Specification of Handcuff

1. Handcuff base:

Each handcuff base should be die struck from high quality silver/stainless steel/carbon steel, struck "dead soft" with enough strikes necessary to minimize the detailing of the die into the handcuff base. The handcuffs should then be trimmed, free of any nicks or burrs along the sides of handcuffs.

2. Polishing:

Each handcuff should be polished in a two phase process utilizing polishing compounds.

3. Finishing:

Each handcuff should be electro magnetically plated with a silver finish.

4. Attachments:

Each handcuff should have a double lock, 20 lock positions, precision tooled jaw, key holes both sides with two keys.

5. Marking:

All handcuffs shall be permanently and legibly marked as follows:

a. Manufacturer's name or trademark and model number
b. Serial number

6. Weight:

The weight of the pair of handcuffs shall not exceed 425 g (15.0oz)

7. Dimensions:

Each handcuff of each pair shall have a minimum opening of 50 mm (2.0 inches) for insertion of the wrist. The inside perimeter of the handcuff shall be a
minimum of 200 mm (7.9 inches) when the ratchet is engaged at the first notch entering the locking mechanism. The inside perimeter of the handcuff shall be a maximum of 165 mm (6.5 inches) when the ratchet is engaged at the last notch entering the locking mechanism. The maximum overall length of the pair of handcuffs shall be 240 mm (9.4 inches)

8. Workmanship:

The handcuffs shall be free from defects shown below:

a. Finish not specified.
b. Finish scratched, damaged of marred, exposing base metal.
c. Foreign matter imbedded in finish.
d. Corroded area.
e. Finish not smooth, continuous, or adherent: ie. blistered, peeled or flaked, pitted, excessive build-up of finish, or discolored
f. Any part missing, broken, malformed, loose or not in proper alignment.
g. Rivet or pin insecure or not secured neatly.
h. Any burr, silver, sharp edge, dent or tool mark.
i. Metal slit, cracked or crazed.
j. End of pin set below exposed surface of plate.
k. Cracked or incomplete welding.
l. Marking is missing, illegible, incorrect of not permanent.
m. Key cannot unlock handcuff or requires undue force to do so.
n. Handcuff cannot be double-locked.
o. Handcuff ratchet does not lock automatically with the pawl.
p. Any malfunctioning in the opening or closing of the handcuffs: eg. ratchet bins or does not rotate freely.

9. Mechanical Strength

Each pair of handcuffs shall withstand a tensile force of 2200 N (495 ibf) for a period not less than 30s when tested. The handcuffs shall not open under load, shall show no sign of permanent distortion or fracture and function in a normal manner.

Necessary test report as per NIJ standard is attached herewith.
NIJ Standard-0307.01

Sep 15, 2002

TECHNOLOGY ASSESSMENT PROGRAM

NIJ Standard for
Metallic Handcuffs

NIJ STANDARD-0307.01

A VOLUNTARY NATIONAL STANDARD PROMULGATED BY THE NATIONAL INSTITUTE OF JUSTICE

March 1982

U.S. DEPARTMENT OF JUSTICE
NATIONAL INSTITUTE OF JUSTICE

James L. Underwood
Acting Director

This standard was formulated by the Law Enforcement Standards Laboratory of the National Bureau of Standards under the direction of Lawrence K. Eliason, Chief of LESL, and Daniel E. Frank, Manager, Security Systems Program. This standard has been reviewed and approved by the Technology Assessment Program Information Center of the International Association of Chiefs of Police and adopted by them as an IACP Standard.

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1. Purpose
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FOREWORD

This document, N|J Standard-0307.01, Metallic Handcuffs, is an equipment standard developed by the Law Enforcement Standards Laboratory of the National Bureau of Standards. It is produced as part of the Technology Assessment Program of the National Institute of Justice. A brief description of the program appears on the inside front cover.

This standard is a technical document that specifies performance and other requirements equipment must meet to conform to the needs of criminal justice agencies for high quality service. Purchasers can use the test methods described in this report to determine firsthand whether a particular piece of equipment meets the standards, or they may have the tests conducted on their behalf by a qualified testing laboratory. Procurement officials may also refer to this standard in their purchasing documents and require that equipment offered for purchase meet the requirements, with compliance guaranteed by the vendor or attested to by an independent laboratory.

Because this N|J standard is designed as a procurement aid, it is necessarily highly technical. For those who seek general guidance about the capabilities of metallic handcuffs, user guides also are published. The guides explain in non-technical language how to select equipment capable of the performance required by an agency.

N|J standards are subjected to continuing review. Technical comments and recommended revisions are welcome. Please send suggestions to the Program Manager for Standards, National Institute of Justice, U.S. Department of Justice, Washington, DC 20531.

Before citing this or any other N|J standard in a contract document, users should verify that the most recent edition of the standard is used. Write to: Chief, Law Enforcement Standards Laboratory, National Bureau of Standards, Washington, DC 20234.

Lester D. Shubin
Program Manager for Standards
National Institute of Justice

1. PURPOSE

This standard establishes requirements and methods of test for metallic handcuffs intended to be used to restrict the physical movement of apprehended persons. This standard is a revision of NILECJ-STD-0307.00. dated October 1974. This standard differs from the base standard in the following areas:
1. The dust test has been deleted.

2. The salt spray test evaluation criteria have been modified.

3. The overall acceptance criteria have been clarified.

4. The dimensions of cheek plate torque bit have been changed.

2. SCOPE

This document addresses double locking metallic handcuffs.

3. DEFINITIONS

3.1 DOUBLE LOCKING MECHANISM

A mechanism which locks a handcuff pawl in an engaged position, and prevents the ratchet from advancing further in the closing direction.

3.2 HANDCUFF

A ring-shaped shackle for the wrist, usually one of a pair connected by a short chain or linked bar. A typical pair of handcuffs is shown in figure 1.

3.3 PAWL

A spring-loaded, pivoted bar which engages the teeth of a ratchet, permitting it to advance in the closing direction only.

3.4 RATCHET

A bar with inclined teeth designed to engage with a pawl. The ratchet is free to advance past the pawl in one direction of motion only.
4. REQUIREMENTS

4.1 ACCEPTANCE CRITERIA

The handcuffs meet the requirement of this standard if four or more of the five handcuff specimens pass all of the tests.

4.2 USER INFORMATION

The following items of information shall be among those supplied to the user by the manufacturer or distributor:

1. Operating instructions
2. Type of finish
3. Weight
4. Materials of construction
5. Certification of compliance with this standard

4.3 MARKING

All handcuffs shall be permanently and legibly marked as follows:

1. Manufacturer's name or trademark and model number
2. Serial number

4. WORKMANSHIP

The handcuffs shall be free from defects shown in table 1.

4.5 WEIGHT

The weight of the pair of handcuffs shall not exceed 425 g (15.0 oz).

4.6 DIMENSIONS

Each handcuff of each pair shall have a minimum opening of 50 mm (2.0 in) for insertion of the wrist. The inside perimeter of the handcuff shall be a minimum of 200 mm (7.9 in) when the ratchet is engaged at the first notch entering the locking mechanism. The inside perimeter of the handcuff shall be a maximum of 165 mm (6.5 in) when the ratchet is engaged at the last notch entering the locking mechanism. The maximum overall length of the pair of handcuffs shall be 240 mm (9.4 in).

Table 1. Defects in workmanship

1. Finish not specified.

2. Finish scratched, damaged or marred, exposing base metal.

3. Foreign matter imbedded in finish.

4. Corroded area.

5. Finish not smooth, continuous, or adherent; i.e., blistered, peeled or flaked, pitted, excessive build-up of finish, or discolored.

6. Any part missing, broken, malformed, loose, or not in proper alignment.

7. Rivet or pin insecure or not secured neatly.

8. Any burr, sliver, sharp edge, dent, or tool mark.

9. Metal split, cracked, or crazed.

10. End of pin set below exposed surface of plate.

11. Cracked or incomplete welding.

12. Marking is missing, illegible, incorrect or not permanent.
13. Key cannot unlock handcuff or requires undue force to do so.

14. Handcuff cannot be double-locked.

15. Handcuff ratchet does not lock automatically with the pawl.

16. Any malfunctioning in the opening or closing of the handcuffs; e.g., ratchet binds or does not rotate freely.

4.7 MECHANICAL STRENGTH

Each pair of handcuffs shall withstand a tensile force of 2200 N (495 lbf) for a period not less than 30 s when tested in accordance with paragraphs 5.6.1 and 5.6.2. The handcuffs shall not open under load, shall show no sign of permanent distortion or fracture and shall function in a normal manner* following these tests.

4.8 SALT SPRAY CORROSION RESISTANCE

The handcuffs shall be subjected to salt spray for 12 h in accordance with paragraph 5.7. While the handcuffs may show some evidence of minor corrosion or discoloration as a result of the test, they shall show no substantial corrosion and shall continue to function in a normal manner.*

4.9 CHEEK PLATE TAMPER RESISTANCE

Each handcuff having cheek plates shall be subjected to cheek-plate torque not to exceed 23.0 N·m (204 lbf·in) in accordance with paragraph 5.8. If a cheek plate separates from the pivot pin of the handcuff, it shall not be possible for the ratchet to be removed from the pivot pin, by hand or with the aid of a screwdriver, and either disengaged from the pawl or displaced such that the locked handcuff may be placed on a person’s wrist through the opening.

* It is permissible for the ratchet and/or pawl to bind immediately following the test, provided that no more than 10 complete revolutions of the ratchet around the pivot eliminate the binding.

5. TEST METHODS

5.1 SAMPLING

A sample of five handcuff specimens shall be selected at random.

5.2 TEST SEQUENCE

The tests shall be performed in the following sequence:

1. Inspection
2. Weight and Dimensional Measurements

3. Mechanical Loading Tests

4. Salt Spray Test

5. Cheek Plate Test

5.3 TEST EQUIPMENT

5.3.1 Tensile Testing Machine

The tensile testing machine shall be capable of applying and maintaining a force of 2200±90 N (495±20 lbf).

5.3.2 Torque Wrench

The torque wrench shall be capable of applying and maintaining a torque of 23.0 N·m (204 lbf/in), with an accuracy and precision of at least 5%, and shall be of the indicator (not the preset) type.

5.3.3 Test Fixtures

The torque bit shall be made from tool steel to the dimensions shown in figure 2 and shall be heat treated to a Rockwell hardness of 55-60C. The tensile loading fixture shall be made from tool steel to the dimensions shown in figure 3.
5.3.4 Salt Spray Chamber

The salt spray chamber shall meet the requirements of ASTM Standard B117-73.

5.4 INSPECTION

Inspect the handcuffs for the defects shown in table 1, with the unaided human eye (20/20 vision).

5.5 WEIGHT AND DIMENSIONAL MEASUREMENTS

Measure and weigh each pair of handcuffs to determine compliance with paragraphs 4.5 and 4.6.

5.6 MECHANICAL LOADING TESTS

5.6.1 Handcuffs

Double lock each handcuff with the ratchet engaged at the first notch entering the locking mechanism. Apply a tensile force of 2200 N (495 lbf) in the direction of the chain (longitudinal), across the handcuffs, using the test figures as shown in figure 3. Maintain the tension for 30 s, note whether the ratchet separates from the pawl, release the tension, and then check the handcuffs for proper operation.
5.6.2 Locking Mechanism

Double lock each handcuff with the ratchet engaged at the first notch entering the locking mechanism. Apply a tensile force of 2200 N (495 lbf) to one of the handcuffs, at right angles to the direction of the chain, using the test fixtures as shown in figure 3. Maintain the tension for 30 s, note whether the ratchet separates from the pawl, release the tension, and then check the handcuff for proper operation. Repeat the test on the other handcuff of the pair.

5.7 SALT SPRAY TEST

Subject the handcuffs to salt spray in accordance with ASTM Standard B117-73.* Use a 5% salt solution, a chamber temperature of 35±2°C (95±3.6°F) and an exposure of 12 h. Suspend the handcuffs so that they do not touch each other or the walls or floor of the chamber. After the test, inspect the handcuffs for evidence of substantial corrosion or improper operation.

5.8 CHEEK PLATE TEST

Engage the handcuff pawl in the third notch from the free end of the ratchet, double-lock the handcuff and keep it locked throughout the test. Clamp the handcuff ratchet in a vise whose jaws are faced with either plastic or soft metal plates. Wear safety goggles for protection. Insert the torque bit between the cheek plates, adjacent to the pivot pin that secures the ratchet to the cheek plates, as shown in figure 2. Use a suitable torque wrench to apply a clockwise torque to the torque bit until the cheek plates yield, deforming to such an extent that a maximum torque of 23.0 N (204 lbf/in) cannot be maintained. If the maximum torque can be applied, retain that torque for a period of 30 s, and then apply the same torque in a counterclockwise direction for 30 s.

If a cheek plate separates from the pivot pin, remove the handcuff from the vise. By hand and with the aid of a screwdriver [146.1 mm (5 3/4 in) ¾ blade length ¾158.8 mm (6 1/4 in), 7.5 mm (19/64 in) ¾ tip width at end ¾11.1 mm (7/16 in), and 0.965 mm (0.038 in) ¾ tip thickness at end ¾41.6 mm (0.062 in)] determine whether it is possible to remove the ratchet from the pivot pin and to disengage the ratchet from the pawl or to break or bend the ratchet sufficiently to enable the handcuff to be removed from or placed on a person's wrist.


ABOUT THE TECHNOLOGY ASSESSMENT PROGRAM

The Technology Assessment Program is sponsored by the Office of Development, Testing and Dissemination of the National Institute of Justice (NIJ), U.S. Department of Justice. The program responds to the mandate of the Justice System Improvement Act of 1979, which created NIJ and directed it to encourage research and development to improve the criminal justice system and to disseminate the results to Federal, State, and local agencies.
The Technology Assessment Program is an applied research effort that determines the technological needs of justice system agencies, sets minimum performance standards for specific devices, tests commercially available equipment against those standards, and disseminates the standards and test results to criminal justice agencies nationwide and internationally.

The program operates through:

The Technology Assessment Program Advisory Council (TAPAC) consisting of nationally recognized criminal justice practitioners from Federal, State, and local agencies, which assesses technological needs and sets priorities for research programs and items to be evaluated and tested.

The Law Enforcement Standards Laboratory (LESL) at the National Bureau of Standards, which develops voluntary National performance standards for compliance testing to ensure that individual items of equipment are suitable for use by criminal justice agencies. The standards are based upon laboratory testing and evaluation of representative samples of each item of equipment to determine the key attributes, develop test methods, and establish minimum performance requirements for each essential attribute. In addition to the highly technical standards, LESL also produces user guides that explain in non-technical terms the capabilities of available equipment.

The Technology Assessment Program Information Center (TAPIC) operated by the International Association of Chiefs of Police (IACP), which supervises a national compliance testing program conducted by independent agencies. The standards developed by LESL serve as performance benchmarks against which commercial equipment is measured. The facilities, personnel, and testing capabilities of the independent laboratories are evaluated by LESL prior to testing each item of equipment, and LESL helps the Information Center staff review and analyze data. Test results are published in Consumer Product Reports designed to help justice system procurement officials make informed purchasing decisions.

All publications issued by the National Institute of Justice, including those of the Technology Assessment Program, are available from the National Criminal Justice Reference Service (NCJRS), which serves as a central information and reference source for the nation's criminal justice community. For further information, or to register with NCJRS, write to the National Institute of Justice, National Criminal Justice Reference Service, Washington, DC 20531

Paul Cascarano, Assistant Director
National Institute of Justice

The following errors in the original document were corrected above:

- In Section 5.2, f. was changed to e.
- In Section 5.3.3, show was changed to shown.