GGG-F-00360D(GSA-FSS)
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SUPERSEDING
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December 23, 1965

INTERIM FEDERAL SPECIFICATION

FINGER, MECHANICAL, AND RETRIEVER TOOL, MAGNETIC

This Interim Federal Specification was developed by Standardization Division, Federal Supply Service, General Services Administration, Washington, D.C. 20406, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

The General Services Administration has authorized the use of this Interim Federal Specification as a valid exception to Federal Specification GGG-F-360b, dated October 5, 1964.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers mechanical fingers and magnetic retrieving tools used for retrieving such objects as screws, washers, nuts, bolts, pins, and similar objects from hard-to-reach places.

1.1 Federal specification coverage. Federal specifications do not include all varieties of the commodity indicated by the title of the specification, or which are commercially available, but are intended to cover only those generally used by the Federal Government.

1.2 Classification.

1.2.1 Types and classes. The fingers and retrieving tools shall be of the following types, classes, and styles as specified (see 6.1):

Type I - Fingers, mechanical.
  Class 1 - Rigid.
  Class 2 - Flexible.

Type II - Retrieving tool, magnetic.
  Class 1 - Telescoping.
  Class 2 - Flexible.
    Style A - Uncovered spring.
    Style B - Covered spring.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards, of the issues in effect on date of invitation for bids, or request for proposal, form a part of this specification:

Federal Specification:

L-P-394 - Plastic Molding Material, Polypropylene, Injection and Extrusion.

Federal Standard:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specification and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

(Single copies of this specification and other Federal Specification required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Wash.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specification:

MIL-H-15424 - Hand Tools; Packaging of.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Material. The material used in the manufacture of the fingers and retrieving tools shall be as hereinafter specified. The materials shall be free from any defects and imperfections that may affect their serviceability.

3.2 Finish.

3.2.1 Surface roughness. All surfaces shall be free from pits, nodules, burrs, cracks, or other detrimental defects. Areas ground, buffed, or otherwise finished by an equivalent method and provided with a coating finish of chromium, shall have a bright finish with a maximum surface roughness of 70 microinches (arithmetical average, using a 0.030-inch cutoff on the surface measuring instrument).

3.2.2 Coatings. The coating shall be adherent, smooth, continuous, and free from pits, blisters, nodules, and other defects which would interfere with their corrosion-protective value and serviceability. For intermating parts, the coating shall not interfere with the ease of operation.

3.2.2.1 Chromium plating. Chromium plating shall be electrodeposited metal consisting of nickel followed by chromium. The minimum thickness shall be 0.0002 inch for nickel and 0.00001 inch for chromium.

3.2.2.2 Cadmium plating. Cadmium plating shall be an electrodeposited coating of cadmium not less than 0.0002 inch thick and shall be subjected to a chemical or electrochemical chromating.

3.2.2.3 Zinc plating. Zinc plating shall be an electrodeposited coating of zinc not less than 0.0002 inch thick and shall be subjected to a chemical or electrochemical chromating.

3.3 Marking. All tools shall be marked in a permanent and legible manner with the manufacturer's name or with a trademark of such known character that the source of manufacture may be readily determined.

3.4 Type I, finger, mechanical. Type I finger shall consist essentially of a housing, plunger, coil spring, and retracting jaws. The finger shall be designed to allow free movement of the assembled parts with a minimum of clearance between the working parts and to preclude the possibility of the parts becoming loose when tested as specified in 4.4.1. The retracting jaws shall be capable of being opened to 13/16-inch minimum, measured between the gripping surfaces. The jaws, when retracted to a closed position, shall be capable of gripping a 0.004-inch feeler gage. The required force to operate the plunger shall not exceed 18 pounds.

3.4.1 Housing. The housing shall be of either steel or brass tubing. The jaw end of the housing shall be flared to allow smooth expansion and retraction of the jaws. The opposite end of the housing shall be provided with a steel or brass flange having a diameter equal to or larger than the diameter of the head of the plunger to afford an adequate grip.

3.4.2 Plunger. The plunger shall be of a round steel rod having a head attached to one end and a pair of jaws attached to the opposite end. Means shall be provided to secure the head and jaws to the rod in such a manner to assure that the head and jaw assembly will not become loose when tested as specified in 4.4.1.

3.4.3 Coil spring. The coil spring shall be of steel having sufficient strength to assure the proper grip when tested as specified in 4.4.2.

3.4.4 Retracting jaws. The retracting jaws shall be of tempered spring steel having sufficient strength to withstand the test requirements of 4.4.1. The jaws shall flex open when the plunger is fully depressed and shall retract smoothly, closing the gripping surfaces when the plunger is fully released.

3.4.5 Class 1, rigid. The fingers shall be provided with a rigid housing of either steel or brass tubing. Class 1 fingers shall conform to table I, and be similar to figure 1.

TABLE I. Type I, class 1, finger, mechanical, rigid.

Plunger head diameter A ≤ 1/8 inch	Overall length B ≤ 1/4 inch	Reach C ≤ 1/2 inch
Inches	Inches	Inches
1-1/4	6-1/2	3-3/4
1-1/4	8-1/2	5-3/4
1-1/4	10-1/2	8
1-1/4	14-1/2	11-3/4

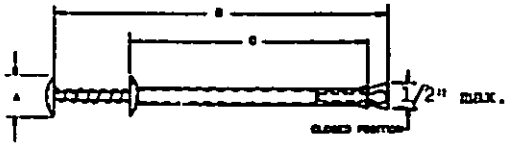

FIGURE 1. Type I, class 1, finger, mechanical, rigid.

3.4.6 Class 2, flexible. The fingers shall be provided with a housing of either steel or brass tubing and a flexible midsection. The flexible midsection shall be of spirally-wound armored cable capable of being bent into various directions and meet the test requirements of 4.4.3. The fingers shall conform to table II, and be similar to figure 2.

TABLE II. Type I, class 2, finger mechanical, flexible.

Plunger head diameter A	Flexible cable length B	Overall length D	Reach E
± 1/8 inch	Min.	± 1/4 inch	± 1/4 inch
Inches	Inches	Inches	Inches
1-7/32	8	17-1/2	14-7/8
1-7/32	7	26-1/2	23-3/4

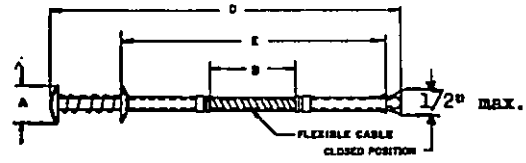

FIGURE 2. - Type I, class 2, finger, mechanical, flexible.

3.5 Type II, magnetic retrieving tools. The retrieving tools shall consist essentially of a handle or handgrip section; a midsection(s); magnet case; and magnet. The midsection(s) shall be either telescopic (class 1), or flexible (class 2).

3.5.1 Magnet case. The magnet case shall be of metal, nylon, or high-impact-strength plastic in accordance with type III, grade B of L-P-394, and shall securely hold a magnetic element.

3.5.1.1 Magnetic element. The magnetic element shall be composed of commercially available material, having long life, permanent magnetic qualities, and shall meet the applicable test requirements specified in 4.4.

3.5.2 Class 1, telescoping. Class 1 magnetic retrieving tool shall be provided with a telescoping body consisting of an inner shaft and outer tube. The tool shall be designed to allow free movement of the assembled parts of the handle with a minimum of clearance between the working parts and to preclude the possibility of the parts becoming loose under normal service conditions. The tool shall be of either single or compound hinge construction.

3.5.2.1 Inner shaft. The inner shaft shall be of steel with means provided for assembly to the magnet case. The handle end of the inner shaft shall be provided with a positive stop to prevent the outer shaft from being disengaged when fully extending the outer shaft.

3.5.2.2 Outer tubing. The outer tubing shall be swaged approximately 1 inch at end opposite of handle to properly engage the inner shaft so that when the inner shaft is fully extended and magnet is held at an angle to the shaft, no swiveling of the inner shaft can take place. The design of the outer tubing shall provide for suitable assembly to the inner shaft and the outer end properly sealed. The outside diameter of the tubing at the hand grip end shall be knurled. When specified (see 6.1), a vinyl or plastic grip, completely encasing the handle for at least 3 inches from the end of the handle, shall be provided.

3.5.2.3 The retrieving tool shall conform to table III and be similar to figure 3a or 3b.

TABLE III. Type II, class 1, retrieving tool, magnetic, telescoping.

Closed length		Extended length		Lifting power	Magnet case diameter	Knurled length
Min.	Max.	Min.	Max.	Min.	Max.	Min.
Inches	Inches	Inches	Inches	Ounces	Inch	Inches
15-1/4	18	26	27-1/2	18	5/8	2-7/8

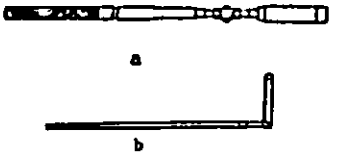

FIGURE 3. - Type II, class 1, retrieving tool, magnetic, telescoping.

3.5.3 Class 2, style A, uncovered spring. Class 2, style A retriever shall be flexible, spirally-wound wire. It shall have a magnet case (see 3.5.1) and magnet (see 3.5.1.1) on one end, and a handle on the other end. Handle shall be designed so parts will not become accidently detached. The tool shall be constructed of spirally-wound wire of not less than 0.054 inch hard drawn wire coiled to meet the diameter requirements of table IV. Wire tensile strength shall have a range of 240,000 to 280,000 pounds per square inch (p.s.i.). The retrieving tool shall conform to table IV, and be similar to figure 4.

TABLE IV. Type II, class 2, styles A and B retrieving tools.

Overall length ± 4	Flexible section F		Magnet case M		Lifting power, style A	Lifting power, style B
	Diameter		Length	Diameter		
	Min.	Max.	Max.	Max.	Min.	Min.
Inches	Inch	Inch	Inches	Inch	Ounces	Ounces
21	0.215	0.375	3	17/32	12	5
33	.215	.375	3	17/32	12	5

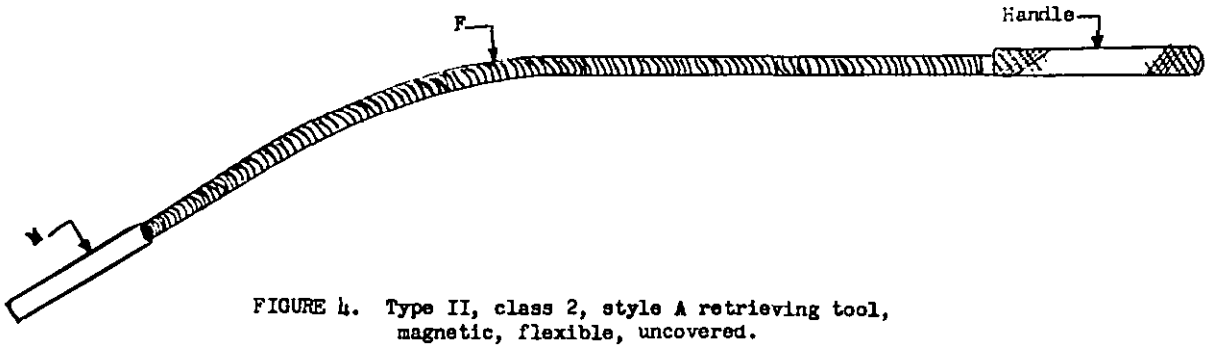

FIGURE 4. Type II, class 2, style A retrieving tool, magnetic, flexible, uncovered.

3.5.4 Class 2, style B, covered. Class 2, style B retriever shall be flexible, spirally-wound wire encased in plastic, vinyl, or neoprene. At the option of the contractor, the encased portion may be considered a handgrip section. If a specific handle is furnished, it shall be designed so parts will not become accidentally detached. The tool shall be constructed of spirally-wound wire as specified in 3.5.3. At the option of the manufacturer, an eye or loop may be provided for hanging the tool when not in use (see figure 5a). The retrieving tool shall conform to table IV, and be similar to figure 5.

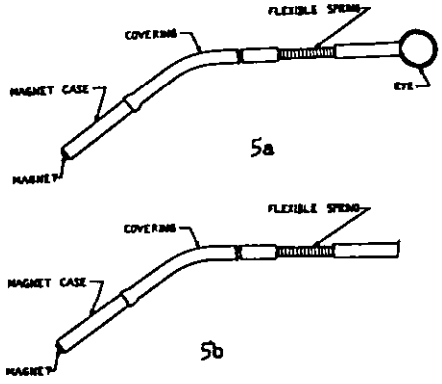

FIGURE 5. Type II, class 2, style B, retrieving tool, magnetic, flexible, covered (5a and 5b illustrate optional styles).

3.6 Workmanship. Workmanship shall be of the highest grade throughout and equal in every respect to good commercial practice. The tools shall be free from rust, burrs, fins, and any imperfections which may impair their serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Inspection of materials and components. In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured, tested and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified herein, or, if none, in accordance with this specification.

4.2 Sampling procedures. Sampling procedures shall be in accordance with MIL-STD-105. Data for sampling shall be as stated in table V.

TABLE V. Sampling data

Category	Sample unit	Inspection level	Acceptable quality level	AQL expressed in terms of	Reference
Visual examination	One each	II	4.0	Defects per hundred units	4.3.1
Dimensional examination	One each	S-3	2.5	Defects per hundred units	4.3.2
Testing	One each	S-3	2.5	Percent defective	4.4 through 4.5.2

4.3 Examination.

4.3.1 Visual examination. Each sample unit shall be examined for any nonconformance in design, material, finish, coating, construction, workmanship, and marking.

4.3.2 Dimensional examination. Each sample unit shall be examined for any nonconformance with dimensional requirements.

4.4 Testing. Each sample unit shall be tested in accordance with 4.4.1 through 4.5.2.

4.4.1 Fatigue test for type I, class 1, mechanical fingers. Each sample mechanical finger shall be operated by hand, or by similar method, to its complete opening and closing limit (see 3.4), a minimum of 500 times, and then subjected to the test specified in 4.4.2. The force required to operate the plunger shall be as specified in 3.4.

4.4.2 Lifting test for type I, class 1. A No. 0-80 flat or round head head machine screw inserted in a 24-ounce block of metal shall be used for the test. The screw head shall extend from the block a sufficient length to permit the fingers to grip the head. The sample fingers, after completion of the fatigue test, shall be capable of gripping the No. 0-80 screw, lifting the block of metal, with the axis of the fingers in a vertical position and holding it suspended for one minute.

4.4.3 Fatigue test for type I, class 2, mechanical fingers. The sample fingers shall be clamped or otherwise secured with the plunger end on a horizontal plane. The gripping end shall be raised until the nonflexible portion adjacent to the finger is at an angle of 70° to the horizontal plane. The flexible portion shall be curved its full length. The plunger mechanism shall be actuated 10 times to its complete opening and closing limit. The 70° angle shall be sustained within a tolerance of plus or minus 5°.

4.4.4 Type II, retrieving tool, magnetic lift test. Each sample of type II retrieving tools shall be subjected to a lift test to determine compliance with the requirements of tables III and IV, as applicable.

4.4.4.1 Test weights. The test weights shall be made from a piece of plain steel, of the weight necessary to obtain the minimum ounces specified in tables III and IV.

4.4.6 Telescopic body and joint-tightness test. Type II, class 1 retrieving tools shall be capable of being positioned in, and holding any pre-set angle of the magnet or length of the tubing. When the telescoping-type tubing is fully extended and the magnet is set at 90° to the longitudinal axis of the body, the outer tubing shall be rotated (manually) through at least 360° without evidence of the one or more inner shaft sections slipping or sliding in the outer tubing section. This test shall be conducted at least once with the longitudinal axis of the body horizontal to the floor and once vertical (magnet positioned above body).

4.5 Plastic handle tests.

4.5.1 Flammability. The tool under test shall be clamped in a support with the handle extended outward in a horizontal position. Under the handle, there shall be clamped a piece of 10-mesh Bunsen burner gauze about 5 inches square, in a horizontal position, 1/4 inch below the bottom of the handle, and with about 1/2 inch of the handle extending beyond the edge of the gauze. A Bunsen burner with an efficient flame 1/2 to 3/4 inch in height, shall be adjusted so that the flame tip will just contact the specimen when placed under the free end of the handle. At the end of 30 seconds, the flame shall be removed and the sample allowed to burn. The rate of travel of the flame shall be determined from the time required for the flame to travel the length of the handle after the removal of the Bunsen burner. In case the handle does not continue to burn after the first ignition, the burner shall be replaced under the free end for a period of 30 seconds immediately following the extenction of the flame. If the handle does not continue to burn until the flame has reached the end of the handle after the second ignition, the sample shall be considered self-extinguishing. If the sample continues to burn, the burning rate shall not exceed 2 inches per minute.

4.5.2 Heat distortion. The handle of the tool under test shall be completely immersed in actively boiling water for a period of 2 minutes. At the end of this period, the sample shall be removed from the water and shall show no significant signs of distortion or blistering.

4.6 Inspection of preparation for delivery requirements. Preservation, packaging, packing, and marking shall be inspected in accordance with MIL-H-15424 to verify compliance with the requirements in section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, and packing. Preservation, packaging, and packing shall be in accordance with MIL-H-15424 for finger, mechanical. The level of preservation and packaging shall be level A or C, as specified (see 6.1), and the level of packing shall be level A, B, or C, as specified (see 6.1).

5.2 Marking.

5.2.1 Civil agencies. In addition to markings required by the contract or order, the interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military agencies. In addition to markings required by the contract or order, the interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

(a) Title, number and date of this specification.
(b) Type and class required (see 1.2).
(c) Size required (see tables I, II, and IV).
(d) Plastic grip, if required (see 3.5.2.2).
(e) Selection of applicable levels of preservation, packaging and packing (see 5.1).

GENERAL SERVICES ADMINISTRATION - FEDERAL SUPPLY SERVICE

SPECIFICATION COMMENT SHEET

BUDGET BUREAU NO. 29-R0175

INSTRUCTIONS

This form provides a way for users of this specification to inform the originator of problems encountered in its use. It is not to be used to request changes to accommodate proprietary features. All comments will be considered and appreciated, but please do not expect a reply. To comment: detach, complete, fold, staple, and mail.

NOTE: Comments on this form do not constitute or imply authorization to waive any part of the document or serve to amend contractual requirements.

1. SPECIFICATION

GGG-F-00360D(GSA-FSS) Finger, Mechanical, and Retriever Took, Magnetic

2. CONTRACT NO. *(If any)*	3. QUANTITY ON CONTRACT *(Optional)*	4. DOLLAR VALUE *(Optional)*

5. GENERAL NATURE OF PROBLEM *(e.g., inspection difficulties, manufacturers unable to meet tolerances, containers collapse under normal warehousing conditions, etc.)*

6. SPECIFIC REQUIREMENTS AFFECTED *(Include paragraph number and lines of wording)*

7. SPECIFIC PROBLEMS *(e.g. tests in 4.2.2 will not assure that the battery will last required time; temperature ranges in table 2 do not conform to commercially available items.)*

8. RECOMMENDATIONS

9. NAME OF MANUFACTURER, ASSOCIATION, GOVT., AGENCY, ETC.	10. ADDRESS *(Number, Street, City, State and Zip Code)*

11. NAME AND TITLE OF SUBMITTER	12. DATE

FORM GSA FEB 69 2200