

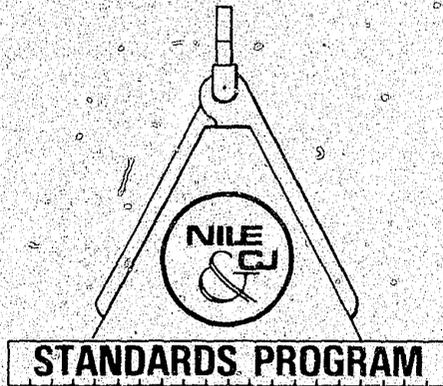
LESP-RPT-0603.00

MARCH 1977

# LAW ENFORCEMENT STANDARDS PROGRAM

## TESTS OF HAND-HELD METAL WEAPON DETECTORS

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U.S. DEPARTMENT OF JUSTICE  
Law Enforcement Assistance Administration  
National Institute of Law Enforcement and Criminal Justice

# LAW ENFORCEMENT STANDARDS PROGRAM

## TESTS OF HAND-HELD METAL WEAPON DETECTORS

MARCH 1977

Points of view or opinions expressed in this document do not necessarily represent the official position or policies of the U.S. Department of Justice

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AND CRIMINAL JUSTICE

Gerald M. Caplan, *Director*

LAW ENFORCEMENT ASSISTANCE  
ADMINISTRATION

Richard W. Velde, *Administrator*

Paul K. Wormeli, *Deputy Administrator*

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This report was prepared by the Law Enforcement Standards Laboratory of the National Bureau of Standards, under the direction of Robert M. Mills, Program Manager for Investigative Aids, and Jacob J. Diamond, Chief of LESL. The testing was performed by the Harry Diamond Laboratories of the U.S. Army Material Command, Adelphi, Maryland.

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# TESTS OF HAND-HELD METAL WEAPON DETECTORS

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## FOREWORD

Following a Congressional mandate\* to develop new and improved techniques, systems, and equipment to strengthen law enforcement and criminal justice, the National Institute of Law Enforcement and Criminal Justice (NILECJ) has established the Law Enforcement Standards Laboratory (LESL) at the National Bureau of Standards. LESL's function is to conduct research that will assist law enforcement and criminal justice agencies in the selection and procurement of quality equipment.

In response to priorities established by NILECJ, LESL is (1) subjecting existing equipment to laboratory testing and evaluation and (2) conducting research leading to the development of several series of documents, including national voluntary equipment standards, user guidelines, state-of-the-art surveys and other reports.

This document, LESP-RPT-0603.00, Tests of Hand-held Metal Weapon Detectors, is a law enforcement equipment report prepared by LESL and issued by NILECJ. Additional reports as well as other documents are being issued under the LESL program in the areas of protective equipment, communications equipment, security systems, weapons, emergency equipment, investigative aids, vehicles and clothing.

Technical comments and suggestions concerning the subject matter of this report are invited from all interested parties. Comments should be addressed to the Program Manager for Standards, National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice, Washington, D.C. 20531.

George Shollenberger  
Program Manager for Standards  
National Institute of Law  
Enforcement and Criminal Justice

\*Section 402(b) of the Omnibus Crime Control and Safe Streets Act of 1968, as amended.

# TESTS OF HAND-HELD METAL WEAPON DETECTORS

## Introduction

This is the final report on a project performed for the Law Enforcement Standards Laboratory (LESL) of the National Bureau of Standards (NBS) by the Harry Diamond Laboratories (HDL) of the U.S. Army Materiel Command.

The object of this project was to test all commercially available hand-held weapon detectors in accordance with NILECJ-STD-0602.00, the "Standard for Hand-Held Metal Detectors for Use in Weapon Detection," developed by LESL and published by the National Institute of Law Enforcement and Criminal Justice (NILECJ) of the Law Enforcement Assistance Administration (LEAA).

While dated October 1974, the standard did not appear in print until about April 1975. HDL actually started the project about August 1974, even before the final text of the standard had been established. It is for this reason that noncompliance with certain formal requirements of the standard were not considered to be failures; they were based on the fact that the manufacturers did not supply certain information required by the standard. It would be obviously unfair to fault the manufacturers for this, since they had no opportunity to learn what information was required, and to add it to their operator's manuals or other literature.

Two each of the detectors listed in table 1 were purchased by HDL in the open market. The vendors were not informed regarding the intended utilization of the devices.

All tests and measurements were performed by HDL in accordance with the test methods given in the standard. The sound pressure level test (paragraph 5.2.2 of the standard) was performed in the large anechoic chamber at the National Bureau of Standards; all the other tests were performed at HDL facilities.

The results of the tests are discussed below and are summarized in table 2. Parenthetical references in the section headings are to paragraphs in the standard.

## Controls (Par. 4.2)

The Solco/Electro-Search instructions did not indicate a direction of motion for final tuning, as required by paragraph 4.2 of the standard. For proper sensitivity, the unit had to be tuned clockwise until an audio signal was heard and then counterclockwise until the signal became just inaudible. This nominal non-compliance was not considered to constitute a failure.

Table 1. Weapon Detectors Tested

Model	Unit	Manufacturer	Type
Transfrisker 6030	1	Federal Laboratories, Inc.	Active
	2		
Electro-Search	1	Solco Engineering Co.	Active
	2		
Model 15 Squealer	1	Rens Manufacturing Co.	Active
	2		
Lawman L-8	1	Law Enforcement Equipment Research, Inc.	Active
	2		
GB-3 Magnetic Locator	1	Schonstedt Instrument Co.	Passive
	2		
Friskem MK7A	1	Infinetics, Inc.	Passive
	2		
Friskem MK7B	1	Infinetics, Inc.	Passive
	2		

Table 2. Test Results

Paragraph*	Requirement	GB-3						
		Transfrisker 6030	Electro-Search	Model 15 Squealer	Lawman L-8	Magnetic Locator	Friskem MK7A	Friskem MK7B
4.2	Controls	C	—	C	C	C	C	C
4.3	Alarm Indication	—	—	—	—	—	—	—
4.3.1	Audible Alarm Indicators	C	C	C	C	C	NA	NA
4.3.2	Visible Alarm Indicators	NA	NA	NA	NA	NA	C	C
4.4	Performance (Applic. 1)	NA	NA	NA	NA	C	NA	NA
4.4	Performance (Applic. 2)	C	C	C	C	C	F	F
4.4	Performance (Applic. 2NM)	C	C	C	C	NA	NA	NA
4.4	Performance (Applic. 3)	C	C	C	C	NA	NA	NA
4.5	Carrier Frequency	C	C	C	C	NA	NA	NA
4.5	Induced Voltage	C	C	C	F	NA	NA	NA
4.6	Operation Near Metal Walls	C	F	C	F	C	C	C
4.7.1	Battery Condition Indication	—	—	—	—	—	—	—
4.7.2	Battery Life	C	C	C	C	C	F	F
4.8	Radio Interference	C	C	C	C	C	C	C
4.9	Electrical Safety	C	C	C	C	C	C	C
4.10	Data Supplied by Manufacturer	—	—	—	—	—	—	—

C = Complied; F = Failed to comply; — = Did not comply, but not considered to have failed; NA = Not Applicable  
\*Of NILECJ Standard 0602.00.

The direction of motion for final tuning of the Rens/Model 15 Squealer was indicated on the unit itself rather than in the instruction manual.

All adjustments to the external controls of each of the models could be completed within ten seconds, as required by the standard.

### Alarm Indication (Par. 4.3)

Alarm indication data for the various detectors are given in table 3. The standard requires that the detectors be identified as either class I (i.e., having simple alarm/no-alarm indicators) or class II (i.e., having proportional alarm indicators). In addition, manufacturers of class II detectors are required to specify the magnitude of the indication which is to be considered an alarm. None of the manufacturers gave this information but, for the reason discussed in the introduction, this was not considered to constitute a failure.

Table 3. Alarm Indication Data

Model	Alarm Type	Volume Control	Speaker or Earphone
Transfrisker 6030	Audible	No	Both
Electro-Search	Audible	No	Speaker
Model 15 Squealer	Audible	Yes	Speaker
Lawman L-8	Audible	No	Both
GB-3 Magnetic Locator	Audible	Yes	Earphone
Friskem MK7A	Visible	NA	NA
Friskem MK7B	Visible	NA	NA

NA = Not Applicable.

### Audible Alarm Indicators (Par. 4.3.1)

The first four detectors listed in table 3 were tested for sound pressure level in accordance with paragraph 5.2.2 of the standard; the results are given in table 4. All the devices met the requirement of the standard. The only one of the four with a volume control, the Model 15 Squealer, could readily be adjusted to the required sound pressure level of 63 decibels.

From table 4, it can also be seen that the same four detectors, considered as class I devices (i.e., noise/no-noise indication), also met the requirement for a nine decibel difference between the sound pressure levels of the alarm and the non-alarm states.

The first five detectors were evaluated as class II detectors whose indications consist of a frequency change, even though the GB-3 Magnetic Locator is the only one considered to be of that class. Their audiofrequency drift rates were determined in accordance with paragraph 5.2.3. The results, given in table 5, show that all units had drift rates less than the maximum permitted rate of 5 Hz per second. All five detectors also met the requirement for minimum change in fundamental frequency to constitute an alarm indication. These data are included in table 7 and table 8.

### Visible Alarm Indicators (Par. 4.3.2)

Two detectors, the Friskem MK7A and Friskem MK7B, were equipped with visible alarm indicators of the meter type. Their alarm indications were readily perceptible when tested under bright and dim light in accordance with paragraph 5.2.4 of the standard.

Full scale deflection of both models was 9.5 mm ( $\frac{3}{8}$  in), with five subdivisions; a 5 mm (0.2 in) deflection would correspond to a deflection of 2.6 divisions. For these two models, accordingly, 2.6 divisions is the required positive alarm indication.

### Other Indicators (Par. 4.3.3)

All detectors tested were equipped with either visible or audible alarms.

### Detection Performance (Par. 4.4)

The detectors were tested for all security applications for which they were considered to be suitable, as listed in table 6. The test data are given in table 7 for passive detectors and table 8 for active detectors.

The Friskem MK7A and MK7B detectors, the only ones which failed to meet the requirements, were passive detectors with visible indicators. They were retested by another laboratory, and again failed to meet the requirements.

Table 4. Sound Pressure Levels

Model	Unit	Alarm OFF* (dB)	Alarm ON (dB)
Transfrisker 6030	1	25	75
	2	25	75
Electro-Search	1	25	68
	2	25	67
Model 15 Squealer (MAX)	1	25	85
	2	25	80
Model 15 Squealer (MIN)	1	25	59
	2	25	45
Lawman L-8	1	25	86
	2	25	84

\*All units were silent in the non-alarm state; only one non-alarm measurement was made.

Table 5. Frequency Stabilities

Model	Unit	Frequency (15 sec) (Hz)	Frequency (45 sec) (Hz)	Average Frequency drift rate (Hz/sec)
Transfrisker 6030	1	424	430	0.2
		444	423	0.7
		429	429	0.0
		435	439	0.2
	Mean			0.3
	2	437	441	0.1
		433	439	0.2
		433	434	0.0
		438	441	0.1
	Mean			0.1
Electro-Search	1	449	452	0.1
		421	427	0.2
		493	501	0.3
		423	477	0.2
	Mean			0.2
	2	651	663	0.4
		546	598	1.7
		403	487	2.8
		513	599	2.9
	Mean			2.0
Model 15 Squealer	1	274	371	3.2
		422	502	2.7
		379	468	3.0
		386	480	3.1
	Mean			3.0
	2	356	402	1.5
		338	414	2.5
		367	455	2.9
		633	679	1.5
	Mean			2.1
Lawman L-8	1	538	527	0.4
		563	564	0.0
		535	538	0.1
		546	560	0.5
	Mean			0.2
	2	549	542	0.2
		565	563	0.1
		550	535	0.5
		564	596	1.1
	Mean			0.5
GB-3 Magnetic Locator	1	164	156	0.3
		240	240	0.0
		209	220	0.4
		205	198	0.2
	Mean			0.2
	2	210	181	1.0
		188	177	0.4
		154	142	0.4
		141	145	0.1
	Mean			0.5

#### Time-Varying Generated Magnetic Field (Par. 4.5)

The carrier frequencies of the four active detectors (Transfrisker 6030, Electro-Search, Model 15 Squealer and Lawman L-8) were between 1 kHz and 1 MHz, as required by paragraph 4.5; the measured carrier waveform periods, and the equivalent frequencies, are shown in table 9.

Table 6. Security Applications

Model	Application*			
	1	2	2NM	3
Transfrisker 6030		x	x	x
Electro-Search		x	x	x
Model 15 Squealer		x	x	x
Lawman L-8		x	x	x
GB-3 Magnetic Locator	x	x		
Friskem MK7A		x		
Friskem MK7B		x		

\*From section 2.1 of NILECT Standard 0602.00:

- 1 = Unobtrusive scanning for ferromagnetic guns and large knives on persons carrying normal metal items including foil packages.
- 2 = Open scanning of persons for ferromagnetic guns and large knives.
- 2NM = Open scanning of persons for guns and large knives constructed of either ferromagnetic or nonferromagnetic metal.
- 3 = Open scanning for either ferromagnetic or non-ferromagnetic weapons as small as a razor blade on persons who have supposedly removed all metal items.

Table 7. Detection Performance of the Passive Detectors

Model	Unit	Alarm Indicator	
		(After 45 sec)	(Coil Current Off)
Friskem MK7A	1	1.5 div <sup>1</sup>	0
	1 <sup>2</sup>	2.5 div <sup>1</sup>	0
	2	2.0 div <sup>1</sup>	0
	2 <sup>2</sup>	2.6 div <sup>1</sup>	0
Friskem MK7B	1	3.0 div <sup>1</sup>	0
	1 <sup>2</sup>	3.0 div <sup>1</sup>	0
	2	2.0 div <sup>1</sup>	0
	2 <sup>2</sup>	2.3 div <sup>1</sup>	0
GB- Magnetic Locator	1	123 Hz	48 Hz
	2	100 Hz	36 Hz
	1 <sup>3</sup>	37 Hz	38 Hz
	2 <sup>3</sup>	29 Hz	28 Hz

<sup>1</sup> Required alarm indication is 2.6 divisions.

<sup>2</sup> Retest by another laboratory.

<sup>3</sup> Foil package test object at 3 in for Security Application 1.

Table 8. Detection Performance of the Active Detectors

Model	Unit	Test Object					
		1M (Magnetic Pistol)		1N (Non-magnetic Pistol)		2 (Stainless-steel, double-edge razor blade)	
		Alarm Indication (Hz) After 45 sec	Test Object Removed	Alarm Indication (Hz) After 45 sec	Test Object Removed	Alarm Indication (Hz) After 45 sec	Test Object Removed
Transfrisker 6030	1	610	0	714	0	373	0
	2	700	0	645	0	403	0
Electro-Search	1	302	0	317	0	345	0
	2	417	0	487	0	517	0
Model 15 Squealer	1	312	0	303	0	480	0
	2	130	0	151	0	150	0
Lawman L-8	1	530	0	515	0	473	0
	2	530	0	525	0	470	0

Table 9. Time-Varying Generated Magnetic Field Test

Model	Unit	Period of Carrier Waveform (sec)	Carrier Frequency (kHz)	Peak-to-Peak Voltage (mV)
Transfrisker 6030	1	$1.19 \times 10^{-4}$	8.4	3.4
	2	$1.21 \times 10^{-4}$	8.3	3.5
Electro-Search	1	$1.36 \times 10^{-6}$	735	82
	2	$1.37 \times 10^{-6}$	730	80
Model 15 Squealer	1	$2.78 \times 10^{-6}$	360	35
	2	$2.77 \times 10^{-6}$	361	729
Lawman L-8	1	$9.80 \times 10^{-6}$	102	0-360
	2	$9.80 \times 10^{-6}$	102	0-370

The only detector using amplitude modulation, the Lawman L-8, was pulsed from 0 to 350 millivolts at a rate of about 470 pulses per second. This complies with the 400 Hz minimum frequency requirement.

However, the 350 mV peak-to-peak voltage induced by the Lawman L-8 exceeds the 200 mV permitted maximum. This is the only model that failed to meet that requirement.

#### Operation Near Metal Walls (Par. 4.6)

As is shown by table 10, two of the detector models (the Electro-Search and the Lawman L-8) failed this test; the other five detector models passed.

#### Battery Condition Indication (Par. 4.7.1)

None of the manufacturers provided a means of determining when the batteries required recharging or replacement. This was not considered to constitute a failure, however, since it seems probable that the manufacturers could have provided suitable indications to the user had they been aware of the requirement.

#### Battery Life (Par. 4.7.2)

All detectors, except for the Friskem MK7A and MK7B, met the detection performance and alarm indication requirements after being operated for the required periods of time. The data is presented in table 11.

Table 10. Test for Operation Near Metal Wall

Model	Unit	Alarm Indication (0.90 m)	Alarm Indication (0.60 m)
Transfrisker 6030	1	0 Hz	0 Hz
	2	0 Hz	0 Hz
Electro-Search	1	0 Hz	<50 Hz
	2	0 Hz	58 Hz
Model 15 Squealer	1	0 Hz	0 Hz
	2	0 Hz	0 Hz
Lawman L-8	1	0 Hz	476 Hz
	2	0 Hz	472 Hz
GB-3 Magnetic Locator	1	40 Hz	40 Hz
	2	30 Hz	30 Hz
Friskem MK7A	1	0	1.0 div.
	2	0	0.3 div.
Friskem MK7B	1	0	0.3 div.
	2	0	0.3 div.

Unit 2 of the Model 15 Squealer failed the detection performance test initially, but passed on retest with new batteries.

The Friskem units were tested at maximum sensitivity. Friskem MK7A, unit 1, developed an unstable meter flick during the last "on" period. The unit continued to respond to the test signal, but flicked from the steady state. New batteries did not correct the problem and the unit was judged in need of repair.

### Radio Interference (Par. 4.8)

The four active detectors were evaluated for compliance with the Federal Communications Commission Code of Federal Regulations; Title 47-Telecommunications; Part 15, Radio Frequency Devices.

Since the Electro-Search, Model 15 Squealer, and Lawman-L-8 units operate "between 10 kHz and 3,000,000 MHz" (see table 9), they fit the FCC definition of radio frequency devices. The Transfrisker 6030 units operate at less than 10 kHz, and are not considered to be rf devices.

The detectors are deemed to fall under the FCC category of "incidental radiation devices", defined as "A device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy."

Under Subpart B of the Regulations, "Incidental Radiation Devices," 15.31, "Operation Requirements," the user is instructed to operate the device "so that the radio frequency energy that is radiated does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference."

The three rf detectors are therefore in compliance with the Regulations when they are operated as instructed in the Regulations.

Table 11. Battery Life Test

Model	Unit	Detection Performance Test		Sound Pressure Level Test	
		After 45 sec	Test Object Removed	Off <sup>1</sup>	On
		Indication		Decibels	
Transfrisker 6030	1	On	Off	24.5	74
	2	On	Off	24.5	76
Electro-Search	1	On	Off	24.5	66
	2	On	Off	24.5	68
Model 15 Squealer	1	On	Off	24.5	84.5 Max
	2	Off	Off	24.5	79.5 Max
	2 <sup>2</sup>	On	Off	— <sup>3</sup>	—
Lawman L-8	1	On	Off	24.5	84
	2	On	Off	24.5	83.5
GB-3 Magnetic Locator	1	120 Hz	47 Hz	NA <sup>4</sup>	NA
	2	94 Hz	29 Hz	NA	NA
Friskem MK7A	1	1.5 div. <sup>5</sup>	0 div.	NA	NA
	2	1.5 div.	0 div.	NA	NA
Friskem MK7B	1	2.5 div.	0 div.	NA	NA
	2	1.5 div.	0 div.	NA	NA

<sup>1</sup> All units were silent in non-alarm state; only one non-alarm measurement was made.

<sup>2</sup> Re-test of Model 15 Squealer, unit 2.

<sup>3</sup> Measurement was not required.

<sup>4</sup> NA = Not Applicable

<sup>5</sup> Required alarm indication is 2.6 divisions.

## Electrical Safety (Par. 4.9)

The Model 15 Squealer was provided with a schematic diagram. The diagram did not show any voltage step-up elements, and it was concluded that the maximum voltage would approximate the battery supply, or 18 volts. One each of the other detectors was disassembled and probed with a voltmeter, no potential differences as high as 42.5 volts were noted. Compliance with Underwriters Laboratories Standard UL 114 was therefore not required.

## Data Supplied by the Manufacturer (Par. 4.10)

An operator's manual was supplied with each detector, in compliance with the standard, except for the Model 15 Squealer, which provided one manual for the two units purchased.

Paragraph 4.10 of the standard requires that the operator's manual contain the following information:

- (a) Security applications (as described in paragraph 2.1 of the standard) and corresponding alarm indication classes (as classified in paragraph 2.2) for which the detector can be adjusted to operate.
- (b) Recommended initial range of response for any class II indication.
- (c) Detector type (as classified in paragraph 2.3).
- (d) Overall dimensions of the detector.
- (e) Dimensions of the detector in the region normally gripped by the hand.
- (f) Weight of the detector.
- (g) Battery type and quantity.
- (h) Operating ambient temperature range.

The information items actually supplied with the various detectors are summarized in table 12. For the reasons discussed in the introduction, this nominal non-compliance with the requirements of the standard was not considered to constitute a failure.

Table 12. Operator's Manual Information

Model	INFORMATION ITEM							
	a	b	c	d	e	f	g	h
Transfrisker 6030	N	N	N	N	N	N	Y	N
Electro-Search	N	N	N	N	N	N	Y	N
Model 15 Squealer	N	N	N	Y	Y	Y	Y	N
Lawman L-8	N	N	N	N	N	N	Y	N
GB-3 Magnetic Locator	N	N	N	Y	Y	Y	Y	Y
Friskem MK7A	N	N	N	Y	Y	Y	Y	N
Friskem MK7B	N	N	N	Y	Y	Y	Y	N

Y = Information supplied.

N = Information not supplied.

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The following publications of the Law Enforcement Standards Program issued by the National Institute of Law Enforcement and Criminal Justice are for sale by the U.S. Government Printing Office. For information concerning the availability and price of any of the publications write to: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

### NATIONAL INSTITUTE OF LAW ENFORCEMENT AND CRIMINAL JUSTICE STANDARDS (NILECJ-STD)

NILECJ-STD	TITLE	GPO STOCK NO.
0102.00	Hearing Protectors for Use on Firing Ranges, March 1973	027-000-00182-3
0301.00	Magnetic Switches for Burglar Alarm Systems, March 1974	027-000-00238-2
0302.00	Mechanically Actuated Switches for Burglar Alarm Systems, May 1974	027-000-00258-7
0303.00	Mercury Switches for Burglar Alarm Systems, May 1974	027-000-00254-4
0103.00	Portable Ballistic Shields, May 1974	027-000-00253-6
0205.00	Mobile Antennas, May 1974	027-000-00250-1
0601.00	Walk-Through Metal Detectors for Use in Weapons Detection, June 1974	027-000-00256-1
0202.00	Mobile FM Transmitters, October 1974	027-000-00287-1
0104.00	Riot Helmets, October 1974	027-000-00286-2
0201.00	Fixed and Base Station FM Transmitters, September 1974	027-000-00358-3
0602.00	Hand-Held Metal Detector for Use in Weapons Detection, October, 1974	027-000-00285-4
0203.00	Personal/Portable FM Transmitters, October 1974	027-000-00293-5
0307.00	Metallic Handcuffs, October 1974	027-000-00292-7
0304.00	Passive, First Generation Night Vision Devices, June 1975	027-000-00325-7
0211.00	Batteries for Personal/Portable Transceivers, June 1975	027-000-00342-7
0207.00	Mobile FM Receivers, June 1975	027-000-00344-3
0603.00	X-Ray Systems for Bomb Disarmanent, June 1975	027-000-00343-5
0305.00	Active Night Vision Devices, June 1975	027-000-00346-0
0105.00	Crash Helmets, June 1975	027-000-00347-8
0212.00	RF Coaxial Cable Assemblies for Mobile Transceivers, September 1975	027-000-00357-5
0206.00	Fixed and Base Station FM Receivers, September 1975	027-000-00358-3
0208.00	Personal/Portable FM Receivers, October 1975	027-000-00366-4
0106.00	Ballistic Helmets, September 1975	027-000-00370-2

### LAW ENFORCEMENT STANDARDS PROGRAM REPORTS (LESP-RPT)

LESP-RPT	TITLE	GPO STOCK NO.
0201.00	Batteries Used with Law Enforcement Communications Equipment—Comparison and Performance Characteristics, May 1972	027-000-00156-4
0202.00	Batteries Used With Law Enforcement Communications	

**LAW ENFORCEMENT STANDARDS PROGRAM REPORTS  
(LESP-RPT) (Continued)**

LESP-RPT	TITLE	GPO STOCK NO.
	Equipment—Chargers and Charging Techniques, June, 1973	027-000-00216-1
0203.00	Technical Terms and Definitions Used With Law Enforcement Communications Equipment, June, 1973	027-000-00214-5
0401.00	Terms and Definitions for Police Patrol Cars, May 1974	027-000-00252-2
0304.00	Simplified Procedures for Evaluating the Image Quality of Objective Lenses for Night Vision Devices, May 1974	027-000-00255-2
0303.00	Image Quality Criterion for the Identification of Faces, May 1974	027-000-00261-7
0204.00	Voice Privacy Equipment for Law Enforcement Communications Systems, May 1974	027-000-00260-9
0302.00	Test Procedures for Night Vision Devices, May 1974	027-000-00257-9
0301.00	Survey of Image Quality Criteria for Passive Night Vision Devices, June 1974	027-000-00259-5
0801.00	Life Cycle Costing Techniques Applicable to Law Enforcement Facilities, May 1974	027-000-00284-6
0205.00	Automatic Vehicle Location Techniques for Law Enforcement Use, September 1974	027-000-00282-0
0502.00	Summary Report on Emergency Vehicle Sirens, September 1974	027-000-00289-7
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