

# INTERIM FEDERAL SPECIFICATION

## WRENCH, PLIER; CLAMP, PLIER; AND PLIER, TUBING PINCH-OFF

This Interim Federal Specification was developed by the 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.

### 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers plier wrenches, plier clamps, and tubing pinch-off pliers. The plier wrenches and plier clamps are used for wrenching and clamping operations in assembly and repair work. The pinch-off pliers are used to pinch-off the flow of gas or other material flowing through rubber tubing or soft copper tubing. Some of the wrenches and clamps are provided with cutters.

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

### 1.2 Classification.

1.2.1 Types, classes, and styles. The tools covered by this specification shall be of the following types, classes, and styles, as specified (see 6.1):

- Type I. - Wrench, plier.
  - Class 1. - Straight jaw.
    - Style A. - Two straight jaws.
    - Style B. - Combination straight and crowned jaws.
    - Style C. - Parallel jaws.
  - Class 2. - Curved jaw.
    - Style A. - Without cutter.
    - Style B. - With cutter.
- Type II. - Clamp, plier.
  - Class 1. - "C" clamp.
  - Class 2. - Sheet metal clamp.
  - Class 3. - Welding clamp.
  - Class 4. - Smooth jaw.
- Type III. - Plier, tubing pinch-off.

### 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 to the extent specified herein.

#### Federal Standards:

- Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).
- Fed. Std. No. 151 - Metals, Test Methods.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications 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 product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, 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.)

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Military Specifications:

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 Illustrations. The illustrations shown herein are for the purpose of identification and are not intended to preclude the purchase of items which are otherwise in accordance with the requirements of this specification.

3.2 Material. The jaws of all tools, except type II classes 2 and 3 tools, shall be forged from steel of such quality that when properly heat treated, will comply with the applicable requirements hereinafter specified. Handles for all tools and the jaws of type II classes 2 and 3 tools if not forged may be of steel fabricated by hot or cold forming to comply with the strength requirements specified herein.

3.3 Design. Each tool shall be similar to the figure to which reference is made and shall be properly proportioned in all parts so as to be strong, durable, and easy to operate. The tools shall be provided with a toggle or cam device having an adjustable mechanism designed so that the jaws can be clamped, locked and except for type I, class 1, style c, the tool shall be easily released by use of one hand anywhere within the capacity of the tool.

3.4 Handles. Handles of tools shall be so shaped as to afford a comfortable grip and shall be free from rough edges and sharp corners. Handles shall not touch when the jaws are in any of the closed positions. The minimum distance between the fixed and movable handle shall be not less than 5/32 inch when the tool is locked in any position of the jaws. Outer hand-gripping surfaces of handles shall be smooth, knurled, or impressed.

3.5 Joints. Tools shall have either lap or box joints. There shall be no excessive sidewise movement, play or other indication of looseness of the two halves of the tool when open or closed. The Rockwell C value of the joint rivet or bolt shall be not less than 28 nor more than 50 for all tools. Where joint rivet or bolt receives a casehardening treatment in addition to the through hardening, a maximum hardness of 60 on the Rockwell C scale will be permitted.

#### 3.6 Jaws.

3.6.1 Jaw openings. The ends of jaws shall open to the respective minimum distance specified herein. The tool shall operate in a smooth and uniform manner.

3.6.2 Jaw hardness. Forged jaws on all tools, except type II, classes 2 and 3 tools, shall show a hardness value of not less than 45 and not more than 60 on the Rockwell C scale when tested as specified in 4.4.1. Stamped jaws of type II classes 2 and 3 tools shall be file hard.

3.7 Scoring. Scored surfaces, where specified for gripping jaws, shall have sharp projections which shall not be retouched or refinished by filing or grinding.

#### 3.8 Finishes.

3.8.1 Surfaces. Surfaces, exclusive of scoring shall be free from pits, nodules, burrs and other defects which will adversely affect the performance of the tool. Surfaces usually ground or otherwise finished and provided with one of the coatings specified in 3.8.2 shall have a maximum surface roughness of 50 microinches.

3.8.2 Coatings. Tools shall have one or a combination of the following coatings at the option of the contractor:

- (a) Natural, free from excess oxide scale, oil-treated.
- (b) Chemically produced oxide coating, oil-treated.
- (c) Chemically produced phosphate coating, oil-treated.
- (d) Polished all over.
- (e) Electro-deposited metallic coating.

3.9 Marking. Each tool shall be marked in a plain and permanent manner with the manufacturer's name or trademark of such known character that the source of manufacture may be readily determined.

3.10 Type I. Type I plier wrench frame structure shall be of rugged construction. Joints shall be so constructed that they will not bind. Adjustments in the jaw opening shall be made by an adjusting screw located at the end of the handle or by an adjusting screw located within the body area of the tool. Adjusting screws located at the end of handles shall show a Rockwell C hardness of not less than 30 at the tip. The plier wrench shall be capable of withstanding the strength test specified in 4.4.2.3.

3.10.1 Jaws. The plier wrench shall have one fixed jaw and one adjustable jaw. The jaws shall be integral with or securely fixed to the tool by welding or other substantial means. There shall be no motion of the gripping surface of either jaw other than that produced by manual operation of the plier wrench. Jaw operation shall be such that a full grip can be obtained by both jaws within the capacity of the tool. The fixed jaw shall be set at an angle of from 8 to 23 degrees with respect to the axis of the handle.

3.10.2 Springs. Where used, springs shall be made of music wire or of hard-drawn steel wire in accordance with the best commercial practices.

3.10.3 Dimensions. Dimensions shall be determined by measuring the tool with jaws in the closed position. Length measurement shall include the adjusting screw on plier wrenches when the adjusting screw is located at the end of the handle, screwed in, and the tool is in the locked position.

3.10.4 Class 1. The gripping surface of class 1 jaws shall be scored with teeth of such form as to securely hold hexagon or square nuts, rods, tubing, or sheet metal with a positive grip. The plier wrench shall be capable of withstanding the locking test of 4.4.2.1.

3.10.4.1 Style A. Style A plier wrench shall have two straight jaws and conform to the requirements shown in table I for the size specified (see 6.1), and shall be similar to figure 1.

TABLE I. Type I, class 1, style A and Type II class 4.

Nominal size	A $\pm 1/2$	B $\pm 1/4$	C $\pm 1/16$	D $\pm 1/4$	E (minimum)	Angle F $\pm 4$	Jaw opening tip-to-tip, minimum	Jaw opening at parallel position $\pm 1/16$
Inches	Inches	Inches	Inch	Inches	Inch	Degrees	Inches	Inch
7 - - - - -	7	2 1/4	7/16	1 5/8	5/32	10	1 1/2	9/16
8 1/2 - - - - -	8 1/2	2 5/8	5/8	1 7/8	5/32	10	1 3/4	5/8

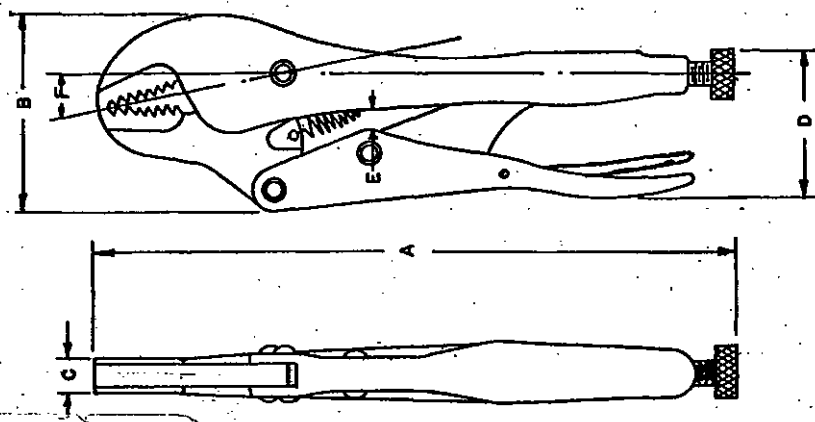


Figure 1. Type I, class 1, style A.

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3.10.4.2 Style B. Style B plier wrench shall have a straight fixed jaw and a crowned adjustable jaw. The pliers shall conform to the requirements shown in table II and shall be similar to figure 2.

TABLE II. Type I, class 1, style B

Nominal size	$\pm A$ $\pm 1/2$	$\pm B$ $\pm 1/4$	$\pm C$ $\pm 1/16$	$\pm D$ $\pm 1/4$	E mini- mum	Angle F $\pm 3$	Jaw opening tip-to- tip, mini- mum	Jaw opening at parallel position $\pm 1/16$
Inches	Inches	Inches	Inch	Inches	Inch	Degrees	Inches	Inch
8 1/2 - - - - -	8 1/2	2 1/4	1/2	2 1/4	1/4	10	1 1/8	5/8

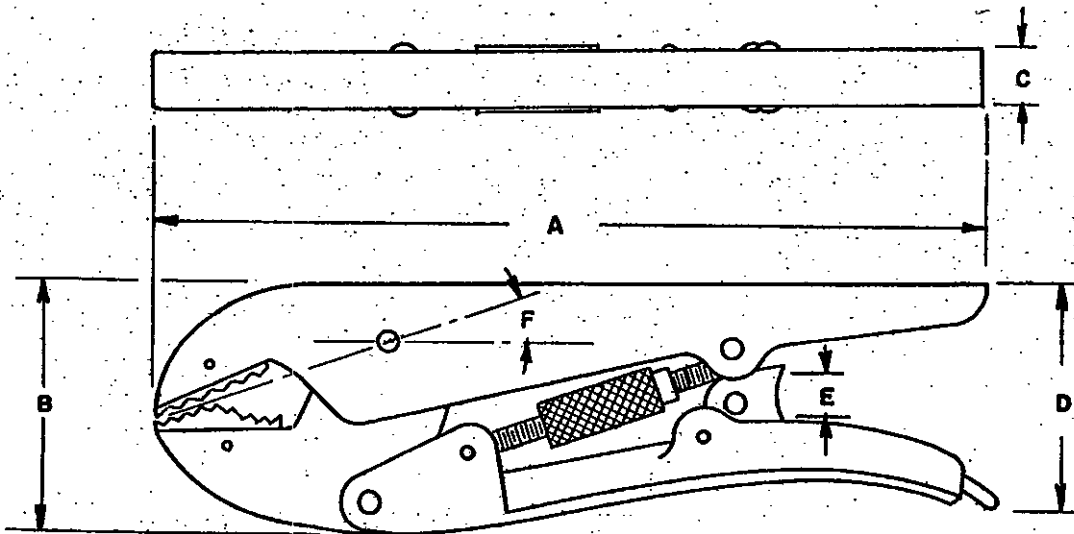


FIGURE 2. Type I, class 1, style B.

3.10.4.3 Style C. The adjustable jaw of style C plier wrenches shall be parallel to the fixed jaw in all positions within its operating capacity with the jaws in the locked position. The plier wrench shall conform to table III for the size specified (see 6.1), and shall be similar to figure 3.

TABLE III. Type I, class 1, style C.

Nominal size	$\pm A$ $\pm 1/2$	$\pm B$ $\pm 1/4$	$\pm C$ $\pm 1/16$	Angle F $\pm 3$	Jaw opening minimum
Inches	Inches	Inches	Inch	Degrees	Inches
7 - - - - -	7 1/2	2	3/8	10	3/4
8 1/2 - - - - -	8 1/2	2 1/4	7/16	10	1
11 - - - - -	11 1/2	2 1/2	1/2	12	1 1/2

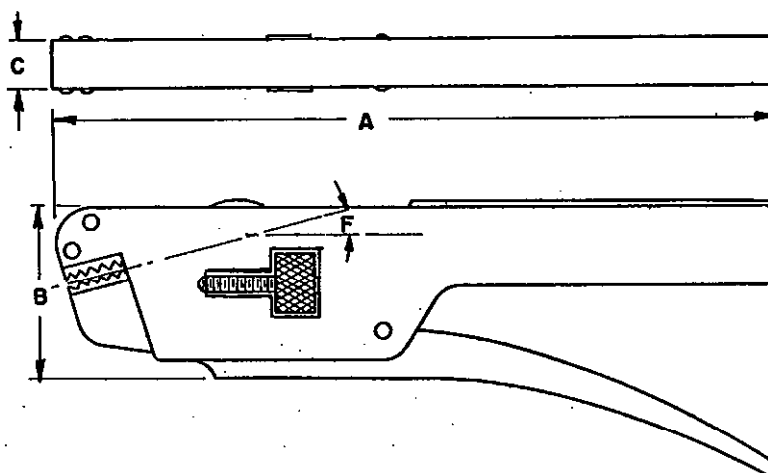


FIGURE 3. Type 1, class 1, style c.

3.10.5 Class 2. Class 2 plier wrench shall have straight, scored gripping surfaces at the outer end of the jaws suitable for gripping flat surfaces, and curved gripping jaws with pointed teeth at the center of the jaws suitable for gripping round surfaces. The plier wrench shall be capable of withstanding the locking test of 4.4.2.1 and the jaw curvature test of 4.4.2.4.

3.10.5.1 Style A. Style A plier wrenches shall conform to the requirements shown in table IV for the size specified (see 6.1), and shall be similar to figure 4.

Table IV. Type 1, class 2, style A

Nominal size	A $\pm \frac{1}{4}$	B $\pm \frac{1}{4}$	C $\pm \frac{1}{4}$	D $\pm \frac{1}{4}$	E minimum	Angle F $\pm 3$	Jaw opening tip-to-tip, minimum
Inches	Inches	Inches	Inch	Inches	Inch	Degrees	Inches
7	7	2	$\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{4}$	10	$1\frac{1}{4}$
$8\frac{1}{2}$	$8\frac{1}{2}$	$2\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{4}$	10	$1\frac{1}{4}$

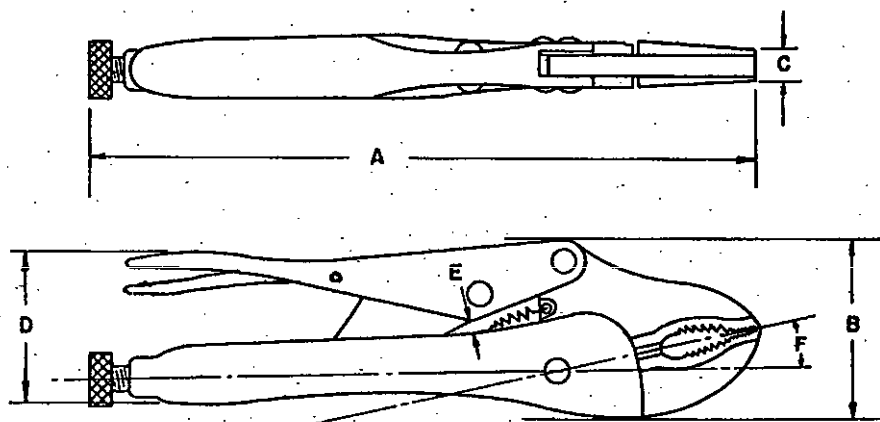


FIGURE 4. Type I, class 2, styles A and B.

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3.10.5.2 Style B. Style B plier wrenches shall be identical to style A plier wrenches (see 3.10.5.1) except that the jaws shall be provided with cutting edges near the joint end. The tool shall cut wire without any assistance, such as bending, pulling or twisting of the wire, and there shall be no visible deformation or damage to the cutting edges of the cutter when tested as specified in 4.4.2.2. The pliers shall conform to the requirements shown in table V for the size specified (see 6.1).

TABLE V Type I, class 2, style B.

Nominal size	A		B $\pm 1/4$	C $\pm 1/16$	D $\pm 1/4$	E minimum	Angle F $\pm 3$	Jaw opening tip-to-tip, minimum
	Min.	Max.						
Inches	Inches	Inches	Inches	Inch	Inches	Inch	Degrees	Inches
5 1/2 - - - - -	5 1/4	5 3/4	1 9/16	1/4	1 7/16	5/32	10	1 1/3
7 - - - - -	6 1/2	7 1/2	2	9/32	1 5/8	5/32	10	1 1/2
8 1/2 - - - - -	8	9	2 5/8	3/8	1 7/8	5/32	10	1 7/8

3.11 Type II. Type II plier clamps shall be in accordance with paragraphs 3.11 to 3.11.4 inclusive. The design of the toggle or cam mechanism for classes 1, 2, and 3, shall be such that when the clamp is in the closed position, (jaw tips together) and then the lever thrown completely open, the jaw tips shall have moved apart a minimum of one (1) inch.

3.11.1 Class 1, "C" clamp. Jaws of class 1, "C" clamps shall have radiused or rounded clamping surfaces with smooth or lightly serrated gripping surfaces. Class 1 clamps shall conform to the dimensions of table VI and be similar to figure 5.

TABLE VI. Type II, class 1 plier clamp, "C" clamp.

Overall length:	Clamping capacity:	Jaw width (across clamping surface):	Throat depth:	Throat width (closed):
$\pm 3/8$ (minimum)		$\pm 1/8$	$\pm 1/2$	$\pm 1/2$
Inches	Inches	Inch	Inches	Inches
	From: To			
11	0 3-3/8	7/16	2-1/2	3-1/2

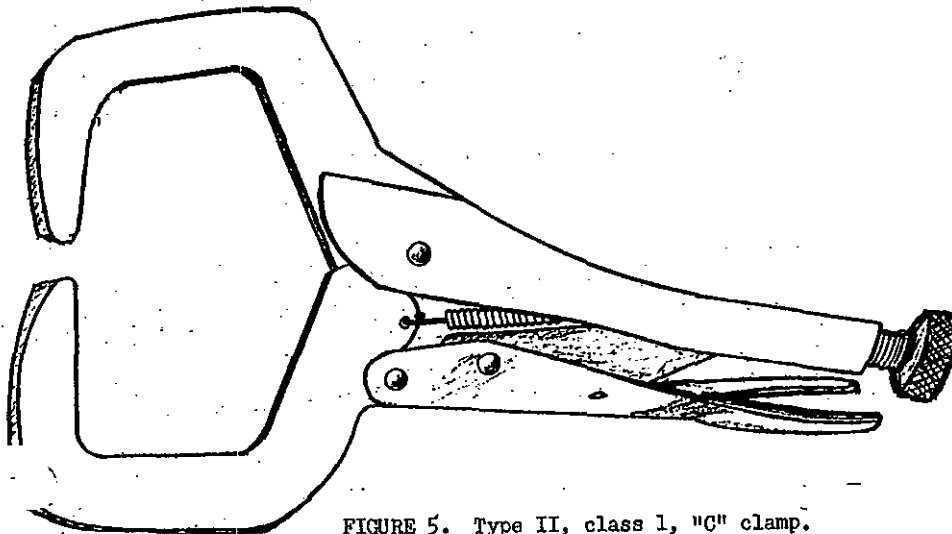


FIGURE 5. Type II, class 1, "C" clamp.

3.11.2 Class 2, sheet metal clamp. Jaws of class 2 clamps shall have enlarged clamping surfaces suitable for gripping and firmly holding sheet metal strips, sheets, etc. Class 2 clamps shall conform to the dimensions in table VII and be similar to figure 6.

TABLE VII. Type II, class 2, plier clamp, sheet metal.

Overall length	Throat	Jaw width
tolerance	depth	
$\pm 3/8$	$\pm 1/2$	$\pm 1/2$
Inches	Inches	Inches
8	1-3/4	3-1/8

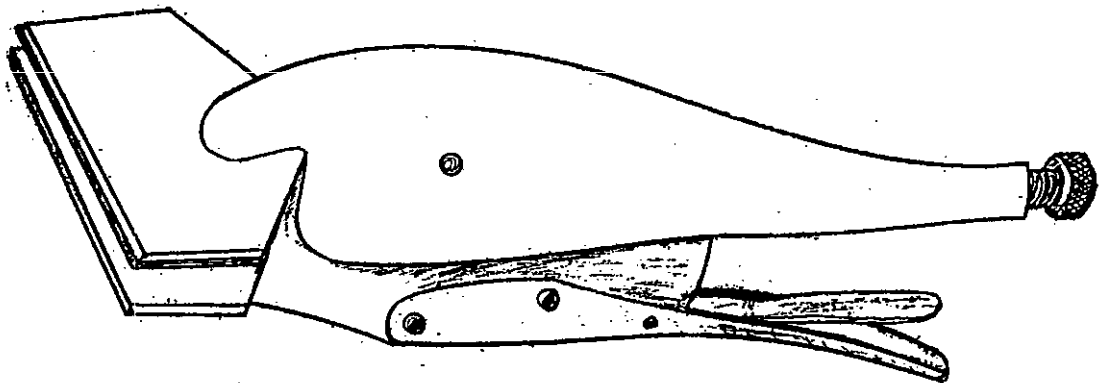


FIGURE 6. Type II, class 2, sheet metal clamp.

3.11.3 Class 3, welding clamp. Jaws of class 3 clamps shall be "U" shaped and constructed with an open area in the center to permit welding, soldering, riveting etc. operations, while the work is clamped. Class 3 clamps shall conform to the dimensions in table VIII and shall be similar to figure 7.

TABLE VIII. Type II, class 3, plier clamp, welding clamp.

Overall length	Clamping capacity	Jaw width	Throat depth
$\pm 3/8$	(minimum)	$\pm 1/2$	$\pm 1/2$
Inches	Inches	Inches	Inches
	From To		
9	0 1-5/8	2-5/8	3



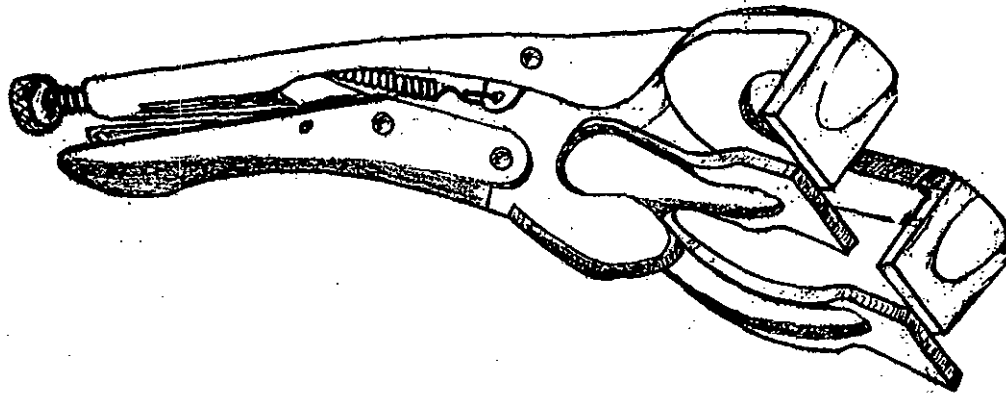


FIGURE 7. Type II, class 3, welding clamp.

3.11.4 Class 4. Class 4 plier clamp shall have smooth jaw surfaces and shall be capable of holding, without marring the surface, parallel-sided material of a thickness up to the minimum jaw opening size. The plier clamp shall conform to the requirements shown in table I, II, or III, as applicable, and shall be similar to either figure 1, 2, or 3, as applicable, (except jaw surfaces shall be smooth). The plier clamp shall be capable of withstanding the tests specified in 4.4.2.3, 4.4.3.1, and 4.4.3.2.

3.12 Type III. Type III, tubing pinch-off pliers shall be capable of sealing 1/4-inch outside diameter soft copper tubing, .030-inch wall thickness, when tested in accordance with 4.4.4. The jaws shall be of the sealing or pinch-off type. When closed, the jaws shall make contact with one another at the far end and the remainder of jaw contact surface shall be approximately parallel so that a .005-inch thickness (feeler) gage cannot be inserted through the closed-jaws. The throat depth shall be at least 3/4-inch. The radius of the stationary jaw shall be 1/8-inch, plus or minus 1/64-inch and the movable jaw radius shall be 5/32-inch plus or minus 1/64-inch. The pliers shall conform to table IX and shall be similar to figure 8.

Table IX. Type III

Nominal size	A $\pm \frac{1}{4}$	B $\pm \frac{1}{4}$	C $\pm \frac{1}{4}$	D $\pm \frac{1}{4}$	E (minimum)
Inches	Inches	Inches	Inches	Inches	Inches
7	7	2 1/4	1/4	1 1/4	1/4

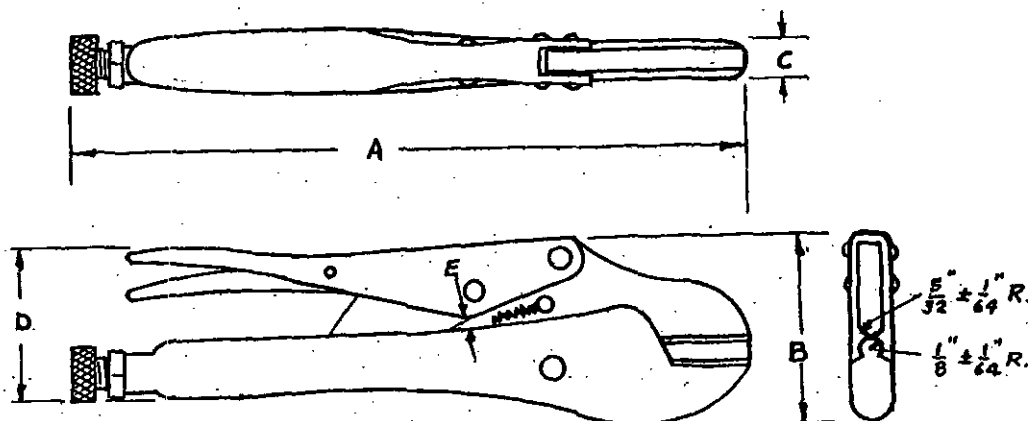


FIGURE 8. Type III, plier, tubing pinch-off.



3.13 Workmanship. Workmanship shall be first class in every respect.

#### 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 above, 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 indicated in table X.

TABLE X		Sampling Data			
Category	Sample Unit	Inspection Level	Acceptable Quality Level	AQL Expressed In Terms Of	Reference
Visual examination	1 ea.	II	Major 2.5 Minor 6.5	Defects per hundred units	4.3.1
Dimensional examination	1 ea.	S-4	1.5	Defects per hundred units	4.3.2
Testing	1 ea.	S-3	1.0	Percent Defective	4.4
Examination of preparation for delivery	one container	S-2	4.0	Defects per hundred units	4.5

#### 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. Defects are listed in table XI.

TABLE XI.		Classification of defects	
Examine	Defect	Major	Minor
Finish	Surfaces not finished as specified. . .	X	
	Coatings (as applicable) not adherent, smooth, continuous or free from uncoated areas, pits, blisters, nodules, and other defects affecting protective value . . .		X
Design	Type, class, style, and size not as specified . . . . .	X	
	Shape of handle does not afford comfortable grip . . . . .		X
Material	Jaws of tools; except type II classes 2 and 3, not made of forged steel. . .	X	
Construction and Workmanship	Jaws cannot be opened by the action of one hand . . . . .	X	
	Excessive side play of the jaws or joints . . . . .	X	
	Jaws not adjustable, adjustable screw sticks or binds or not knurled, or joint sticks or binds . . . . .	X	

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Examine	Defect	Major	Minor
Construction and Workmanship (cont'd)	Gripping surfaces defective, not properly scored or projections not sharp, length of scoring less than required, or longitudinal groove missing where required (type I only).	X	
	Cutting edges defective, evidence of nicks, burrs, or wire edges, not aligned, or not provided with adequate clearance or recess, length of cutter not as required, or fail to make contact throughout the entire length when in the closed position (type I, class 2, style B only).	X	
	Gripping surfaces not smooth (type II, classes 2, 3, and 4, only).	X	
	Jaws not parallel in all positions within the capacity of the tool (type I, class 1, style C only).	X	
	Springs (as applicable) missing or damaged.	X	
	Minimum distance between handles in any locked position is less than the allowable.	X	
	Failure of jaws to lock in any position within the capacity of the tool.	X	
	Handles; evidence of fins, burrs, rough edges or sharp corners.	X	
	Marking, manufacturer's name or trademark missing, illegible, incorrect, not permanently marked.		X

**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 tests under 4.4.1, 4.4.2, 4.4.3, and 4.4.4 as applicable.

4.4.1 Hardness test. The forged jaws of all tools, except type II classes 2 and 3, shall be tested for hardness requirements in accordance with Method 243 of Federal Standard 151, to determine compliance with 3.6.2. The inspector shall use a file to determine that the jaws of type II classes 2 and 3 tools have been case hardened or similarly heat-treated, that is, no actual hardness determination has to be made.

#### 4.4.2 Type I

4.4.2.1 Locking test, (classes 1 and 2, except 5 1/2 inch size of type I, class 2, style B). The plier wrench shall be tested by gripping two steel mandrels, one 3/4-inch diameter (not hardened) and the other 3/4-inch hexagon (hardened), and shall withstand the test load shown in table XII. The mandrels shall be gripped at the center of the jaws, of the plier wrenches and the hexagonal mandrels shall be gripped across corners except that for the class 1, style C, parallel jaw plier wrenches, the hexagonal mandrels shall be gripped across flats. A locking force of not less than 30 pounds nor more than 35 pounds shall be applied to lock the toggle mechanism. Chatillon torque testing machine or other similar testing device shall be used in this test. When the load is applied, the mandrel shall not turn in the jaws of the plier wrench. The plier wrench shall be examined after completion of test. Appreciable wear or breakage of jaws or any other part of the plier wrench shall be cause for rejection.

TABLE XII. Locking test for type I, classes 1 and 2 (except 5 1/2-inch size).

Nominal size ± 1/2	Mandrel size	Applied load, minimum
Inches	Inch	Inch-pounds
7 - - - - -	3/4 diameter (not hardened)	300
7 - - - - -	3/4 hexagon (hardened)	450
8 1/2 - - - - -	3/4 diameter (not hardened)	480
8 1/2 - - - - -	3/4 hexagon (hardened)	900
11 - - - - -	3/4 diameter (not hardened)	740
11 - - - - -	3/4 hexagon (hardened)	1000

4.4.2.1.1 Locking test (type I, class 2, style B, 5 1/2-inch size. The type I, class 2, style B, 5 1/2-inch size shall be tested in accordance with 4.4.2.1, except for the following: Two mandrels shall be used, one mandrel shall be 1/2-inch diameter round mild steel (not-hardened) and the other mandrel shall be 1/2-inch hexagon steel hardened. A locking force of not more than 35 pounds shall be applied to lock the toggle mechanism. The minimum applied load shall be 225-inch-pounds for the round mandrel and 300-inch-pounds for the hexagon mandrel.

4.4.2.2 Cutting test for type I, class 2, style B. The 5 1/2-inch size plier wrench shall cut .048 inch diameter heat treated steel wire in one setting of the plier wrench, without damage to the tool. The force required to lock the toggle mechanism and complete the cut shall not exceed 35 pounds. The 7-inch and 8 1/2-inch plier wrenches shall cut 0.091-inch-diameter plow-steel wire in not more than three progressive adjustments without damage to the tool. The force required to lock the toggle mechanism in making each progressive cut shall not exceed 70 pounds.

4.4.2.3 Strength test for type I, classes 1 and 2, and type II, class 4. The tools shall be tested on a leverage system similar to figure 9, and shall conform to the dimensions shown to determine if the tools are capable of withstanding a test load of 2500 pounds at the jaw tip, except that the 5 1/2-inch size of type I, class 2, style B tool shall withstand a test load of 900 pounds at the jaw tip. The tools shall have passed the jaw tip test if the jaws come together and match and all the joints and adjusting screw work properly after the test load has been applied for a duration of 10 seconds.

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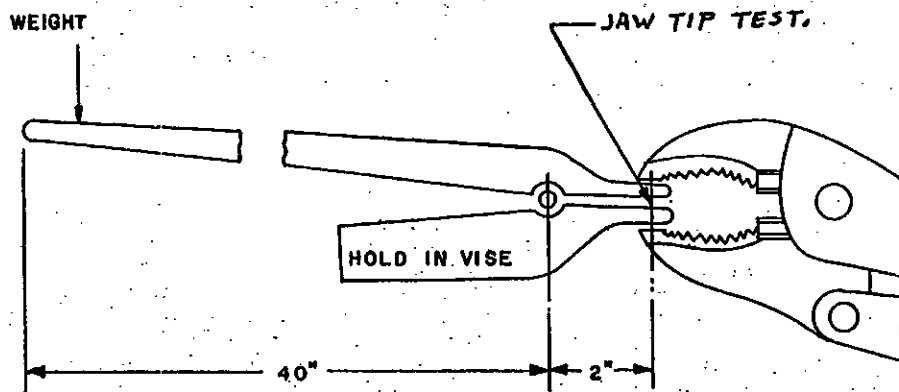


FIGURE 9. Method of applying jaw tip test load.

4.4.2.4 Jaw-curvature test for type I, class 2. The 5 1/2-inch size, type I, class 2, style B plier-wrench shall grip a 7/32-inch diameter rod in the deepest part of the arc, but shall permit a 5/32-inch diameter rod to slip through. The 7-inch size, type I, class 2, (styles A and B) plier-wrench shall grip a 5/16-inch diameter rod in the deepest part of the arc, but shall permit a 7/32-inch rod to slip through. The 8 1/2-inch size, type I, class 2, (styles A and B) plier-wrench shall grip a 3/8-inch diameter rod and permit a 9/32-inch rod to slip through.

#### 4.4.3 Type II.

4.4.3.1 Type II, classes 1, 2, and 3 jaw tip test. The plier clamps shall be tested by clamping the jaws on a leverage system similar to, and conforming to the dimensions shown in figure 9 and the test loads of table XIII. The jaw tips of the clamps shall be capable of withstanding the respective loads specified in table XIII for each class clamp. The tools shall have passed this test if there are no visible cracks, breakage, permanent set and if the jaws come together and meet, and the adjusting screw and all joints work properly after the test load has been applied for a duration of 10 seconds.

TABLE XIII. Type II, classes 1, 2, and 3 jaw tip test loads.

Clamps	Test load applied on handle:	Total test load: (on jaws)
	Pounds	Pounds
Class 1:	45	900
Class 2:	50	1000
Class 3:	25	500

4.4.3.2 Class 4, gripping test. The type II, class 4 plier clamp shall be tested by gripping two pieces of rolled commercial brass 1/8 inch thick by approximately 7/8 inch wide by 6 inches long and having a Rockwell B hardness value of not less than 56 nor more than 61. With the ends overlapping approximately 1/2 inch, the two pieces of brass shall be clamped with the plier clamp under test. A locking force of not less than 30 pounds nor more than 35 pounds shall be applied to lock the toggle mechanism. The free ends of the brass shall then be secured in a dynamometer or any other similar machine. When the pull is applied to the free ends, slippage shall not occur prior to an applied force of 155 pounds.

4.4.3.3 If any one of the sample plier clamps fail under the proof test or if after the load is removed it is found that the sample clamp is permanently deformed or damaged in any manner, it shall be rejected.

4.4.4 Type III. Type III tubing pinch-off pliers shall be tested under the following conditions:

- Fit a 1/4-inch outside diameter soft copper tube, with a .030-inch wall thickness, onto an air line having an air pressure of 100 pounds per square inch.
- Place the copper tube between the jaws of the plier and apply a pressure of 70 pounds to the tip of the movable lever of the plier.

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- (c) The tool shall seal the tube by pinching-off the air supply and remain locked on the tube.
- (d) With air pressure of 100 psi applied to one end of the tube, the sealed tube portion and locked plier in between, and the free end of the tube immersed in water, there shall be no evidence of bubbles appearing at the submerged end.
- (e) If bubbles appear the plier shall be considered defective.

4.5 Inspection of preparation for delivery requirements. An inspection shall be made to determine that the preservation, packaging, packing, and marking comply with the requirements of section 5 of this specification. Defects shall be scored in accordance with table XIV. The sample unit shall be one shipping container fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot.

TABLE XIV Classification of Preparation for Delivery Defects

Examine	Defects
Markings (exterior and interior)	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Materials	Any component missing, or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling. Distortion of container.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, and packing. Unless otherwise specified (see 6.1) the pliers shall be preserved, packaged, and packed in accordance with MIL-H-15424. The level of preservation, and packaging shall be A or C and the level of packing, A, B, or C as specified (see 6.1).

5.1.1 As part of the requirements of section 5 of this specification, the following is considered as part of table I of MIL-H-15424:

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 6	COLUMN 7
Wrench, plier	P-8, P-9	I	1	48	48
Clamp, plier	P-8, P-9	I	1	48	48
Plier, tubing pinch-off	P-8, P-9	I	1	48	48

## 5.2 Marking.

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

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

## 6. NOTES

6.1 Ordering data. Procurement documents shall specify the following and purchasers should exercise any desired options offered herein:

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- (a) Title, number and date of this specification.
- (b) Type, class, and style required (see 1.2.1).
- (c) Size required (see applicable table).
- (d) Level of preservation, packaging, and packing required (see sec. 5).
- (e) Additional marking, if required (see 5.2).

6.2 Transportation description. The applicable transportation description is as follows:

Tools, not otherwise indexed by name  
 Carload minimum weight 24,000 pounds  
 Subject to Rule 34, Uniform Freight Classification

Truckload minimum weight, 24,000 pounds

6.3 Superseding data. When finalized, this specification is intended to supersede in part the following specifications:

GGG-P-471c Pliers  
 GGG-C-00406b (GSA-FSS) Clamps and Hand Screws.

6.3.1 Types, classes and styles. The following list indicates the types, classes, and styles in this specification and the items transferred from other specifications.

This specification:

Type I  
   Class 1  
     Style A  
     Style B  
     Style C  
   Class 2  
     Style A  
     Style B  
 Type II  
   Class 1  
   Class 2  
   Class 3  
   Class 4  
 Type III (New Tool)

Formerly

GGG-P-471c	Type XIII
GGG-P-471c	Class 1
GGG-P-471c	Style A
GGG-P-471c	Style B
GGG-P-471c	Style C
GGG-P-471c	Class 2
GGG-P-471c	Style A
GGG-P-471c	Style B
GGG-C-00406b	Type VI Class A
GGG-C-00406b	Class B
GGG-C-00406b	Class C
GGG-P-471c	Type XIII Class 3