



AEROSPACE STANDARD

AS4283™

REV. D

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Superseding AS4283C

Handles and Attachments for Hand Socket Wrenches

RATIONALE

For Five-Year Review.

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1. SCOPE

This SAE Aerospace Standard (AS) covers handles and attachments for use with sockets and crowfoot wrenches in aerospace applications involving high torque, limited clearances, and generally clean conditions. This document provides additional requirements beyond ASME B107.110 Category 10, appropriate for aerospace use.

Inclusion of dimensional data in this document is not intended to imply all the products described therein are stock production sizes. Consumers are requested to consult with manufacturers concerning lists of stock production sizes.

1.1 Classification

This document covers handles and attachments for socket wrenches and shall be of the following types, classes, and styles as specified:

1.1.1 Type I Handles

Class 1 - Hinged handles

Class 2 - Ratchet, reversible

Style A - Coarse action

Style B - Fine action

Class 3 - Speeder, brace type

1.1.2 Type II Attachments

Class 1 - Universal joint

Class 2 - Bar, extension, solid

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AS478N Identification Marking Methods

AS4984B Coating Requirements for Aerospace Hand Tools

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E18 Standard Test Methods for Rockwell Hardness of Metallic Materials

2.3 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B107.4 Driving and Spindle Ends for Portable Hand, Impact, Air and Electric Tools

ASME B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

ASME B107.110 Category 10 Handles and Attachments for Hand Socket Wrenches

3. TECHNICAL REQUIREMENTS

3.1 Illustrations

The illustrations shown herein are descriptive and not restrictive and are included for the convenience of requisitioning and purchasing officers and manufacturers and are not intended to preclude the purchase of handles and attachments, which are otherwise in accordance with this document.

3.2 Materials

Unless otherwise specified hereinafter, the materials used in load bearing components in the manufacture of handles and attachments shall be steel, the chemical composition and heat treatment of which shall be such as to produce handles and attachments conforming to the physical requirements specified herein. Powdered metal pawls may be used.

3.3 Marking

Marking shall be in accordance with ASME B107.110 Category 10 and AS478N.

3.4 Manufacture and Design

3.4.1 General Design

Unless otherwise specified herein, all dimensions and attributes shall be in conformance with ASME B107.110 Category 10.

3.4.2 Drive End Dimensions

External and Internal drive end dimensions shall conform to ASME B107.4.

3.4.2.1 Retention Ball and Spring

Minimum pull off force shall be in accordance with ASME B107.4.

3.4.3 Surface Condition and Finish Requirements

All external surfaces shall be free from pits, nodules, forge/cast flash, burrs, cracks, and other detrimental defects. The external flash shall blend smoothly with adjacent surfaces.

Except for knurled handles, all external surfaces shall have a maximum Ra roughness height value of 250 μ in. Microinch measurements shall be made with a surface-measuring instrument using a 0.030 inch (0.76 mm) roughness width cutoff.

Definitions and nomenclature used herein can be found in ASME B46.1.

3.4.4 Coating

Handles and attachments shall be protected with one of the following three types as specified within AS4984:

Type I - Nickel chromium coating

Type II - Black oxide or black phosphate or other black finish coatings

Type III - Alternative coatings

3.5 Type I, Class 1, Handles, Hinged

Hinged handles shall conform to Figure 1 and Table 1.

3.6 Type I, Class 2, Handles, Ratchet, Reversible

Ratchets shall conform to Figure 2 and Table 2. All screws shall be securely retained by means of either lock washers, nylon inserts, or oil resistant adhesive. The ratchet shall ratchet with equal ease and similar sound in both directions. It shall be free of any neutral, or disengaged, position in which it may easily come to rest. There may be a moment during the reversing process when the ratchet is not engaged in either direction, but it shall not have a tendency to stop in this position during normal ratcheting or reversing. It is not required that the ratchet be open for servicing or cleaning. Ratchet gears integral with the drive tang shall be 42 to 56 HRc.

3.7 Type I, Class 3, Handles, Speeder, Brace Type

Speeder handles shall conform to Figure 3 and Table 3. The axis of the top and bottom portions of the speeder handle shall conform to 4.4.

3.8 Type II, Class 1, Attachments, Universal Joint

Universal joints shall conform to Figure 4 and Table 4.

3.9 Type II, Class 2, Attachments, Bar Extension, Solid

The bar extension shall conform to Figure 5 and Table 5.

3.10 Workmanship

All items covered herein shall be free from fins, burrs, external sharp or rough edges, corners or surfaces and other defects which may impair their serviceability or durability.

3.10.1 Foreign Object Damage

It is important to avoid damage to aircraft engines due to foreign objects. Rips, tears, broaching slugs, burrs, splinters, and/or any material which could be removed during gaging, load testing, or normal use and/or any indication of rust shall be unacceptable.

4. TEST PROCEDURES

Testing for requirements contained in the applicable tables herein and the applicable tables in ASME B107.110 Category 10 shall be conducted in accordance with ASME B107.110 Category 10 unless otherwise specified. Adequate safeguards for personnel and property shall be employed in conducting all tests. Approved eye protection shall be worn at all times and equipment safety shields shall be in place when tests are in progress.

4.1 Testing

4.2 Hardness Testing

Hardness definitions, nomenclature, and procedures used herein can be found in ASTM E18. When grinding is necessary to prepare the test surface, the amount removed must not exceed 0.007 inch on the surface contacted by the indenter.

4.3 Qualification Tests

To qualify the design and processes, a sample tool shall be subjected to the following qualification tests. The manufacturer shall maintain a record of compliance with the cyclic torque test for each reversible ratchet handle. Retest shall be required whenever the design or method of manufacture is changed.

4.3.1 Ratchet Cycle Test

The ratchet mechanism shall withstand a cycle test of 50000 cycles using the cycle test torque as specified in Table 2 without failure of the ratchet mechanism or loosening of screws or other parts of the ratchet handle. Following the cyclic test, the ratchet handle shall carry the proof torque specified in Table 2 and shall reverse 12 times without jamming or other evidence of malfunction. Cycle tests shall be run at a speed not exceeding 30 load cycles per minute. The ratchet shall advance by at least one tooth or 10 degrees on each cycle. The torque shall be measured from the square drive by a torque sensor or other device capable of detecting peak torque.

4.4 Speeder Straightness Test

Straightness shall be measured by placing a straight edge so as to make contact with the stem close to the grip and wherever else it touches the stem in the vicinity of the crank or square. The straight edge shall be in the plane of the crank sweep. If the straight edge fails to touch the stem adjacent to the square or adjacent to the end of the crank toward the square, the gap shall not exceed 0.3 inch. This test shall be repeated with the straight edge at a right angle to the plane of the crank and the gap shall again not exceed 0.3 inch. See Figure 6.

5. NOTES

5.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

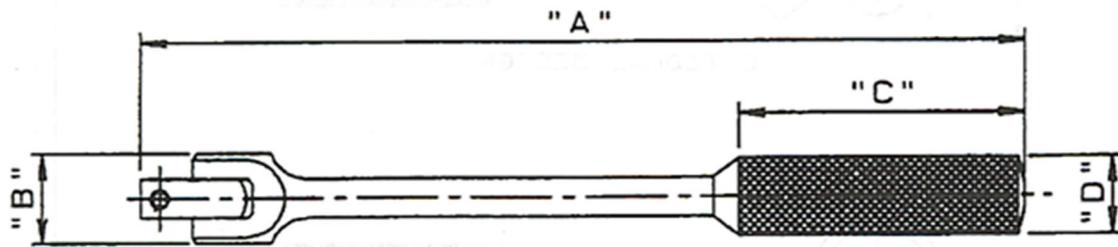


Figure 1 - Type I, class 1, handles, hinged

Table 1 - Type I, class 1, handles, hinged

Drive Inches	Nominal Length Inches	Overall Length Inches		Dimension Across Hinge Inches	Handgrip Length Inches	Handgrip Diameter or Width Inches	Proof Torque lbf-in Min
		Min	Max	"B" Max	"C" Min	"D" Min	
1/4	6	4.90	6.20	0.625	2.000	0.400	550
3/8	8	7.80	8.80	0.938	2.500	0.615	2000
3/8	10	9.50	10.50	0.938	2.500	0.615	2000
1/2	15	12.70	15.90	1.250	3.500	0.750	5000
1/2	18	17.50	19.00	1.250	3.500	0.750	5000
1/2	24	23.00	25.00	1.300	3.500	0.750	5000
3/4	22	18.20	23.00	1.940	3.500	0.750	14000

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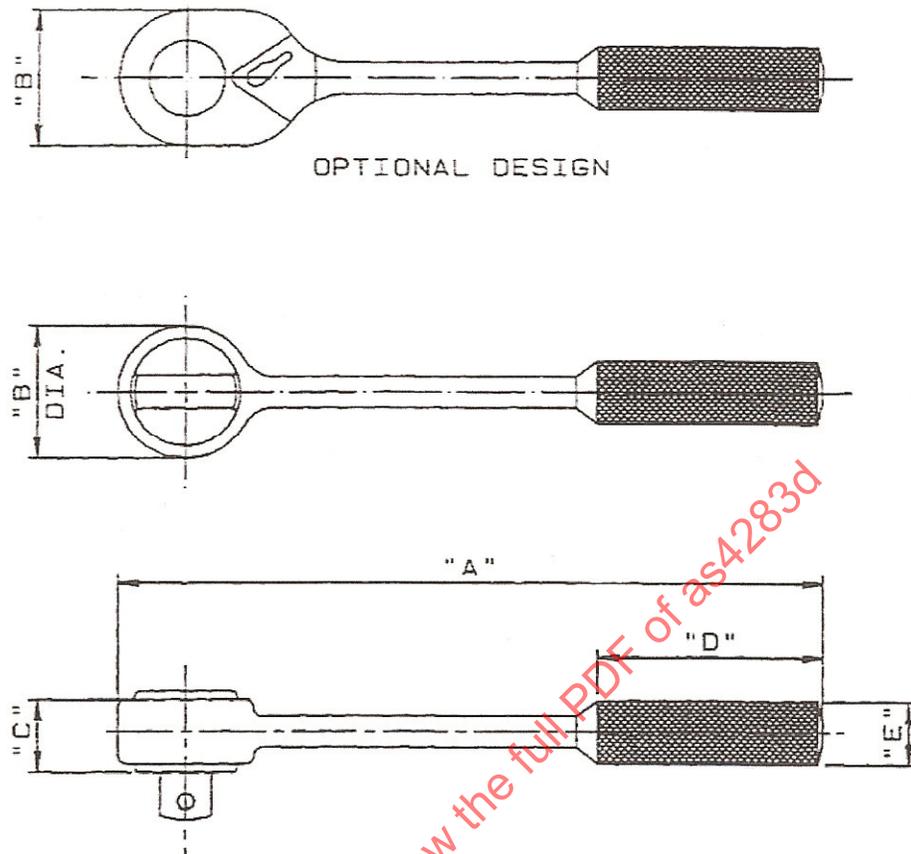


Figure 2 - Type I, class 2, handles, ratchet, reversible, style A and style B

Table 2 - Type I, class 2, handles, ratchet, reversible, style A and style B

Drive Inches	Overall Length Inches "A"	Overall Length Inches "A"	Head Dimensions Width Inches "B"	Head Dimensions Head Thick & Rev. Lever Inches "C"	Handgrip Length Inches "D"	Handgrip Diameter or Width Inches "E"	Style A	Style B	Proof Torque lbf-in Min	Cycle Test Torque lbf-in Min
							Course Action Number of Teeth In Gear Range	Fine Action Number of Teeth In Gear Min		
1/4	4.62	6.00	1.060	0.593	2.000	0.370	20-35	36	550	138
3/8	6.87	8.87	1.430	0.875	2.500	0.530	24-35	36	2000	500
3/8	10.00	12.00	1.430	0.875	2.500	0.530	24-35	36	2000	500
1/2	10.00	12.00	1.937	1.000	3.500	0.680	24-35	36	5000	1250
1/2	14.87	16.87	1.937	1.000	3.500	0.680	24-35	36	5000	1250
3/4	19.75	24.50	2.810	1.375	3.500	0.790	24-35	36	14000	--

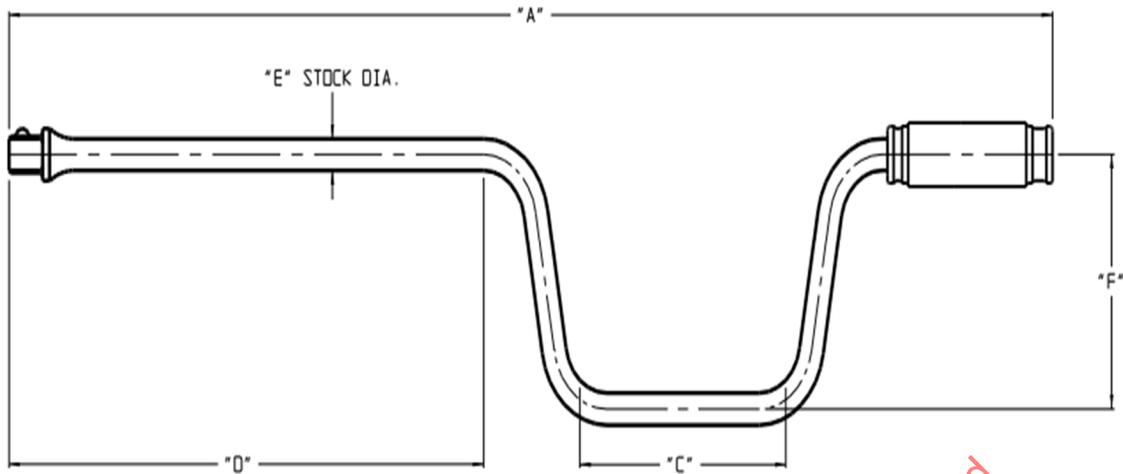


Figure 3 - Type I, class 3, handles, speeder, brace type

Table 3 - Type I, class 3, handles, speeder, brace type

Drive Inches	Overall Length Inches	Overall Length Inches	Grip Length Inches	Extension Length Inches	Diameter or Width Inches	Crank Sweep Radius Inches
	"A" Min	"A" Max	"C" Min	"D" Min	"E" Max	"F" Min
1/4	15.20	16.50	3.50	6.40	0.437	2.500
3/8	14.20	17.50	3.50	6.40	0.500	2.875
1/2	16.50	20.00	3.50	7.00	0.562	3.375

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