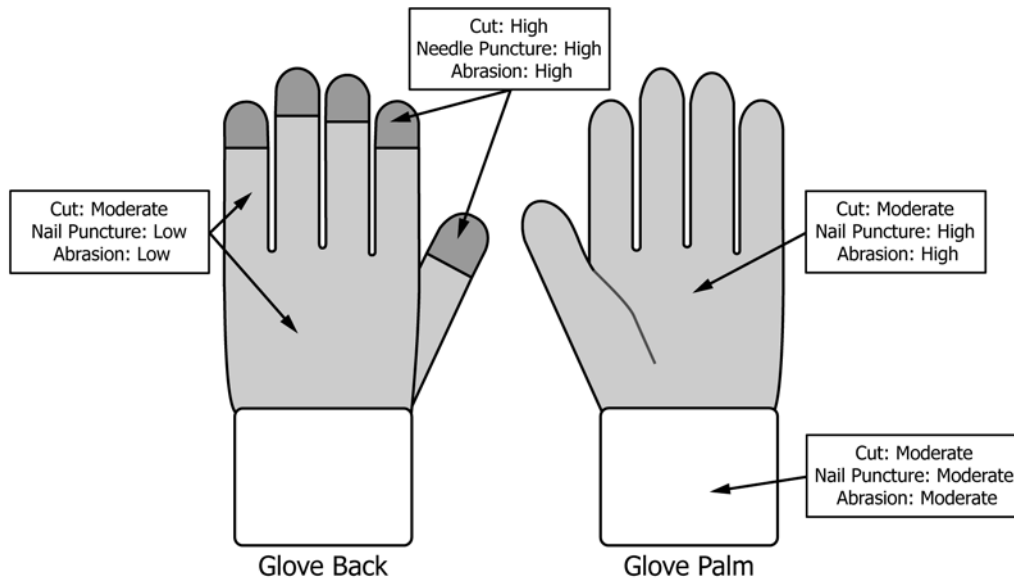


FIG. 1 Graphical Representation of Protection Areas and Respective Protection Levels for a Glove

TABLE 1 Cut Resistance Performance

Cut Resistance Rating	Average Load or Force of Penetration		
	Grams-force	[Newtons]	[Pounds-force]
Low	≥500	[≥4.9]	[≥1.1]
Moderate	≥1000	[≥9.8]	[≥2.2]
High	≥2200	[≥21.5]	[≥4.8]

reseller. An SDOC is a legally binding attestation by the supplier that the gloves were tested and demonstrated to meet requirements.

8.5.2 Specification E3109 requires that documentation be provided with gloves, including pre-use information, care and maintenance guidance, and warranty information. The purchaser should verify that this documentation is provided by the supplier or reseller.

8.6 Sample procurement language is provided in Appendix X3, and purchasers are encouraged to include this language in procurement specifications.

9. Keywords

9.1 gloves; protection

8.5.1 At the time this guide was written, certified gloves were not available, and the best option for ensuring that gloves meet Specification E3109 is to require in your procurement that a Supplier’s Declaration of Conformity (SDOC) and test report as specified in Practice E3108 be provided by the supplier or

APPENDIXES

(Nonmandatory Information)

X1. END USER SURVEY

X1.1 During development of the protective glove specification, a survey was developed and released to determine the threats of concern for law enforcement and corrections personnel. Over 700 officer responses were received across the United States. As shown in Fig. X1.1, most officer responses were from Corrections Officers, Patrol Officers, and Tactical Officers, the exact target audience of the specification.

X1.2 The survey consisted of ten questions which were used to define the scope of the specification:

- X1.2.1 What is your primary job function?
- X1.2.2 Indicate the state where you work.
- X1.2.3 What gloves do you currently wear the most?

X1.2.4 Please answer the following questions about your current gloves.

X1.2.5 Indicate all of the threats and hazards that you have encountered.

X1.2.6 Rate each of the duty glove attributes in terms of how important the features are to you.

X1.2.7 Rank each of the general glove features (1 is the highest rank and 5 is the lowest rank).

X1.2.8 Do you believe there are tradeoffs for gloves between protection, durability, and fit/dexterity?

X1.2.9 Would you like to participate in the development of a standard on duty gloves? If so, provide your contact information.

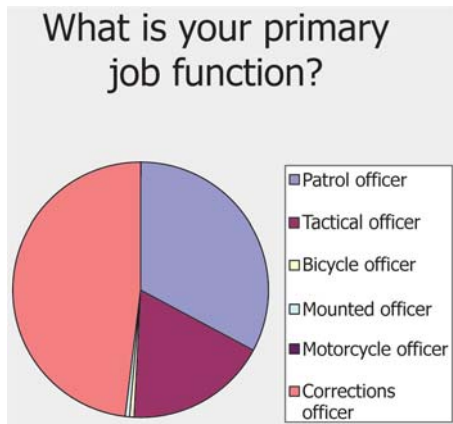


FIG. X1.1 Job Functions of Survey Respondents

X1.3 Of particular interest to the development team for Specification E3109 were two of these ten questions. The first was X1.2.5, which asked the officers to identify each hazard they had encountered during their day to day operations. As shown in Fig. X1.2, eight hazards were identified, and officers were asked to indicate all hazards they had encountered. It can be seen that cutting objects, biohazards, and hypodermic needles were the most frequently encountered.

The second question of particular interest was X1.2.6 which asked officers to rank each identified hazard in level of importance. As shown in Fig. X1.3, needlesticks, puncture, and dexterity were rated the highest priorities for these 700+ officers.

The results of the ten-question survey helped to define the scope of Specification E3109 to ensure the highest priority needs of law enforcement officers were addressed.

X1.2.10 Are there any features for your duty gloves not addressed above that you believe should also be considered as part of glove standard or specification?

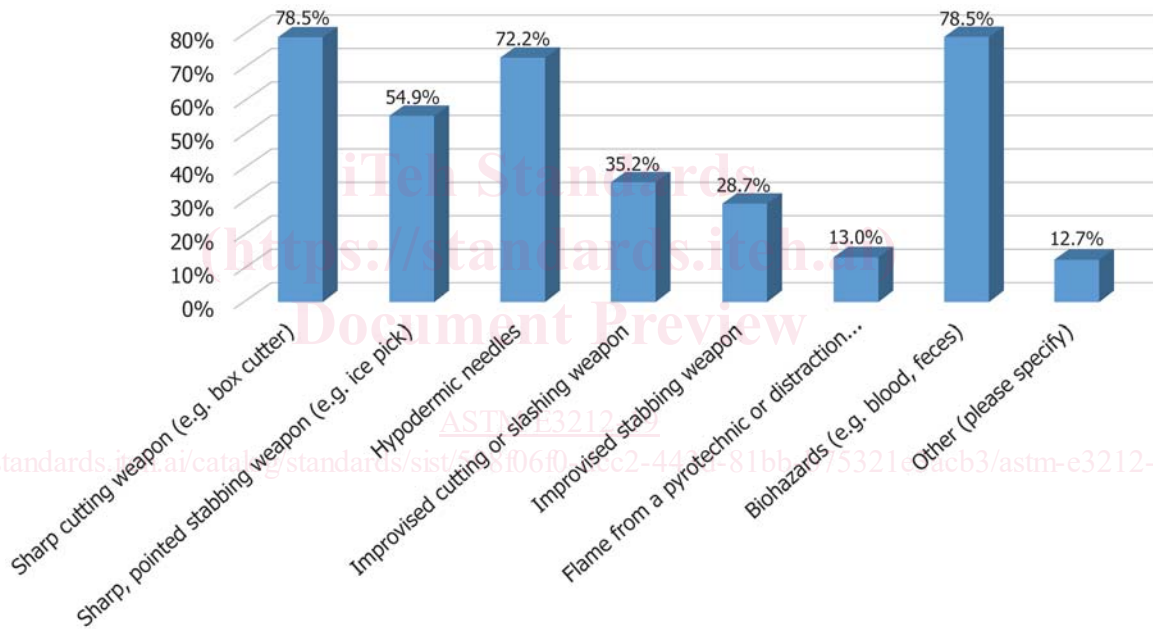


FIG. X1.2 Hazards Encountered

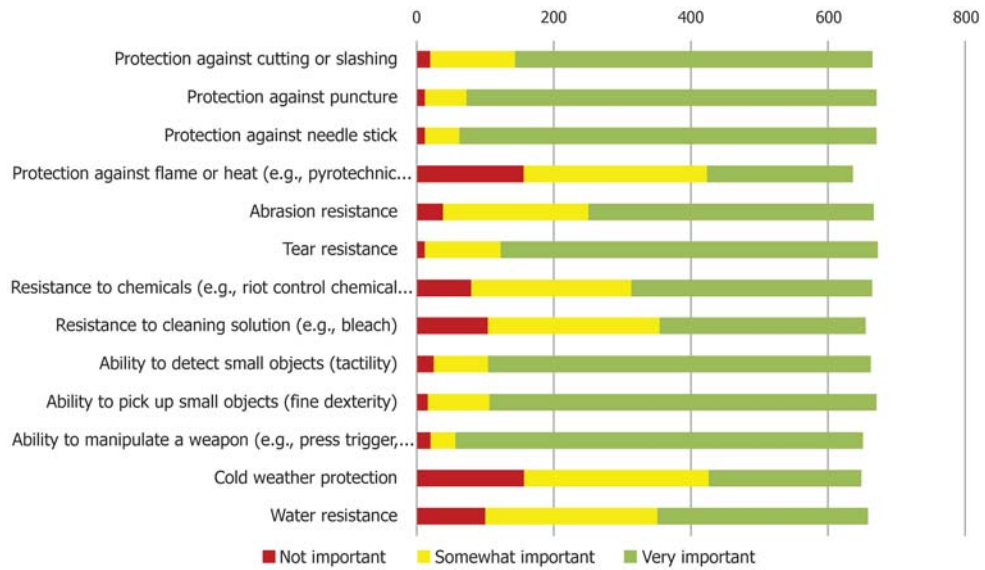


FIG. X1.3 Glove Protection Priorities

X2. DEXTERITY EVALUATION PROCEDURES

iTeh Standards
 (https://standards.itih.ai)
 Document Preview

[ASTM E3212-19](https://standards.itih.ai/catalog/standards/sist/598f06f0-dcc2-443d-81bb-b75321e3acb3/astm-e3212-19)

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