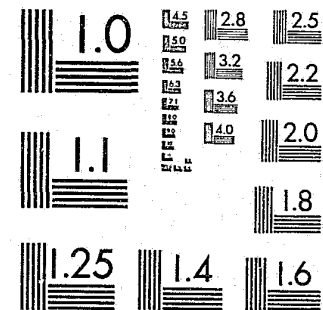


National Criminal Justice Reference Service



This microfiche was produced from documents received for inclusion in the NCJRS data base. Since NCJRS cannot exercise control over the physical condition of the documents submitted, the individual frame quality will vary. The resolution chart on this frame may be used to evaluate the document quality.



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Microfilming procedures used to create this fiche comply with the standards set forth in 41CFR 101-11.504.

Points of view or opinions stated in this document are those of the author(s) and do not represent the official position or policies of the U. S. Department of Justice.

National Institute of Justice
United States Department of Justice
Washington, D. C. 20531

8/14/85

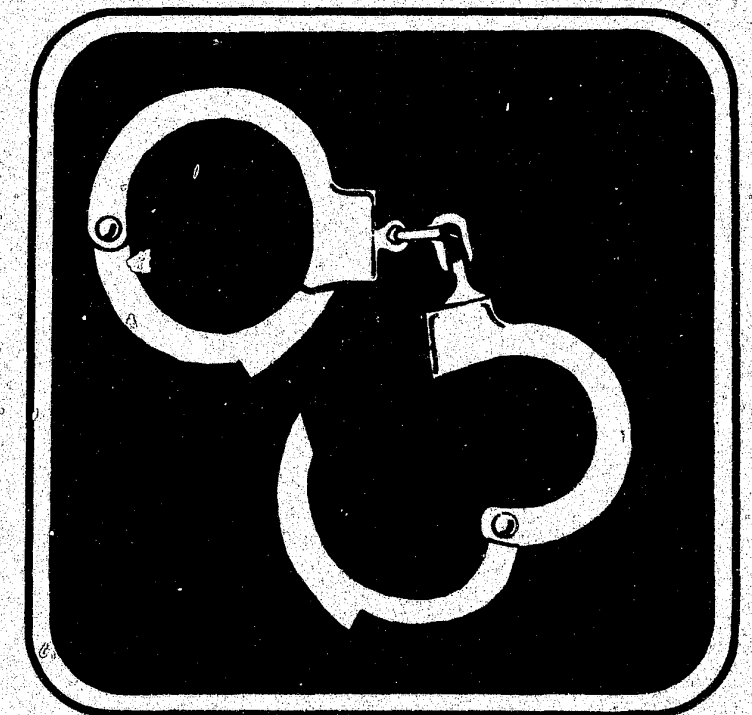
nij

U. S. Department of Justice
National Institute of Justice

Technology Assessment Program

INFORMATION CENTER

Metallic Handcuff Testing



A Program of the National Institute of Justice
Conducted by the
INTERNATIONAL ASSOCIATION of CHIEFS of POLICE

MAY 1982

96880

96880

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 the 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 bench marks 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

METALLIC HANDCUFF TESTING

PREPARED BY THE
TECHNOLOGY ASSESSMENT PROGRAM INFORMATION CENTER
RESEARCH DIVISION
INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
GAITHERSBURG, MARYLAND 20878

UNDER

SUPPORTING GRANT NUMBERS
78NI-AX-0016 (S-2)
81IJ-CX-0071

AWARDED BY THE
U.S. DEPARTMENT OF JUSTICE
NATIONAL INSTITUTE OF JUSTICE

Test results and analyses herein do not represent product approval or endorsement by the National Institute of Justice, the U.S. Department of Justice; the National Bureau of Standards, the U.S. Department of Commerce; the IACP; or the laboratories which conducted the equipment testing.

CONTENTS

	<u>Page</u>
Executive Summary	1
Introduction	3
Metallic Handcuff Test Results	4
Appendix A - NIJ-Standard-0307.01	
Appendix B - Manufacturers or Suppliers of Metallic Handcuffs	

NCJRS
FEB 18 1985
ACQUISITIONS

U.S. Department of Justice
National Institute of Justice

This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the National Institute of Justice.

Permission to reproduce this copyrighted material has been granted by
Public Domain/NIJ
U.S. Department of Justice

to the National Criminal Justice Reference Service (NCJRS).

Further reproduction outside of the NCJRS system requires permission of the copyright owner.

EXECUTIVE SUMMARY

The metallic handcuff is a basic item of equipment issued to law enforcement officers. The use of metallic handcuffs as a temporary restraining device is an everyday occurrence in the law enforcement community. Their purpose is to contain an individual for a short duration and under proper surveillance. The TAPIC tested 17 models of handcuffs to ascertain their mechanical strength and their resistance to corrosion. In order to fully comply with the requirements of the standard, at least four of the five handcuffs tested must pass all of the tests. Only 5 models tested were in complete compliance with the requirements of the standard.

The five models were the Peerless 10 ounce and Smith & Wesson models 90, 91, 94, and 938. Two additional models of handcuffs passed the mechanical requirements but did not have the required serial numbers. The Federal Laboratories model, Federal Super, and the model from Fabrique National De Herstal SA (Belgium) did not have serial numbers. The "Belgium" handcuffs have a single cheek plate design and uses a magnetic key instead of the traditional handcuff key.

Paragraph 4.3 of the Standard deals with marking and serial numbers for handcuffs. Of the 17 models tested, 16 had manufacturer markings. Eleven of the 17 models, or 65 percent, had serial numbers. Serial numbers are important for inventory control and TAPIC urges all manufacturers to add serial numbers.

Paragraph 4.5 of the Standard specifies that the maximum weight of the handcuffs shall not exceed 15 ounces. All manufacturers met this requirement.

Paragraph 4.6 of the Standard specifies dimensional measurements of handcuffs. Three models of handcuffs exceeded the maximum overall length requirements of 9.4 inches.

The metallic handcuffs were subjected to several mechanical strength tests to determine compliance with the requirements of paragraph 4.7 of the Standard. Nine of 17 models, or 53 percent, passed this portion of the testing program. Some of the passing models showed signs of binding after the 495 foot pound load had been released and/or the double lock was not operating properly.

NIJ-Standard 0307.01, is the first standard to address the problem of cheek plate tampering to escape from metallic handcuffs. Paragraph 4.8 of the Standard specifies Cheek Plate Tamper Resistance requirements. Nine of 17 models met the requirement. One model has a single cheek plate and was not tested as the requirement was not applicable. The purpose of this requirement is to minimize the possibility of a prisoner escaping from the handcuffs by tampering with the cheekplates. The test is severe, and as long as the handcuffs will continue to provide restraint following the test, there is no requirement that the handcuffs continue to function in a normal manner. The data are footnoted in the case of those handcuffs that passed the test to provide information on the nature of mechanical failure that does not affect the ability of the handcuff to provide restraint.

Rusting handcuffs have been a problem for many seaside communities and communities with a highly humid environment. The metallic handcuffs were subjected to a 12-hour salt spray to ascertain their resistance to corrosion. All models showed some signs of corrosion. It should be noted that if officers clean and oil their handcuffs monthly when they clean their firearms, the problem of corrosion would all but disappear.

Paragraph 4.4 of the Standard deals with workmanship inspection upon receipt of the handcuffs. If the requirements are interpreted strictly, all handcuffs tested would be found to have some minor flaws. Agencies should use the requirements of paragraph 4.4 to determine whether to accept or deny receipt of purchased handcuffs keeping in mind the intended use of the handcuffs.

INTRODUCTION

Metallic handcuffs are a basic item of police equipment. Although handcuffs are relatively simple devices, they have material and mechanical features that can significantly influence their performance. Aside from basic requirements such as standardized opening dimensions to fit a wide range of wrist sizes, serial numbers, and quality of workmanship, the strength and corrosion resistance of the handcuffs are major factors contributing to dependability.

The Technology Assessment Program Information Center (TAPIC) subjected 17 models of double-locking metallic handcuffs to the test requirements of NIJ-Standard-0307.01, a voluntary national standard issued by the National Institute of Justice (NIJ) which was developed by the Law Enforcement Standards Laboratory (LESL), National Bureau of Standards (NBS), approved by the Technology Assessment Program Advisory Council (TAPAC), and adopted by the International Association of Chiefs of Police (IACP).

The following paragraphs provide a summary of the types of tests and the special conditions required to evaluate the performance of metallic handcuffs.

Mechanical/Loading Tests

These two tests are designed to evaluate the strength of the handcuffs by pulling on them. The first tests the strength of the handcuffs, the interconnecting chain and the attachment (swivels usually) of the chain to the handcuffs. The second tests the strength of the locking mechanism of each handcuff.

Cheek Plate Test

This test applies a twisting force (torque) between the cheek plates of each cuff to evaluate the strength of the rivet or pivot of the handcuff, and whether the ratchet can be broken out of the cheek plates. The handcuffs are also evaluated to see if a person could escape from them if any of the aforementioned adverse conditions occur.

Salt Spray Resistance

The handcuffs are subjected to a standard salt spray environment for a specified time. After the salt spray test, the handcuffs are checked for normal operation and inspected for evidence of severe corrosion.

METALLIC HANDCUFF TEST RESULTS

The next 17 pages of this report present the handcuff testing results in detail. The following terms and abbreviations are used in the charts:

P = Passed the requirements of the Standard.

F = Failed to meet the requirements of the Standard.

NA = Requirement not applicable to this particular model of handcuff.

NT = No test performed. See applicable footnote.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: American Munitions Company

ADDRESS: 200 Ruggles Street, Fond Du Lac, WI 54935

MODEL NUMBER: None

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:	None	None	None	None	None
		SAMPLE NUMBER:	2256	2257	2258	2259	2260
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P
	Serial Number		F	F	F	F	F
4.5 WEIGHT:	Shall not exceed 15 oz.		10.8	10.9	10.9	10.8	10.8
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches		8.3	8.3	8.3	8.0	8.0
	Maximum inside perimeter at last notch - 6.5 inches		5.8	5.8	5.9	5.8	5.8
	Maximum overall length - 9.4 inches		9.3	9.3	9.3	9.3	9.4
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		P	P ¹	P	F ²	P
		(R)	P	P ¹	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(L)	P	F ³	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P ⁴	P	P	P	P
		(L)	P	P	P	P	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		P ⁵	P ⁵	P ⁵	P ⁵	P ⁵

NOTES:

1. Right cuff binding.
2. Severe binding - loss of double locking after tensile testing.
3. Left cuff will not unlock after tensile test.
4. Right cuff will not double lock after cheek plate test.
5. Cuffs showed signs of corrosion of laminated plates at swivel juncture when received. Excessive corrosion of locking mechanism after test, but cuffs still function.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Australian Government - Small Arms Factory

ADDRESS: P.O. Box 70, Lithgow N.S.W. 2790 Australia

MODEL NUMBER: Saf-Lok

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		66341	66342	66343	66344	66345
		SAMPLE NUMBER:				
		2162	2163	2164	2165	2166
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	14.6	14.5	14.6	14.6	14.5
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.1	8.1	8.0	8.0	8.1
	Maximum inside perimeter at last notch - 6.5 inches	6.0	5.9	5.8	5.9	5.9
	Maximum overall length - 9.4 inches	10.1	10.1	10.0	9.9	10.1
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	P	P	F ¹	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) (L)	P P	P P	P P	P F ²
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	P	P	P
		(L)	P	P	P	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ³	p ³	p ³	p ³	p ³

NOTES:

1. Ratchet separated from pawl at 390 lbs.
2. Ratchet separated from pawl at 480 lbs.
3. Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Bianchi

ADDRESS: 100 Calle Cortez, Temecula, CA 92390

MODEL NUMBER: 500

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		12328	10981	11481	11150	11553
		SAMPLE NUMBER:				
		2298	2299	2300	2301	2302
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	9.7	9.9	9.7	9.8	9.7
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.1	8.1	8.1	8.1	8.1
	Maximum inside perimeter at last notch - 6.5 inches	5.7	5.7	5.8	5.8	5.7
	Maximum overall length - 9.4 inches	9.2	9.2	9.4	9.3	9.3
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	F ¹	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) (L)	F ² F ²	F ² F ²	F ² F ²	F ² P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	p ³	P	p ³
		(L)	P	P	P	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ⁴	p ⁴	p ⁴	p ⁴	p ⁴

NOTES:

1. Second tooth engagement of left cuff as first tooth would not engage, as called for in standard, due to defect.
2. Ratchet separated from pawl at 100 to 465 lbs.
3. Binds, but still double locks.
4. Slight to moderate exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Fabrique Nationale De Herstal S.A.

ADDRESS: Rue Voie De Liege 33, 4400 Herstal, Belgium

MODEL NUMBER: None

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:	None	None	None	None	None
		SAMPLE NUMBER:	2157	2158	2159	2160	2161
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P
	Serial Number		F	F	F	F	F
4.5 WEIGHT:	Shall not exceed 15 oz.		7.7	7.6	7.7	7.7	7.7
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.5	2.5	2.5	2.5	2.5
	Minimum inside perimeter at first notch - 7.9 inches		8.7	8.7	8.6	8.6	8.6
	Maximum inside perimeter at last notch - 6.5 inches		6.1	6.0	6.1	6.1	6.1
	Maximum overall length - 9.4 inches		11.0	11.0	10.9	10.0	10.9
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		P	F ¹	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	P	P
		(L)	P	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	NA ²	NA ²	NA ²	NA ²	NA ²
		(L)	NA ²	NA ²	NA ²	NA ²	NA ²
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		p ³	p ³	p ³	p ³	p ³

NOTES:

- Chain swivel fractured on this pair of handcuffs.
- NA - Not applicable—Test not performed as handcuffs have a single cheek plate.
- Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Federal Laboratories, Inc.

ADDRESS: Distributed by: Fargo Intl., P.O. Box 177, 214 Golden Lane, New Oxford, PA 17350

MODEL NUMBER: Federal Super

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:	None	None	None	None	None
		SAMPLE NUMBER:	2267	2268	2269	2270	2271
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P
	Serial Number		F	F	F	F	F
4.5 WEIGHT:	Shall not exceed 15 oz.		11.0	11.0	11.0	11.0	11.0
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches		8.3	8.3	8.3	8.3	8.3
	Maximum inside perimeter at last notch - 6.5 inches		5.8	5.8	5.8	5.8	5.8
	Maximum overall length - 9.4 inches		9.2	9.2	9.2	9.3	9.2
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		P	P	P	F ¹	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	F ²	P
		(L)	P	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	P	P	NT ³	P
		(L)	P	P	P	NT ³	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		p ⁴	p ⁴	p ⁴	p ⁴	p ⁴

NOTES:

- Right cuff ratchet separated from pawl at 335 lbs.
- Distorted from previous test - does not lock.
- NT - No test performed due to previous mechanical failures.
- Slight to moderate exterior corrosion; excessive corrosion of locking mechanism and laminated plates at swivel juncture, but cuffs still function.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Firearms Import & Export Corporation (FIE)

ADDRESS: Distributed by: Parker, P.O. Box 4960, Hialeah, FL 33014

MODEL NUMBER: HC-1

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:	None	None	None	None	None
		SAMPLE NUMBER:	2285	2286	2287	2288	2289
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P
	Serial Number		F	F	F	F	F
4.5 WEIGHT:	Shall not exceed 15 oz.		8.5	8.5	8.4	8.1	8.5
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches		8.0	8.1	8.1	8.0	8.0
	Maximum inside perimeter at last notch - 6.5 inches		5.7	5.6	5.7	5.6	5.7
	Maximum overall length - 9.4 inches		9.3	9.3	9.3	9.1	9.2
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		F ¹	F ¹	F ¹	NT ²	NT ²
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	NT ³	NT ³	NT ³	F	F
		(L)	NT ³	NT ³	NT ³	F	F
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F	F	NT ³	F	F
		(L)	F	F	NT ³	F	F
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		NT ³	NT ³	NT ³	NT ³	NT ³

NOTES:

1. Ratchet separated from pawl at a range of 200 to 350 lbs.
2. NT - No test to save two samples for locking mechanism tests.
3. NT - No test due to previous severe mechanical failure.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Hamburger Woolen Company

ADDRESS: 510 Avenue of the Americas, New York, NY 10011

MODEL NUMBER: 97470

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:	60633	60639	60636	60635	60638
		SAMPLE NUMBER:	2314	2312	2313	2315	2316
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P
	Serial Number		P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.		9.6	9.2	9.5	9.2	9.3
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches		8.3	8.3	8.3	8.3	8.3
	Maximum inside perimeter at last notch - 6.5 inches		5.7	5.6	5.6	5.6	5.6
	Maximum overall length - 9.4 inches		9.4	9.3	9.3	9.3	9.4
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		F	F	F	F	F
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹
		(L)	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹
		(L)	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		NT ¹	NT ¹	NT ¹	NT ¹	NT ¹

NOTES:

1. NT - No test due to previous mechanical failure causing ratchet to misalign from pawl preventing locking of the handcuffs.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Japanese

ADDRESS: Distributed by: Super Surplus, Wisconsin Ave., Bethesda, MD 20014

MODEL NUMBER: None

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:					
		None	None	None	None	None	
		SAMPLE NUMBER:					
		2125	2126	2127	2128	2129	
4.3 MARKINGS:	Manufacturer's name or trade mark	F	F	F	F	F	
	Serial Number	F	F	F	F	F	
4.5 WEIGHT:	Shall not exceed 15 oz.	8.7	8.6	8.7	8.7	8.7	
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.1	2.1	2.1	2.1	2.1	
	Minimum inside perimeter at first notch - 7.9 inches	7.8	7.8	7.8	7.8	7.8	
	Maximum inside perimeter at last notch - 6.5 inches	5.8	5.8	5.8	5.8	5.8	
	Maximum overall length - 9.4 inches	10.4	10.5	10.4	10.4	10.4	
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	F	F	F	F	F	
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) F (L) F	F	F	F	F	
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F	F	NT ¹	NT ¹	F
		(L)	F	F	NT ¹	NT ¹	F
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹	

NOTES:

1. NT - No test performed due to previous severe mechanical failure.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Jay-Pee Company (Spain)

ADDRESS: Distributed by: Mountain West Alarm Supply Co., P.O. Box 10780, Phoenix, AZ 85064

MODEL NUMBER: None

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:					
		None	None	None	None	None	
		SAMPLE NUMBER:					
		2292	2293	2294	2295	2296	
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P	
	Serial Number	F	F	F	F	F	
4.5 WEIGHT:	Shall not exceed 15 oz.	11.4	11.5	11.5	11.5	11.5	
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	1.9	1.9	2.0	2.0	1.9	
	Minimum inside perimeter at first notch - 7.9 inches	8.0	8.0	8.1	8.0	8.0	
	Maximum inside perimeter at last notch - 6.5 inches	5.5	5.0	5.5	5.5	5.5	
	Maximum overall length - 9.4 inches	9.6	9.5	9.6	9.5	9.5	
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	F	F	F	F	F	
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) F (L) F	F	F	F	F	
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F	F	F	F	F
		(L)	F	F	F	F	F
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹	

NOTES:

1. NT - No test performed due to previous severe mechanical failure.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Peerless Handcuff Company
 ADDRESS: 95 State Street, Springfield, Massachusetts 01103
 MODEL NUMBER: Lightweight

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		52772	52773	52774	52775	52776
		SAMPLE NUMBER:				
		2261	2262	2263	2264	2265
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	7.3	7.2	7.2	7.3	7.2
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.2	8.2	8.3	8.3	8.3
	Maximum inside perimeter at last notch - 6.5 inches	5.8	5.8	5.9	5.9	5.9
	Maximum overall length - 9.4 inches	9.2	9.3	9.2	9.2	9.2
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	P	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	P
		(L)	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F ¹	F ¹	F ¹	F ¹
		(L)	F ¹	F ¹	F ¹	F ¹
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ²	p ²	p ²	p ²	p ²

- NOTES:
- Handcuff cheek plates were spread open and rivet pin popped at a torque range of 100 in. lbs. to 152 in. lbs. Subject could escape from handcuffs.
 - Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Peerless Handcuff Company
 ADDRESS: 95 State Street, Springfield, MA 01103
 MODEL NUMBER: Peerless 10 oz.

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		930350	930354	930355	930353	930352
		SAMPLE NUMBER:				
		2250	2251	2252	2253	2254
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	9.6	9.5	9.5	9.5	9.5
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.1	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.3	8.3	8.3	8.3	8.3
	Maximum inside perimeter at last notch - 6.5 inches	5.9	5.9	5.9	5.9	5.9
	Maximum overall length - 9.4 inches	9.3	9.3	9.4	9.4	9.4
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	P	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	p ¹	p ²
		(L)	P	F ³	p ¹	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	P	P	P
		(L)	P	P	P	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ⁴	p ⁴	p ⁴	p ⁴	p ⁴

- NOTES:
- Binding but still double locks.
 - Difficult to double lock right cuff.
 - Will not double lock.
 - Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: PIC Inc. (Spain)
 ADDRESS: Surplus Center, 3451 N. Washington Blvd., Arlington, Virginia 22210
 MODEL NUMBER: None

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:		39269	39264	39268	39270	39272
		SAMPLE NUMBER:		2151	2152	2153	2154	2155
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P	P
	Serial Number		P	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.		10.8	10.8	10.7	10.7	10.7	10.7
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		1.9	1.9	1.9	1.9	1.9	1.9
	Minimum inside perimeter at first notch - 7.9 inches		8.1	8.1	8.1	8.1	8.1	8.1
	Maximum inside perimeter at last notch - 6.5 inches		5.6	5.7	5.5	5.	5.	5.
	Maximum overall length - 9.4 inches		9.3	9.3	9.4	9.3	9.2	9.2
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		F	F	F	F	F	F
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	F	NT ¹	F	NT ¹	F	NT ¹
		(L)	F	NT ¹	F	NT ¹	F	NT ¹
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F	NT ¹	F	NT ¹	F	NT ¹
		(L)	F	NT ¹	F	NT ¹	F	NT ¹
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		NT ¹	NT ¹	NT ¹	NT ¹	NT ¹	NT ¹

NOTES:
 1. NT - No test performed due to previous severe mechanical failure.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Smith & Wesson
 ADDRESS: 2100 Roosevelt Ave., Springfield, MA 01101
 MODEL NUMBER: 90

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:		273292	260805	279858	281795	279548
		SAMPLE NUMBER:		2273	2274	2275	2277	2278
4.3 MARKINGS:	Manufacturer's name or trade mark		P	P	P	P	P	P
	Serial Number		P	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.		9.3	9.4	9.2	9.4	9.5	9.5
4.6 DIMENSIONS:	Minimum opening - 2.0 inches		2.0	2.0	2.0	2.5	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches		8.3	8.3	8.4	8.4	8.4	8.4
	Maximum inside perimeter at last notch - 6.5 inches		5.9	5.9	5.9	5.9	5.9	5.9
	Maximum overall length - 9.4 inches		8.9	9.0	8.9	8.8	8.9	8.9
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.		P	P	P	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	P	P	P
		(L)	P	P	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	P	P	P	P	P
		(L)	P	P	P	P	P	P
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating		p ¹	p ¹	p ¹	p ¹	p ¹	p ¹

NOTES:
 1. Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Smith & Wesson
 ADDRESS: 2100 Roosevelt Ave., Springfield, MA 01101
 MODEL NUMBER: 91

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		013123	013124	012999	012998	013098
		SAMPLE NUMBER:				
		2320	2322	2318	2319	2321
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	8.8	8.9	9.1	8.9	9.2
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.1	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.4	8.4	8.3	8.3	8.3
	Maximum inside perimeter at last notch - 6.5 inches	5.9	5.9	6.0	6.0	6.0
	Maximum overall length - 9.4 inches	9.0	8.9	8.9	9.0	8.9
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	p ¹	p ¹	p ¹	p ¹	p ¹
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) P (L) P	P P	P p ²	P P	p ² P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	p ³	P	p ³	p ³
		(L)	p ³	P	P	p ⁴
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ⁵	p ⁵	p ⁵	p ⁵	p ⁵

- NOTES:
1. Binding not as severe after tensile testing. Previous binding was caused by salt spray corrosion test.
 2. Binds after tensile test.
 3. Binds, but still locks.
 4. Will not unlock.
 5. Slight exterior corrosion easily cleaned; moderate to heavy interior corrosion of locking mechanism.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Smith & Wesson
 ADDRESS: 2100 Roosevelt Ave., Springfield, MA 01101
 MODEL NUMBER: 94

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		755716	757453	755203	800912	898073
		SAMPLE NUMBER:				
		2307	2308	2306	2310	2309
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	11.1	11.2	11.2	11.2	11.2
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.0	2.0	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.2	8.3	8.2	8.1	8.2
	Maximum inside perimeter at last notch - 6.5 inches	5.8	5.9	5.9	5.8	6.0
	Maximum overall length - 9.4 inches	9.4	9.4	9.4	9.4	9.3
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	F ¹	P	P	P	P
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R) P (L) P	P P	P P	P P	P P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	p ²	P	P
		(L)	P	P	P	p ²
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ³	p ³	p ³	p ³	p ³

- NOTES:
1. Ratchet separated from pawl under load.
 2. Ratchet binding in cheek plates due to deformation; retains locking ability.
 3. Slight exterior corrosion easily cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Smith & Wesson
 ADDRESS: 2100 Roosevelt Ave., Springfield, MA 01101
 MODEL NUMBER: 926

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:					
		005841	005982	005972	005936	006029	
		SAMPLE NUMBER:					
		2280	2281	2282	2283	2284	
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P	
	Serial Number	P	P	P	P	P	
4.5 WEIGHT:	Shall not exceed 15 oz.	3.6	3.6	3.6	3.5	3.5	
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.0	2.0	2.0	2.0	2.0	
	Minimum inside perimeter at first notch - 7.9 inches	8.2	8.2	8.2	8.2	8.1	
	Maximum inside perimeter at last notch - 6.5 inches	5.8	5.8	5.8	5.8	5.7	
	Maximum overall length - 9.4 inches	8.5	8.7	8.6	8.6	8.5	
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	P	P	P	P	
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	P	
		(L)	P	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	F ¹	F ¹	F ¹	NT ²	F ¹
		(L)	F ¹	F ¹	F ¹	NT ²	F ¹
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ³	p ³	p ³	p ³	p ³	

NOTES:

- Rivet pin on cheek plates popped open at a torque of 95 in. lbs. to 150 in. lbs. Subject could escape from cuffs.
- NT - No test due to previous mechanical failure of the other 4 samples.
- Slight to moderate exterior corrosion. Can be cleaned.

METALLIC HANDCUFF TEST RESULTS

BRAND NAME/MANUFACTURER: Smith & Wesson
 ADDRESS: 2100 Roosevelt Ave., Springfield, MA 01101
 MODEL NUMBER: 938

HANDCUFF PERFORMANCE REQUIREMENTS AND NIJ-STANDARD-0307.01 PARAGRAPH REFERENCE NUMBERS		SERIAL NUMBER:				
		869591	965019	869467	869510	869884
		SAMPLE NUMBER:				
		2328	2324	2326	2325	2327
4.3 MARKINGS:	Manufacturer's name or trade mark	P	P	P	P	P
	Serial Number	P	P	P	P	P
4.5 WEIGHT:	Shall not exceed 15 oz.	7.8	8.0	8.0	8.2	8.1
4.6 DIMENSIONS:	Minimum opening - 2.0 inches	2.2	2.1	2.1	2.0	2.0
	Minimum inside perimeter at first notch - 7.9 inches	8.2	8.2	8.2	8.2	8.2
	Maximum inside perimeter at last notch - 6.5 inches	6.2	6.0	5.8	5.7	5.8
	Maximum overall length - 9.4 inches	8.7	8.7	8.7	8.8	8.8
4.7 MECHANICAL STRENGTH:	Handcuffs shall withstand a tensile force of 495 lbs.	P	P	P	P	p ¹
	Locking mechanism shall withstand a tensile force of 495 lbs.	(R)	P	P	P	p ¹
		(L)	P	P	P	P
4.8 CHEEK PLATE TAMPER RESISTANCE:	Following test in which the Cheek plate is subjected to a maximum torque of 204 inch pounds, the cuff must still provide restraint.	(R)	P	P	P	p ²
		(L)	P	P	P	p ³
4.10 SALT SPRAY CORROSION RESISTANCE:	Shall show no evidence of corrosion of basic metal or coating	p ⁴	p ⁴	p ⁴	p ⁴	p ⁴

NOTES:

- Right cuff binds but still locks.
- Right cuff still binding.
- Left cuff binds but still locks.
- Slight exterior corrosion easily cleaned.

APPENDIX A

METALLIC HANDCUFFS

NIJ-STANDARD-0307.01

NIJ STANDARD FOR METALLIC HANDCUFFS

CONTENTS

	Page
Foreword	v
1. Purpose	1
2. Scope	1
3. Definitions	1
4. Requirements	1
4.1 Acceptance Criteria	1
4.2 User Information	1
4.3 Marking	2
4.4 Workmanship	2
4.5 Weight	2
4.6 Dimensions	2
4.7 Mechanical Strength	3
4.8 Salt Spray Corrosion Resistance	3
4.9 Check Plate Tamper Resistance	3
5. Test Methods	3
5.1 Sampling	3
5.2 Test Sequence	3
5.3 Test Equipment	4
5.4 Inspection	4
5.5 Weight and Dimensional Measurements	4
5.6 Mechanical Loading Tests	5
5.7 Salt Spray Test	6
5.8 Check Plate Test	6

NIJ STANDARD FOR METALLIC HANDCUFFS

FOREWORD

This document, NIJ 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 NIJ 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.

NIJ 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 NIJ 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:

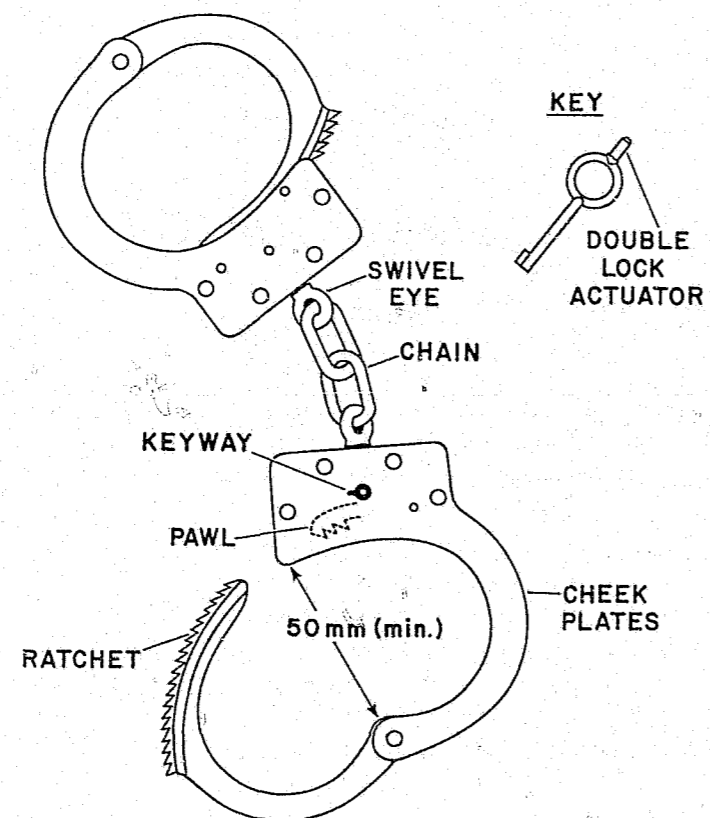


FIGURE 1. Handcuffs.

- a) Operating instructions
- b) Type of finish
- c) Weight
- d) Materials of construction
- e) Certification of compliance with this standard

4.3 Marking

All handcuffs shall be permanently and legibly marked as follows:

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

4.4 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

- a) Finish not specified.
- b) Finish scratched, damaged or marred, exposing base metal.
- c) Foreign matter imbedded in finish.
- d) Corroded area.
- e) Finish not smooth, continuous, or adherent; i.e., 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, sliver, sharp edge, dent, or tool mark.
- i) Metal split, cracked, or crazed.
- j) End of pin set below exposed surface of plate.
- k) Cracked or incomplete welding.
- l) Marking is missing, illegible, incorrect or 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; 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.

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:

- a) Inspection
- b) Weight and Dimensional Measurements
- c) Mechanical Loading Tests
- d) Salt Spray Test
- f) Check Plate Test

*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.

5.3 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.

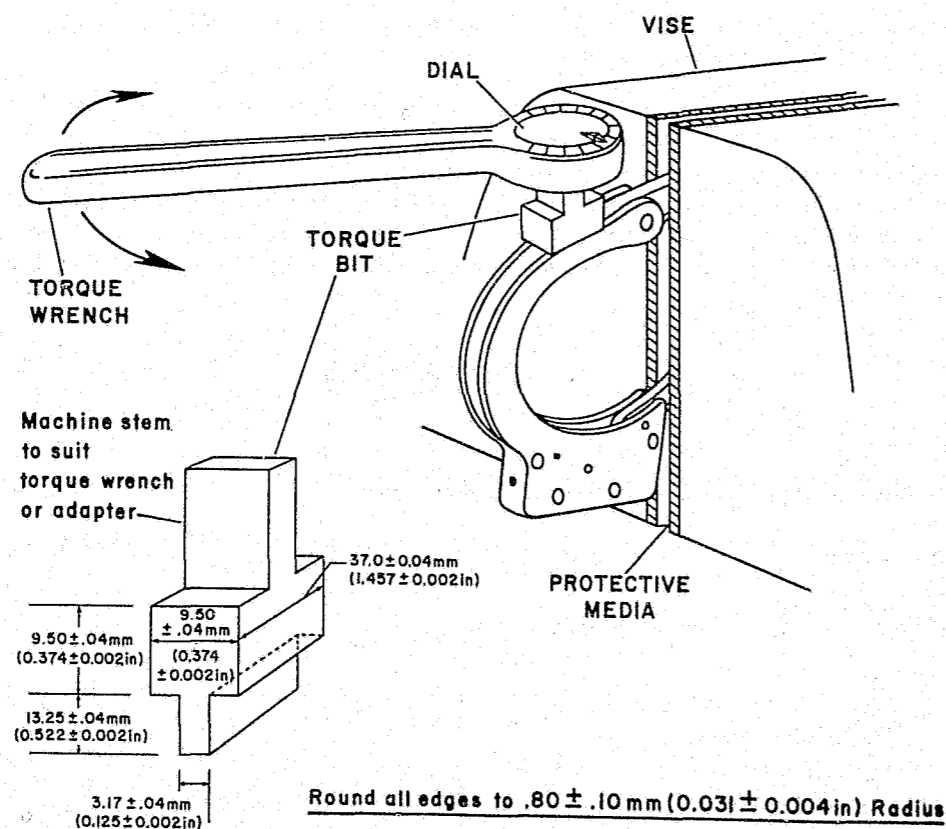


FIGURE 2. Cheek plate test.

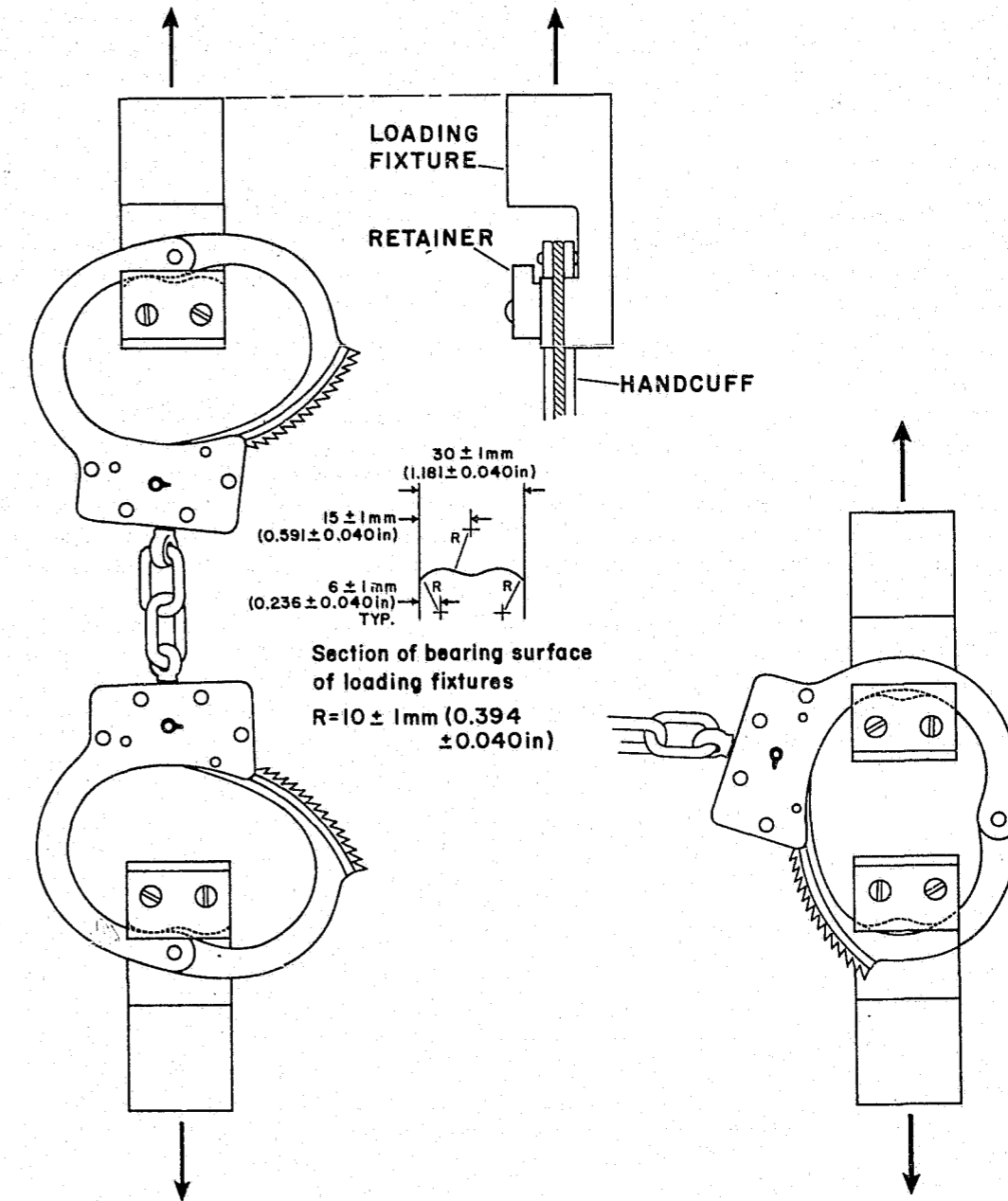


FIGURE 3. Mechanical loading tests.

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 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 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) <blade length <158.8 mm (6 1/4 in), 7.5 mm (19/64 in) <tip width at end <11.1 mm (7/16 in), and 0.965 mm (0.038 in) <tip thickness at end <1.6 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.

APPENDIX B

MANUFACTURERS OR SUPPLIERS OF METALLIC HANDCUFFS

*ASTM-B117-73, 1973, "Standard Method of Salt Spray (Fog) Testing," American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

MANUFACTURERS OR SUPPLIERS OF METALLIC HANDCUFFS

American Munitions Company
200 Ruggles Street
Fond Du Lac, WI 54935

Australian Government -
Small Arms Factory
P.O. Box 70
Lithgow N.S.W. 2790 Australia

Bianchi
100 Calle Cortez
Temecula, CA 92390

Fabrique Nationale De Herstal S.A.
Rue Voie De Liege 33
4400 Herstal, Belgium

Federal Laboratories, Inc.
Distributed by:
Fargo International
P.O. Box 177
214 Golden Lane
New Oxford, PA 17350

Firearms Import & Export
Corporation (FIE)
Distributed by:
Parker
P.O. Box 4960
Hialeah, FL 22014

Hamburger Woolen Company
510 Avenue of the Americas
New York, NY 10011

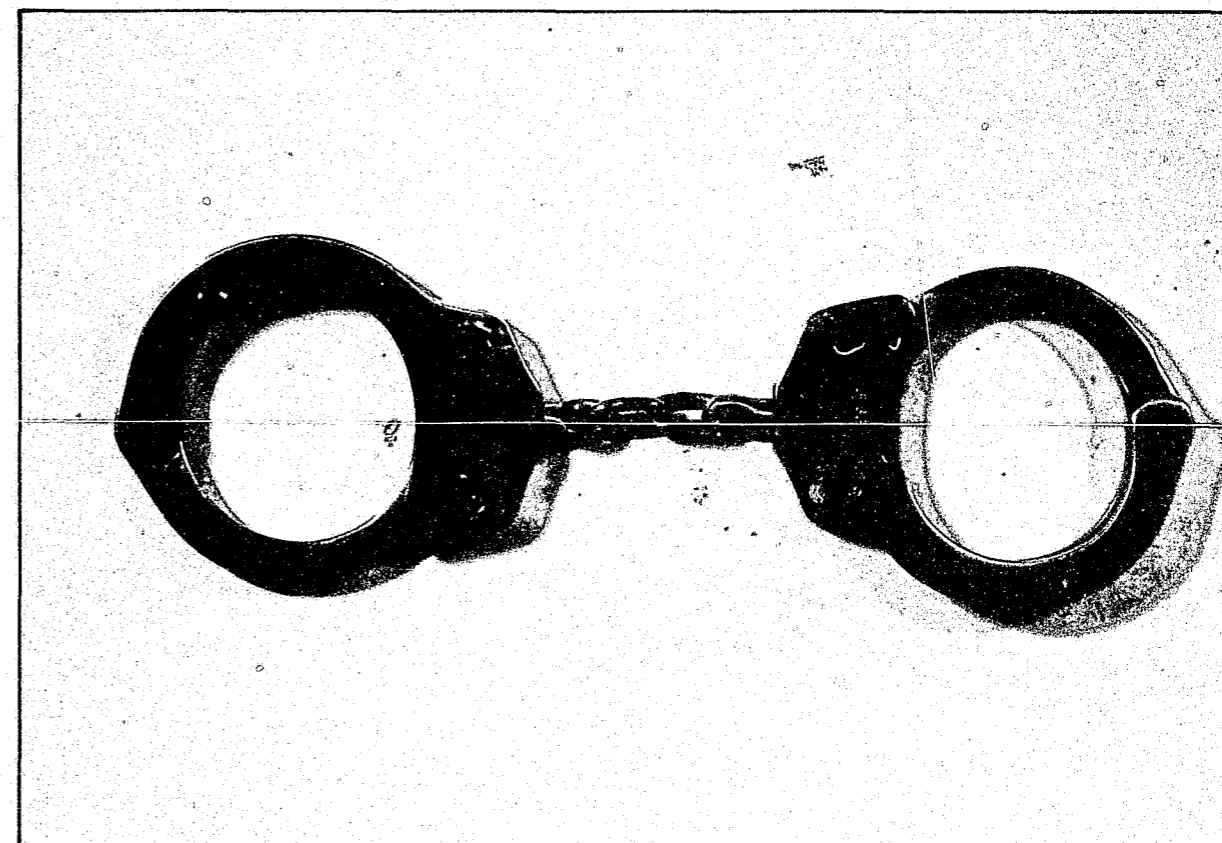
Japanese
Distributed by:
Super Surplus
Wisconsin Avenue
Bethesda, MD 20014

Jay-Pee Company (Spain)
Distributed by:
Mountain West Alarm Supply Co.
P.O. Box 10780
Phoenix, AZ 85064

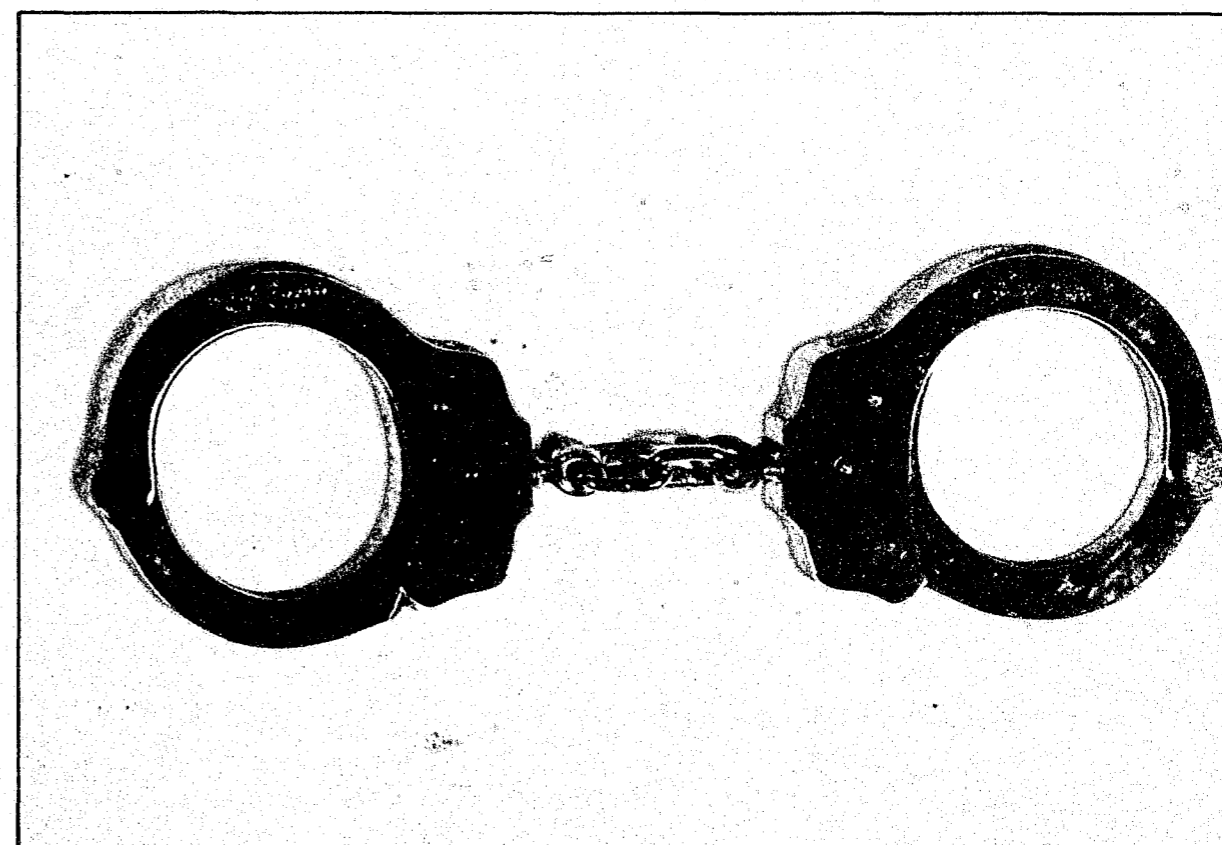
Peerless Handcuff Company
95 State Street
Springfield, MA 01103

PIC Incorporated (Spain)
Surplus Center
3451 N. Washington Boulevard
Arlington, VA 22210

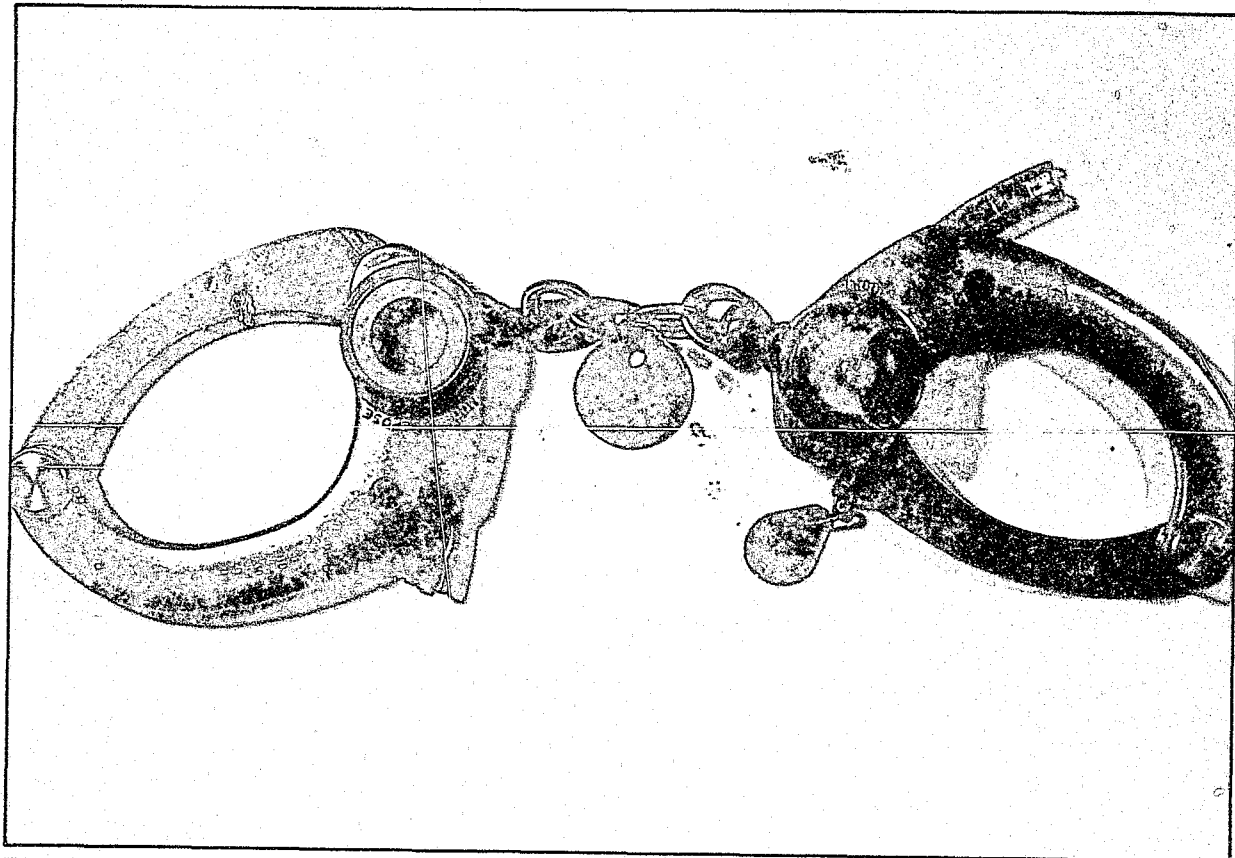
Smith & Wesson
2100 Roosevelt Avenue
Springfield, MA 01101



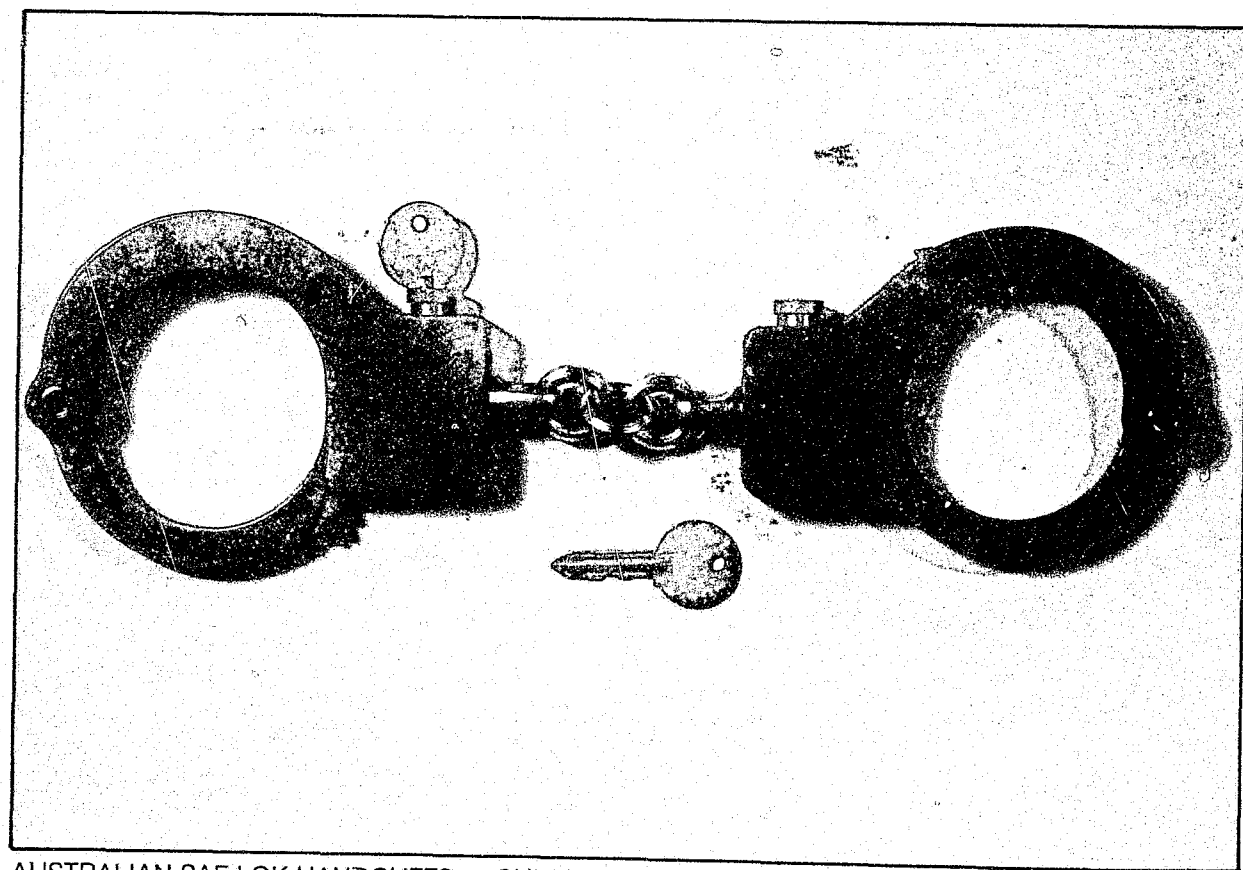
BIANCHI MODEL 500 HANDCUFFS — USED TO ILLUSTRATE TYPICAL HANDCUFF WITH KEYWAY ON SIDE OF CHEEKPLATE BODY.



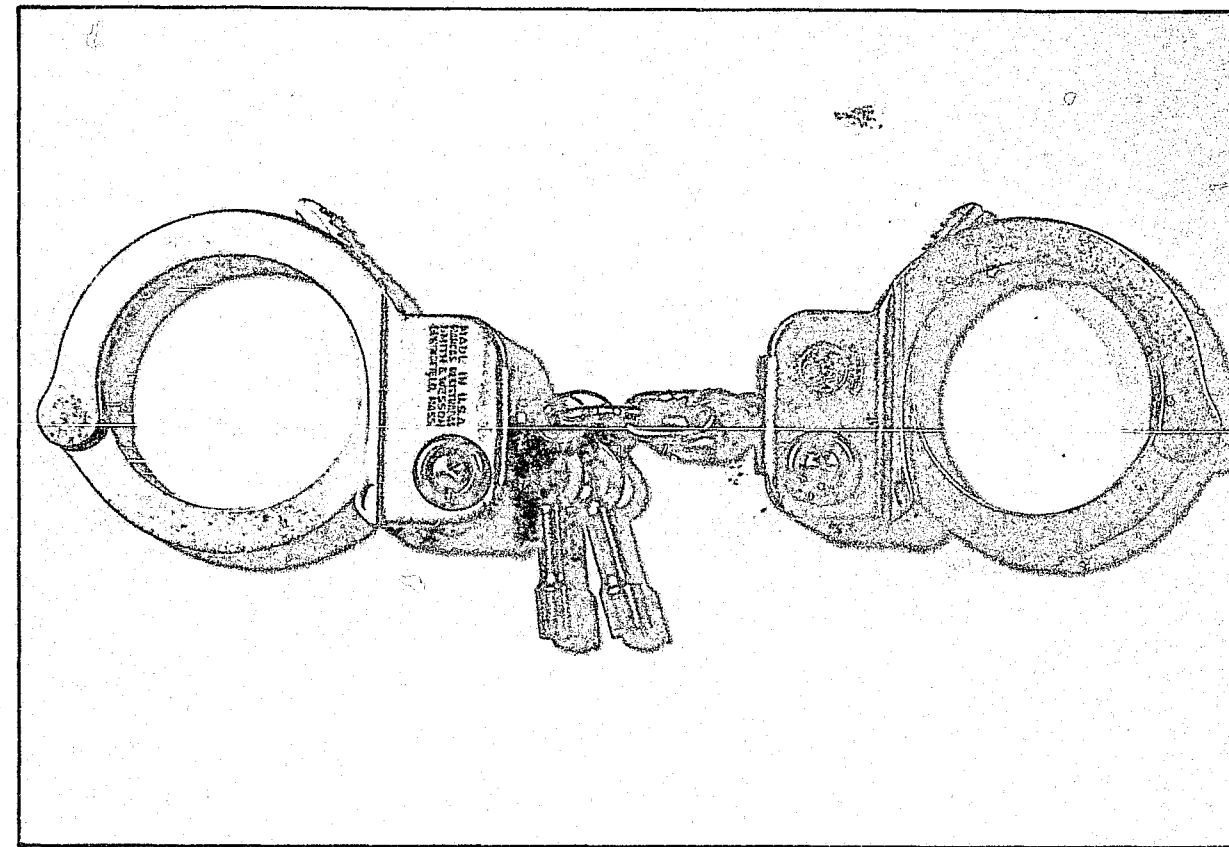
PEERLESS 10 OZ. HANDCUFFS — USED TO ILLUSTRATE HANDCUFFS WITH KEYWAY IN CENTER OF CHEEKPLATE BODY.



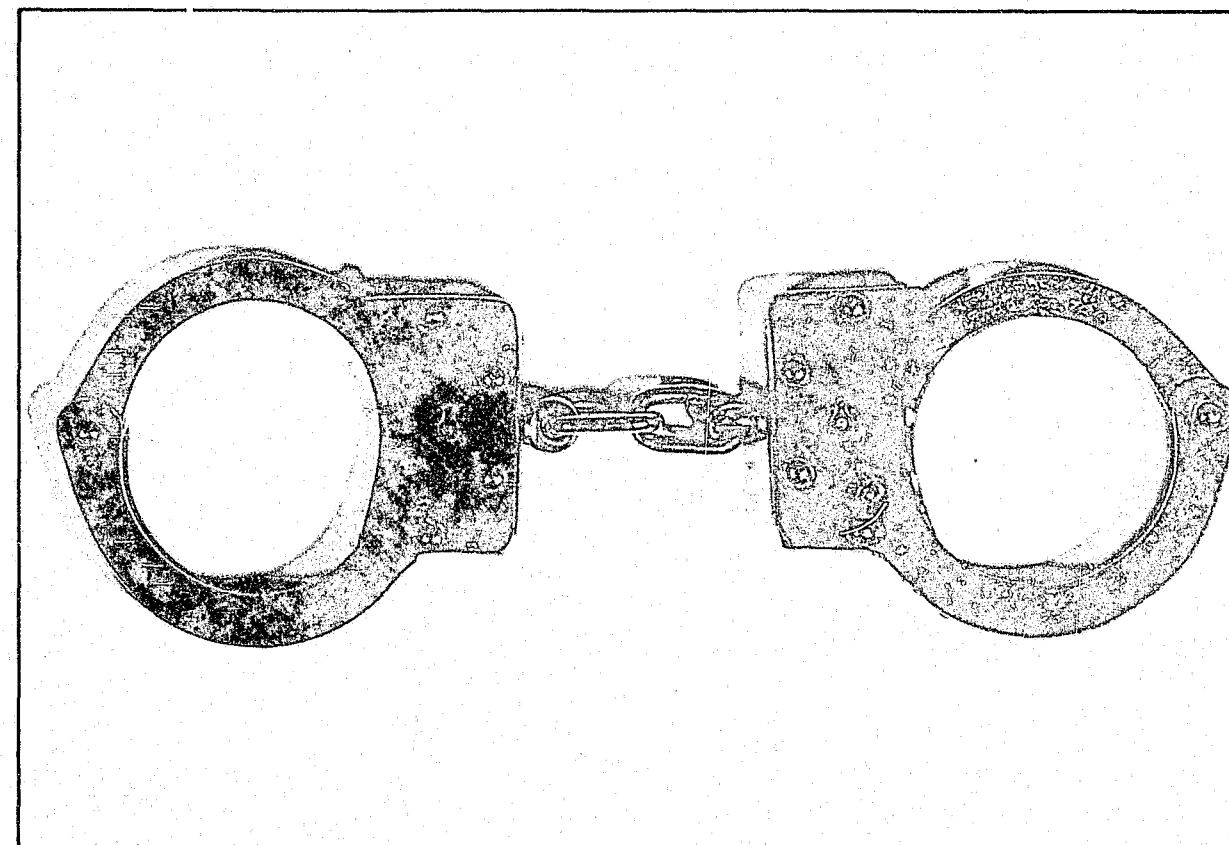
FABRIQUE NATIONAL DE HERSTAL S.A. (BELGIUM) MAGNETIC LOCK HANDCUFFS



AUSTRALIAN SAF-LOK HANDCUFFS — CUFFS USE A KEY LOCK WITH MULTIPLE PINS



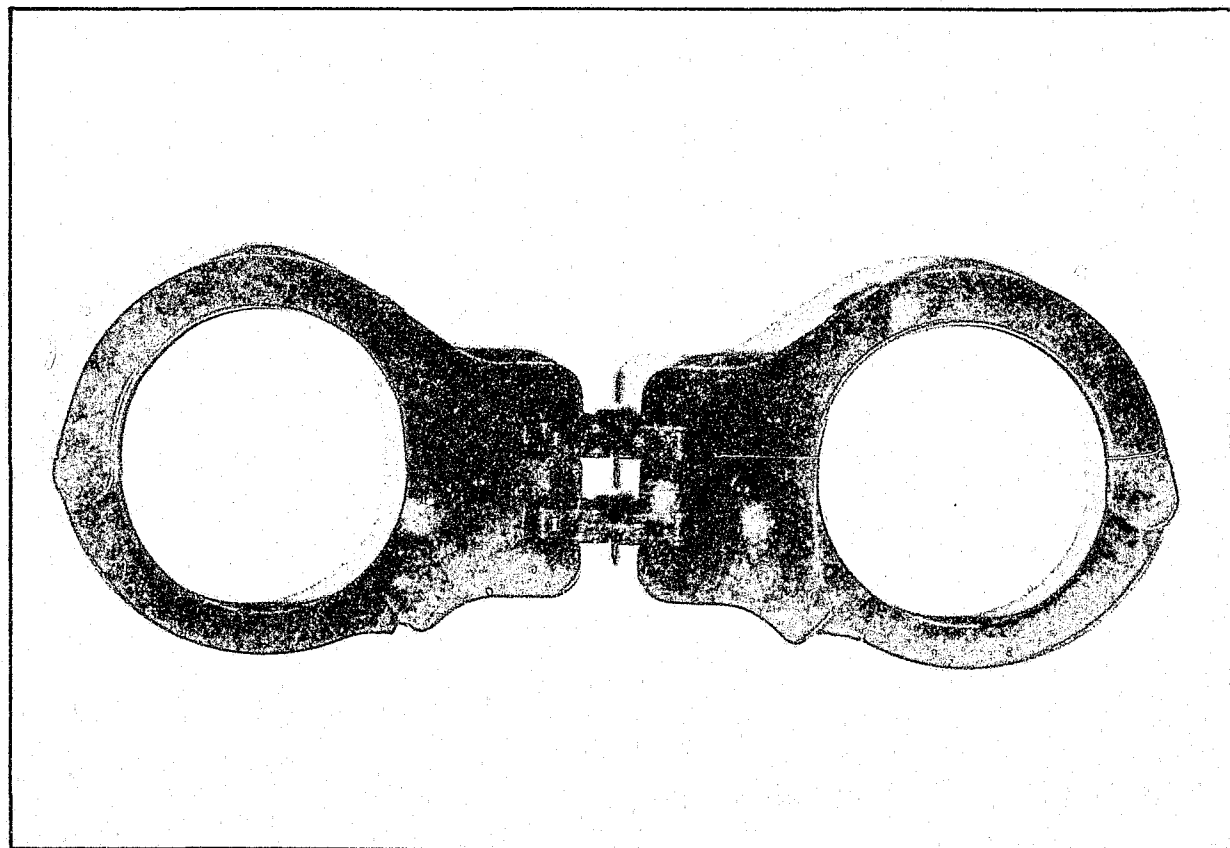
SMITH & WESSON MODEL HANDCUFFS — "HIGH SECURITY" S & W MODEL USING AN "ACE" TYPE OF KEY AND LOCK.



AMERICAN MUNITIONS COMPANY HANDCUFFS — USED TO ILLUSTRATE RAISED RIVET CONSTRUCTION OF HANDCUFFS. THESE HANDCUFFS ARE THE SAME AS FEDERAL LABORATORY'S "FEDERAL SUPER" MODEL, BOTH OF WHICH LACK SERIAL NUMBERS.



F. I. E. THUMBCUFFS — NOT RECOMMENDED FOR LAW ENFORCEMENT USE AS THEY CUT OFF CIRCULATION TO THE THUMBS AND MAY CAUSE INJURY.



PEERLESS HINGED HANDCUFFS — TEST RESULTS TO BE PUBLISHED IN SUPPLEMENT NO. 1 TO THIS REPORT.

**TECHNOLOGY ASSESSMENT PROGRAM
ADVISORY COUNCIL (TAPAC)**

Chief James P. Damos, Chairman

Dr. Noel C. Bufe
Northwestern University Traffic Institute

Roy F. Carlson
National Highway Traffic Safety Administration

Commissioner Charles T. Cobb
Federal Protective Service

Dr. Michael Greenwood
Federal Judicial Center

John Grow
California Highway Patrol

John W. Gunn, Jr.
Drug Enforcement Administration

Clarence Edward Hawkins
US Armament Research & Development Command

Mike Huckaby
Bureau of Alcohol, Tobacco and Firearms

Lt. Col. Thomas H. Johnson
Air Force Office of Security Police

Thomas F. Kelleher
Federal Bureau of Investigation

Deputy Commissioner Guy Marcoux
Royal Canadian Mounted Police

Chief Harlin R. McEwen
Village of Cayuga Heights Police Department

David Pisenti
FBI Academy

Andrew H. Principe
Northern Illinois Police Crime Laboratory

Chief Howard L. Runyon, Sr.
Passaic Township Police Department

Maj. Gen. Paul M. Timmerberg
US Army Criminal Investigation Command

James Webster
Bureau of Prisons

RESEARCH DIVISION

TECHNOLOGY ASSESSMENT PROGRAM INFORMATION CENTER (TAPIC)

Norman Darwick, Executive Director
R. D. Smith, Chief of Staff, Operations
Frank D. Roberson, Director, Research Division,
and Project Director

Joseph L. Gormley, Senior Staff Analyst
Robert A. Miller, Senior Staff Analyst
Allen L. Pearson, Senior Staff Analyst
Warren J. Woodfield, Technical Staff Analyst

NATIONAL INSTITUTE OF JUSTICE

Paul Cascarano, Assistant Director, NIJ
Paul Estaver, Director, Reference & Dissemination Division, NIJ
Lester D. Shubin, Program Manager for Standards, NIJ

**NATIONAL BUREAU OF STANDARDS
LAW ENFORCEMENT STANDARDS LABORATORY (LESL)**

Lawrence K. Ellason, Chief, LESL

END