

GGG-W-651E
March, 11, 1988
 SUPERSEDING
 GGG-W-00651D (GSA-FSS)
 July 8, 1966
 GGG-W-651C
 July 9, 1958

FEDERAL SPECIFICATION

WRENCHES: PIPE WRENCH AND BASIN WRENCH

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies.

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers pipe wrenches with jaws, chain, or strap at the end, and basin wrenches with interchangeable jaws, for turning pipe and fittings.

1.2 Classification.

1.2.1 Types and classes. Wrenches shall be of the following types and classes, as specified (see 6.2.1).

- Type II - Heavy duty, adjustable
 - Class A - Drop-forged steel or cast malleable iron, ductile iron, or steel
 - Class C - Forged or cast aluminum alloy
- Type III - Chain
 - Class A - Pipe only
- Type V - Strap
- Type VI - Angle style, adjustable
- Type VII - Basin

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

- QQ-A-367 - Aluminum Alloy Forgings, Heat Treated
- QQ-A-596 - Aluminum Alloy Permanent And Semi-Permanent Mold Castings
- QQ-A-601 - Aluminum Alloy Sand Castings
- PPP-P-40 - Packaging and Packing of Hand Tools

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions, as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification, other Federal specifications, and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Houston; Denver; Los Angeles; San Francisco; and Seattle, WA.

(Federal Government activities may obtain copies of Federal specifications, standards, commercial item descriptions and the Index of Federal Specifications, from established distribution points in their Agencies.)

PSC 5120

DISTRIBUTION STATEMENT A. Approved for Public Release, Distribution is Unlimited.

GGG-W-651E

Military Standard:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(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.)

2.2 Other publication. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bid or solicitation for offer shall apply.

American Society For Testing and Materials (ASTM) Standards:

ASTM E 18 - Rockwell Hardness and Rockwell Superficial Hardness
Of Metallic Materials.

(Application for copies should be addressed to the American Society For Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

3. REQUIREMENTS

3.1 The illustrations herein are descriptive and not restrictive and are not intended to preclude the purchase of wrenches otherwise conforming to this specification.

3.2 Materials. The materials shall be as specified herein for the individual type.

3.3 Finish. Unless otherwise specified, wrenches shall have one or a combination of any of the following finishes at the option of the manufacturer (see 6.2.1):

- (a) Natural, free from excess oxide scale, oil treated.
- (b) Chemically produced oxide coating, oil treated.
- (c) Chemically produced phosphate coating, oil treated.
- (d) Zinc or other equally suitable plating.
- (e) Lacquered or enameled.

3.4 Identification markings. Each wrench shall be etched or stamped in a permanent and legible manner with the manufacturer's name or identifying symbol of such known character that the source may be readily identifiable, part number and country of origin. Types II, III, and VI wrenches shall be marked with either pipe size capacity, the size number (length) or both capacity and length.

3.5 Type II, heavy duty, adjustable. Type II wrenches shall be used for heavy duty and severe service and shall have a 90 degree jaw opening to the axis of the handle.

3.5.1 Class A, drop-forged steel, cast malleable iron, ductile iron, or steel. The wrenches shall consist of a bar or handle, fixed jaw, a frame, a moveable jaw, and an adjusting nut.

3.5.1.1 The bar or handle shall be made of cast malleable iron, ductile iron or steel heat treated to a Rockwell C hardness of 25 to 40. The moveable jaw shall be drop forged steel heat treated to Rockwell C hardness of 40 to 49 on the shank; and adjacent to the teeth, a Rockwell C hardness of not less than 55 nor more than 60. The frame or housing shall be either forged or cast integral with the bar or handle assembled thereto in accordance with accepted industry practice. The bar handle on forged steel wrenches of size 10 inches or larger shall be provided with a hardened-steel replaceable jaw insert secured by means of steel pin or rivet. The bar or handle on all size wrenches of cast malleable iron, ductile iron or steel shall be provided with hardened-steel replaceable jaw insert secured by means of a steel pin or rivet. The teeth on the jaw insert shall show a Rockwell C hardness of not less than 55 nor more than 60. Casehardened jaws will not be acceptable.

GGG-W-651E

3.5.1.2 The adjusting nut shall be heat treated to a Rockwell C hardness of not less than 32 nor more than 48.

3.5.1.3 Type II, class A wrenches shall conform to table I and shall be similar to figure 1.

TABLE I. Type II, class A heavy duty, adjustable pipe wrench

Size (minimum overall length, opened)	Minimum size range, pipe size	Maximum weight		Bending moment
		Pounds	Ounces	
Inches	Inches			Inch/pounds
6	1/8 to 1/2	---	8	1,500
8	1/4 to 3/4	---	15	3,300
10	1/4 to 1	2	---	7,000
12	1/2 to 1-1/4	3	2	10,000
14	1/2 to 1-1/2	3	14	13,000
18	1 to 2	6	4	20,000
24	1-1/2 to 2-1/2	10	4	28,000
36	2-1/2 to 3-1/2	20	---	45,500
48	3 to 5	36	---	52,000



FIGURE 1. Type II, class A, heavy duty, adjustable pipe wrench drop forged steel, malleable or ductile iron or steel

3.5.2 Class C, forged or cast aluminum alloy. Class C wrenches with hardened steel jaws shall conform to type II, class A, except as specified herein.

3.5.2.1 Handle. The bar or handle and frame shall be forged or cast aluminum alloy in accordance with QQ-A-367, QQ-A-596 or QQ-A-601, and shall be heat treated and aged.

3.5.2.2 Moveable jaw. The moveable jaw shall be forged from aluminum alloy in accordance with QQ-A-367, and shall be heat treated and aged, or the moveable jaw shall be drop-forged steel in accordance with applicable portion of paragraph 3.5.1.1.

3.5.2.3 Adjusting nut. The adjusting nut shall be of steel and shall be heat treated to a Rockwell C hardness of not less than 32 nor more than 48, or commercial aluminum alloy 2024 T4, or equivalent. The adjusting nut shall operate freely and shall not jam or lock when wrench is subjected to the bending moment test specified in 4.3.1.

3.5.2.4 Type II, class C wrenches shall conform to table Ia and shall be similar to figure 1 or 2.

GGG-W-651E

TABLE IA. Type II, class C, heavy duty, adjustable pipe wrench

Size (minimum overall length, opened)	Minimum size range, pipe size	Maximum weight		Bending moment
Inches	Inches	Pounds	Ounces	Inch/Pounds
10	1/4 to 1	1	2	6,000
14	1/2 to 1-1/2	2.5	---	11,500
18	1 to 2	3.75	---	18,000
24	1-1/2 to 2-1/2	6	---	25,000
36	2-1/2 to 3-1/2	11	---	40,500
48	3 to 5	18.5	---	46,500



FIGURE 2. Type II, class C, heavy duty adjustable pipe wrench, forged aluminum alloy

3.6 Type III, chain. Type III wrenches shall be of the flatlink chain type, and shall consist primarily of a handle, a set of jaws, and a length of flatlink chain.

3.6.1 Handle. The handle shall be of steel, malleable iron, or ductile iron, sized and shaped with one end forming the handgrip and the other end fitted with double outer jaws, or single piece jaws of approximate design.

3.6.2 Jaws. The jaws shall be of heat treated steel, and have a Rockwell C hardness of not less than 48 nor more than 62, adjacent to the teeth. The pipe jaws, except for the 4 to 18 inch size, class A, may be double ended and reversible with teeth provided on all working surfaces. The 4 to 18 inch class A wrench shall be provided with a single end working surface. The teeth shall be shaped so that they will not slip over the pipe surface under service conditions. The jaws shall be secured firmly to the handle for easy removal when required.

3.6.3 Chain. There shall be a steel flatlink chain secured to the handle so that it can be used efficiently and without adjustment when set to grip pipe in connection with the teeth.

3.6.4 Class A, pipe only. Class A wrenches shall conform to table II and shall be similar to figure 3.

TABLE II. Type III, class A chain pipe wrench

Minimum size range, pipe	Overall length, minimum		Bending moment	Weight maximum
	Handle	Chain		
Inches	Inches	Inches	Inch/pounds	Pounds
3/4 to 4	32	26	14,000	21
1 to 6	43	31	15,000	33
1-1/2 to 8	46	40	20,000	50
2 to 12	46	48	25,000	85
4 to 18	46	71	50,000	160

GGG-W-651E

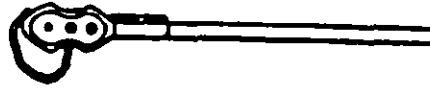


FIGURE 3. Type III, class A, chain pipe wrench, pipe only.

3.7 Type V, strap. Type V wrenches shall be equipped with a flexible woven strap and so designed as to be used on nickel-plated or polished-brass pipe or tubing without scratching or otherwise marring the pipe. The wrenches shall consist primarily of a head, a handle, and a strap.

3.7.1 Head. The head shall be of steel, malleable iron, ductile iron, or aluminum alloy and shall be finished and shaped as to prevent the crushing of light tubing under service conditions. When the head is required to be threaded to receive the handle and a particular material is required, these requirements shall be specified in the contract or order (see 6.2.1).

3.7.2 Handle. The handle may be integral with the head or may be a piece of pipe or tubing, in which case it shall be fastened to the head as to make a strong and compact wrench. When the handle is of pipe or tubing, it shall be rounded on the gripping end to prevent the hand from chafing. When specified (see 6.2.1), the handle shall be of pipe and tubing not less than 1/2 inch in diameter and shall be knurled three fourths of its length to insure proper gripping dimensions and supports. Handles shall be capable of withstanding 2250 inch-pounds of torque for the 12-inch size wrench and 3000 inch-pounds for the 18-inch size wrench.

3.7.3 Strap. The strap shall be a flexible woven type and of a material suitable for the purpose intended and shall show a tensile strength as specified for the respective capacity of the wrench, when subjected to the proof test specified in 4.3.3. All straps shall be treated for added traction. When a strap of 3-ply cotton and nylon material, 0.160-inch thick, 100-ounce weight per square yard is required, it shall be as specified in the contract or order (see 6.2.1).

3.7.4 Type V wrenches shall conform to table III and shall be similar to figure 4.

TABLE III. Type V, strap pipe wrench

Size (minimum length)	Minimum size range, pipe size	Width $\pm 1/8$ inch	Strap requirements	
			Overall strap length (min.)	Tensile strength (min.)
Inches	Inches	Inches	Inches	Pounds
12	1/8 to 2	1-1/8	17	2250
18	1 to 5	1-3/4	36	3000

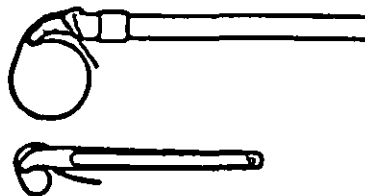


FIGURE 4. Type V, strap pipe wrench

GGG-W-651E

3.8 Type VI, angle style, adjustable. Type VI wrenches shall be of an angle style having the jaw opening at an angle of 25 degrees to the axis of the handle, and shall consist of a handle, a fixed jaw, jaw insert, a moveable jaw, and an adjusting nut.

3.8.1 Handle. The handle shall be drop-forged steel, or cast malleable iron, or ductile iron. One end of the handle shall form an handgrip and the opposite end shall be shaped to form a fixed jaw or receive a steel jaw insert. If jaw inserts are furnished, they shall be secured to the handle member by a steel pin or rivet. The forged steel handle shall be heat-treated to a hardness of not less than 25 nor more than 40 on a Rockwell C scale.

3.8.1.1 Fixed jaw or jaw insert. The teeth on the fixed jaw or jaw insert shall be machined, shaped, and heat-treated to a hardness of not less than 55 nor more than 60 on a Rockwell C scale. Casehardened jaws will not be accepted. The teeth shall grip securely without crushing the pipe and without slipping during the ordinary operation of the wrench.

3.8.2 Moveable jaw. The moveable jaw shall be drop-forged steel, finished and shaped to form a shank and hook jaw. The shank shall be heat-treated to a hardness of not less than 40 nor more than 49 on a Rockwell C scale. The shank shall be provided with threads cut and shaped to engage the threads in the adjusting nut. The teeth on the jaw shall be heat-treated to show adjacent to the teeth a hardness of not less than 55 nor more than 60 on a Rockwell C scale. Casehardened teeth will not be accepted. The teeth shall grip securely without crushing the pipe and without slipping during the ordinary operation of the wrench.

3.8.3 Adjusting nut. The adjusting nut shall be of steel, circular in shape, knurled externally, and threaded internally to engage the threads on the moveable jaw. The nut shall operate freely without excessive play, and shall not jam or lock when the wrench is subjected to the bending moment test specified in 4.3.1. It shall be of steel hardened to not less than 32 nor more than 48 on a Rockwell C scale.

3.8.4 Operation. The motion between the various parts of the wrench shall permit the teeth to grip and hold the pipe for successive turns without the necessity of altering the adjusting nut. The wrench shall release freely when the direction of pressure on the handle is reversed.

3.8.5 Springs. The wrench may be furnished with or without a spring (or springs). If equipped with a spring (or springs) the greatest angle movement shall not exceed 10 degrees. If no springs are provided, the greatest angle of movement between the jaws shall not exceed 8 degrees. The greatest angle movement shall be the difference in angles between the jaws when at their minimum and maximum possible angular operation shall be interpreted to mean operation of the wrenches in the minimum through maximum pipe size range specified in applicable tables. The spring (or springs) provided in the wrench assembly shall balance the moveable jaw action, be secured to the frame or handle or retained by the frame to prevent it from coming loose during normal operation or when the wrench is disassembled.

3.8.6 Type VI wrenches shall conform to table IV and shall be similar to figure 5.

TABLE IV. Type VI, angle style, adjustable pipe wrench

Size (minimum overall length opened)	Minimum size range, pipe size	Maximum weight		Bending moment
Inches	Inches	Pounds	Ounces	Inch/pound
6	1/8 to 1/2	----	8	1,000
8	1/4 to 3/4	----	15	3,000
10	1/4 to 1	2	----	5,000
12	1/2 to 1-1/4	2	14	7,500
14	1/2 to 1-1/2	3	14	9,500
18	1 to 2	6	4	13,500
24	1 to 2-1/2	10	4	19,000
36	2-1/2 to 3-1/2	20	----	30,000

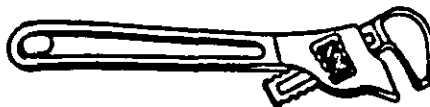


FIGURE 5. Type VI, angle style, adjustable pipe wrench

3.9 Type VII, basin. The wrench shall be of steel, and consist of a body (shank); one fixed jaw; and a spring-loaded jaw(s) to provide the jaw capacities specified in table V. A jaw hinge pin and T-handle shall be provided as specified in 3.9.4 and 3.9.5.

3.9.1 Body (shank). One end of the body shall be provided with a jaw with teeth for left and right hand operation of the wrench. The teeth shall be casehardened to a minimum depth of 0.008 inch. The end opposite the jaw shall be provided with a transverse hole for accommodating a sliding T-handle. The body (shank) may be one-piece construction, or telescopic. When a telescopic shank is furnished, it shall be easily adjustable to a minimum overall length of 10 inches to 18 inches maximum, and shall be securely retained in position by means of spring-loaded pin(s).

3.9.2 Interchangeable jaws. When interchangeable jaws are furnished, they shall be of the capacities specified in table V. The jaws shall be designed for attachment to the body shackle by means of a steel pin; or wrenches with telescopic handles may have interchangeable shanks complete with different size jaws. All jaws shall be designed for right- or left-hand, and/or over-end operation, as positioned.

3.9.3 Jaw teeth. The jaw teeth shall be casehardened to a minimum depth of 0.008 inch, or to a hardness of not less than 40 nor more than 58 on a Rockwell C scale.

3.9.4 Jaw hinge pin. A pin shall be provided for attaching the jaws to the body and for holding the pin in place on the assembled tool. Operation of the pin, facilitating the removal or the attachment of the jaws, shall be easily and readily accomplished without the use of special tools.

3.9.5 T-handle. The T-handle shall be a straight steel rod, arranged so that it may be used in the centralized position, or moved through the wrench body in either direction, as required to provide additional leverage, or to clear obstructions when working in confined spaces. Means shall be provided in accordance with accepted industry practice to prevent the handle from being unintentionally detached from the wrench. The handle shall be not less than 5 inches long with a minimum diameter of 11/32 inch.

3.9.6 Type VII wrenches shall conform to table V and shall be similar to figure 6.



Alternate designs

FIGURE 6. Type VII, basin wrench

GGG-W-651E

TABLE V. Type VII, basin wrench.

Overall length				Jaw capacity slip nut size minimum	Weight maximum	
Adjustable shank		One-piece shank			Pounds	Ounces
Min.	Max.	Min.	Max.	Inches		
Inches	Inches	Inches	Inches	Inches		
10	18	10	18	1/8 to 3/8	2	6
				1/2 to 1		
				1-1/4 to 2		

3.10 Workmanship. The wrenches shall be free from fins, burrs, rough or sharp edges, and any defects that would affect appearance, serviceability or durability.

3.11 Regulatory requirements. The offerer/contractor is encouraged to use recovered materials in accordance with Public Law 94-580, as amended, to the maximum extent practicable.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for performance of the inspection requirements specified herein, unless disapproved by 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 the 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 Examination of the end item. The lot size shall consist of all wrenches of the same type, class and size offered for acceptance at one time. Sampling and acceptance shall be in accordance with MIL-STD-105, at the indicated inspection level and acceptable quality level.

4.2.1 Visual defects. The wrenches shall be examined for design, material, finish, coating, construction, workmanship, and marking. The sample unit shall be one completely fabricated wrench. The inspection level shall be Level I with an acceptable quality level (AQL) of 2.5 percent defective for major and 4.0 percent defective for minor. Defects are listed in table VI.

TABLE VI. Defects list

Examine	Defect	Major	Minor
Design	Any characteristic not in accordance with specified requirements.	X	
Finish	Not type specified.	X	
	Indication of rust.	X	
	Scratch or mar affecting appearance.		X
	Peeling, blistering, or chipping.		X
	Dirt, grit, or foreign matter imbedded in finish.		X
Construction and workmanship	Part missing or not specified type or size.	X	
	Component fractured, split, punctured, sprung, malformed, or otherwise impaired.	X	
	Component not properly assembled seriously affecting serviceability.	X	

TABLE VI. Defects list cont'd

	Castings not free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects.	X	
	Burred, or sharp edges, or projections which may cause injury.	X	
	Operation omitted or not properly performed, affecting serviceability.	X	
	Not connected or joined as specified or poorly accomplished.		X
	Operation omitted or not properly performed, not affecting serviceability.		X
	Adjusting nut that requires abnormal force to operate.	X	
	Angle of jaw opening not as specified.	X	
	Frame pins or rivets not spun over or riveted in such a manner as to preclude their working loose.	X	
	Jaw teeth missing, chipped, cracked, broken, not properly shaped, or teeth not even.	X	
	Lock bolt (when required) is defective or fails to lock.	X	
	T-handle not the required length or diameter.	X	
	Strap defective, torn, frayed, not flexible, not treated for added traction.	X	
	Shackle defective, not secured to head, sticks, binds, or is excessively loose.	X	
	T-handle fails to slide or not prevented from becoming detached from body.	X	
Marking and Identification	Manufacturer's name, or trademark, wrench size, and country of origin missing, illegible, incorrect, or not permanent.		X
	Size not stamped on wrench when required.		X

4.2.1.1 Dimensional defects. Defects in dimensions shall be smaller or larger than specified. The sample unit shall be one completely fabricated wrench. The inspection level shall be I with an AQL of 4.0 percent defective.

4.2.2 Examination of preparation for delivery. An examination shall be made to determine compliance with the requirements of section 5 and the contract. The sample unit shall be one container fully prepared for delivery. Defects shall be scored in accordance with Table VII. The inspection level shall be S-3 with an AQL of 4.0 percent defective.

TABLE VII. Classification of Preparation For Delivery Requirements

<u>Examine</u>	<u>Defects</u>
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.

4.2.3 Testing. Each sample unit shall be tested in accordance with paragraph 4.3, as applicable. The sample unit shall be one completely fabricated wrench. The inspection level shall be S-3 with an AQL of 2.5 percent defective.

GGG-W-651E

4.3 Tests.

4.3.1 Types II and VI. The sample wrenches shall be subjected to the respective inch-pounds bending moment specified in tables I, IA, and IV. In the bending moment test, each sample shall be made to grip a solid mandrel of a diameter equal to the maximum stated capacity of the wrench. The mandrel shall be supported to prevent rotation. The test load, in pounds, to be applied shall be determined by dividing the required bending moment by the perpendicular distance, in inches, between the center of the mandrel and the line in which the load acts. The load shall be applied to the wrench handle about 2 inches from the end by means of a knife edge, and shall act at right angles to the center line of the handle. There shall be no permanent deformation or cracking of any portion of the wrench under the bending moment test. The threads on the nut and moveable jaw, and the nut itself shall not permanently deform under the bending moment test.

4.3.2 Type III. The sample wrenches shall be subjected to respective bending moment specified in table II. The sample chain wrench shall be made to grip a mandrel, preferably solid, of suitable diameter, and supported to prevent rotation. The test load in pounds to be applied shall be determined in accordance with the procedure outlined in 4.3.1. The load shall be applied to the wrench handle near its end or near the end of such extension of the handle (made by slipping a piece of pipe over it) as may be found necessary to effect the specified bending moment. Before and after the bending moment test each sample shall also be subjected to a brief practical test to determine whether it operates satisfactorily.

4.3.3. Type V. The sample wrenches shall be subjected to a service test to determine whether they will grip polished pipe or similar articles securely and as to whether they are otherwise satisfactory for the purpose for which wrenches of this type are ordinarily employed. Under this test, the samples shall not mar the surface of soft or hard chrome. The straps of sample wrenches shall be subjected to a proof test to determine conformance with the tensile strength specified in table III. This test shall be conducted on a standard tension machine. The handle shall be subjected to a torque test to determine compliance with 3.7.2. The handle shall be supported in a fixture and shall be tested independently of the strap. The test load, in pounds, shall be determined by dividing the required bending moment by the perpendicular distance, in inches, between the center of the fixture and the line in which the load acts. The load shall be applied 2 inches from the handle end and shall act at right angles to the center line of the handle. There shall be no permanent deformation or cracking of any portion of the wrench under the bending moment test.

4.3.4 Type VII. The sample wrenches shall be subjected to a service test to determine the ability of the wrench to grip, loosen, and tighten slip nuts and to determine whether the wrench is otherwise satisfactory for the purpose for which wrenches of this type are ordinarily employed.

4.3.5 Rockwell hardness. The Rockwell hardness test shall be performed in accordance with ASTM E 18. Hardness at the tooth section for types II, III, VI, and VII wrenches shall be measured near the bottom of the teeth, the distance from the edge to be limited to a space barely sufficient to produce a satisfactory reading. The hardness of the adjusting nut shall be measured on either end where it bears on the frame.

4.3.5.1 Hardness of the moveable jaw shank of type II, class A, and type VI heavy duty adjustable wrenches, 14-inch size and larger, shall be measured in three places - the first position at a point 1 inch from the end, the second position about the center portion of the shank, and the third position in a line parallel to the teeth but as nearly as practicable a distance of 1 inch back on the shank.

4.3.5.2 The hardness of the handle of type II, class A, and type VI steel wrenches, 14-inch size and larger, shall be measured in three places - the first position as nearly as practicable 1 inch from the end, the second position one-half the distance between the end and the back of the frame, and the third position at a point 1-1/2 inches from the back or lower edge of the frame.

4.3.5.3 For type II, class A, and type VI steel wrenches of the 6-, 8, and 10-inch sizes, two Rockwell readings shall be obtained, namely the readings in the

first and third positions (see 4.3.5.2). This applies to both the jaw shank and the handle.

4.3.5.4 In the event of dispute three Rockwell readings shall be taken at or near each of the positions designated, and the average of the three readings shall govern.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing and marking. Preservation, packaging, packing, and marking shall be in accordance with PPP-P-40. The level of preservation, packaging, and packing shall be A or C, as specified (see 6.1).

6. NOTES

6.1 Intended use.

6.1.1 Type II, classes A and C wrenches are intended for heavy duty and severe service where heavy loads and abuse are likely to be encountered.

6.1.2 Type III, class A wrenches are intended for use on pipe of larger sizes than is within the capacity of types II, and VI wrenches.

6.1.3 Type V wrenches are intended for use on polished brass or nickel-plated pipe or tubing where it is desired to avoid tooth marks or scoring on the surface of the tubing.

6.1.4 Type VI wrenches are intended for general purposes where the service is not unusually severe, and where the service is in confined quarters.

6.1.5 Type VII wrenches are intended for use under lavatories and sinks and for connections inaccessible for type II wrenches.

6.2 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, class, and size required (see 1.2 and applicable table).
- (c) Finish, if a particular finish is required (see 3.3).
- (d) When the head is required to be threaded (see 3.7.1).
- (e) When a particular material is required (see 3.7.1).
- (f) When the 1/2-inch size of pipe and knurled length is required (see 3.7.2).
- (g) When a strap of the thickness, and ply specified in 3.7.3 is required.
- (h) Level of preservation, packaging and packing required (see 5.1).

6.2.1 When repair parts for wrenches are required, the following should be specified:

- (a) The manufacturer's name or trademark.
- (b) Country of origin.
- (c) The type of wrench.
- (d) The size of wrench.
- (e) The proper name and manufacturer's number or symbol of the parts.
- (f) Any other data applicable to the wrench which will assist in identifying proper repair parts.

MILITARY INTEREST

Military Coordinating Activity

Army - GL

Custodians

Army - GL

Navy - SA

Air Force - 99

Review activity

Air Force - 84

PREPARING ACTIVITY

GSA - FSS

Supersession data:

Type I - deleted

Type IV - deleted