

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

REV.
E

AS1004

FEDERAL SUPPLY CLASS
4730

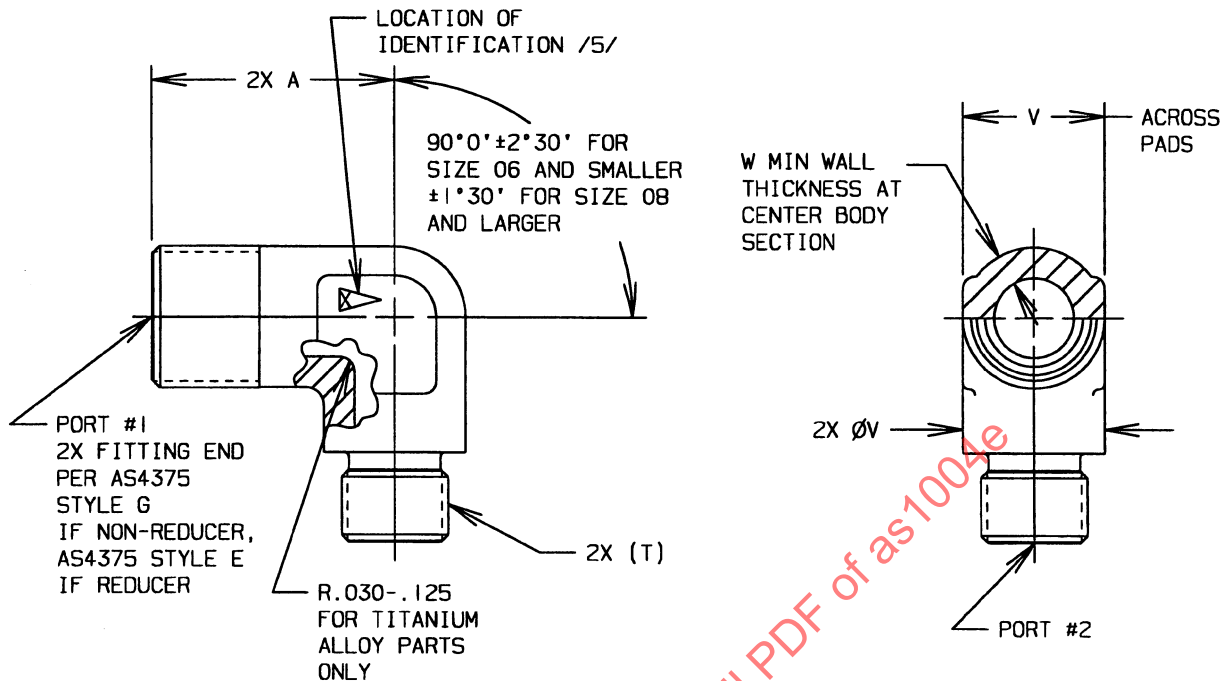
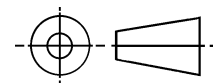


FIGURE 1 - FITTING, ELBOW, 90°

INACTIVE IN PART /21/



THIRD ANGLE PROJECTION



CUSTODIAN: SAE G-3/G-3B

PROCUREMENT SPECIFICATION: /4/ AS18280

SAE Aerospace
An SAE International Group

(R)

AEROSPACE STANDARD

FITTING, ELBOW, 90°,
STANDARD AND REDUCER,
FLARELESS

AS1004
SHEET 1 OF 5

**REV.
E**

REV. E	TABLE 1 - DIMENSIONS AND WEIGHTS /12/						
	BASIC NO. AS1004 /11/ /20/ SIZE CODE	V	W	LB/EA APPROX REF ALUM	LB/EA APPROX REF STEEL	LB/EA APPROX REF TI	
AS1004	02	.297- .314	.090	.0105	.0300	.0166	
	03	.360- .377	.100	.0162	.0465	.0257	
	04	.423- .440	.110	.0217	.0624	.0344	
	05	.485- .502	.120	.0295	.0847	.0467	
	06	.547- .565	.120	.0378	.109	.0599	
	08	.735- .753	.150	.0783	.225	.124	
	10	.860- .878	.170	.0959	.275	.152	
	12	1.047-1.065	.185	.179	.514	.283	
	14	1.173-1.191	.200	.227	.652	.359	
	16	1.292-1.317	.205	.276	.791	.436	
	20	1.605-1.630	.240	.466	1.34	.739	
	24	1.855-1.880	.250	.595	1.71	.943	
	32	2.542-2.572	.350	1.40	4.01	2.21	

TABLE 2 - LEG LENGTH A /13/													
FORGING SIZE /11/	TUBE SIZE OF PORT #2 02	TUBE SIZE OF PORT #2 03	TUBE SIZE OF PORT #2 04	TUBE SIZE OF PORT #2 05	TUBE SIZE OF PORT #2 06	TUBE SIZE OF PORT #2 08	TUBE SIZE OF PORT #2 10	TUBE SIZE OF PORT #2 12	TUBE SIZE OF PORT #2 14	TUBE SIZE OF PORT #2 16	TUBE SIZE OF PORT #2 20	TUBE SIZE OF PORT #2 24	TUBE SIZE OF PORT #2 32
02	.773	-	-	-	-	-	-	-	-	-	-	-	-
03	.789	.836	-	-	-	-	-	-	-	-	-	-	-
04	.820	.867	.898	-	-	-	-	-	-	-	-	-	-
05	.883	.930	.961	.961	-	-	-	-	-	-	-	-	-
06	.961	1.008	1.039	1.039	1.055	-	-	-	-	-	-	-	-
08	1.086	1.133	1.164	1.164	1.180	1.273	-	-	-	-	-	-	-
10	1.180	1.226	1.258	1.258	1.274	1.367	1.430	-	-	-	-	-	-
12	1.272	1.320	1.351	1.351	1.367	1.460	1.523	1.586	-	-	-	-	-
14	1.398	1.445	1.476	1.476	1.492	1.585	1.648	1.742	1.680	-	-	-	-
16	1.429	1.476	1.507	1.507	1.523	1.616	1.679	1.742	1.742	1.742	-	-	-
20	1.585	1.632	1.663	1.663	1.679	1.772	1.835	1.898	1.898	1.898	1.898	-	-
24	1.710	1.757	1.788	1.788	1.804	1.897	1.960	2.023	2.023	2.023	2.023	2.023	-
32	2.148	2.195	2.226	2.226	2.242	2.335	2.398	2.461	2.461	2.461	2.461	2.461	2.461

 An SAE International Group	AEROSPACE STANDARD		AS1004 SHEET 2 OF 5	REV. E
	(R)	FITTING, ELBOW, 90°, STANDARD AND REDUCER, FLARELESS		

TABLE 3 - TUBE SIZE AND CORRESPONDING THREAD

PORT SIZE	(NOMINAL TUBE SIZE)	T THREAD PER AS8879 CLASS 3A
02	.125	.3125-24 UNJF
03	.188	.3750-24 UNJF
04	.250	.4375-20 UNJF
05	.312	.5000-20 UNJF
06	.375	.5625-18 UNJF
08	.500	.7500-16 UNJF
10	.625	.8750-14 UNJF
12	.750	1.0625-12 UNJ
14	.875	1.8750-12 UNJ
16	1.000	1.3125-12 UNJ
20	1.250	1.6250-12 UNJ
24	1.500	1.8750-12 UNJ
32	2.000	2.5000-12 UNJ

NOTES:

/1/ MATERIAL:

- a. NO CODE LETTER - TYPE 4130 STEEL FORGING OR BAR PER AMS 6370 OR AMS-S-6758 EXCEPT HEAT TREATMENT PER PROCUREMENT SPECIFICATION. /2/
- b. CODE LETTER D - TYPE 2024-T6 OR -T851 ALUMINUM ALLOY BAR PER AMS-QQ-A-225/6 OR TYPE 2014-T6 ALUMINUM ALLOY FORGING PER AMS 4133. /2/ /21/
- c. CODE LETTER F - TYPE 4130 LOW ALLOY STEEL FORGING OR BAR PER AMS 6370 OR AMS-S-6758 EXCEPT HEAT TREATMENT PER PROCUREMENT SPECIFICATION. /2/ /21/
- d. CODE LETTER J - TYPE 304 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS 5639 OR AMS-QQ-S-763 EXCEPT HARDNESS PER PROCUREMENT SPECIFICATION. /2/
- e. CODE LETTER K - TYPE 316 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS 5648 OR AMS-QQ-S-763 EXCEPT HARDNESS PER PROCUREMENT SPECIFICATION. /2/
- f. CODE LETTER R - TYPE 321 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS 5645 OR AMS-QQ-S-763 EXCEPT HARDNESS PER PROCUREMENT SPECIFICATION. /2/
- g. CODE LETTER S - TYPE 347 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS 5646 OR AMS-QQ-S-763 EXCEPT HARDNESS PER PROCUREMENT SPECIFICATION. /2/ /21/
- h. CODE LETTER T - TYPE 6AL-4V TITANIUM ALLOY FORGING OR BAR PER AMS 4928.
- i. CODE LETTER W - TYPE 7075-T73 ALUMINUM ALLOY FORGING PER AMS 4141 OR AMS-QQ-A-367; OR 7075-T7351 ALUMINUM ALLOY BAR PER AMS 4124; OR 7075-T73 ALUMINUM ALLOY BAR PER AMS-QQ-A-225/9. /2/

/2/ HEAT TREATMENT:

- a. NO CODE LETTER AND MATERIAL CODE LETTER F - HARDNESS SHALL BE 92 HRB TO 40 HRC PER PROCUREMENT SPECIFICATION.
- b. MATERIAL CODE LETTERS D AND W - ELECTRICAL CONDUCTIVITY AND HARDNESS PER PROCUREMENT SPECIFICATION.
- c. MATERIAL CODE LETTERS J, K, R AND S - HARDNESS SHALL BE Rb 80 MINIMUM PER PROCUREMENT SPECIFICATION.
- d. OTHER MATERIAL CODES - NONE.

REV. E				
AS1004				
3. FINISH: a. NO CODE LETTER AND MATERIAL CODE LETTER F - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2. b. MATERIAL CODE LETTER D - ANODIZE PER AMS 2472 OR MIL-A-8625, TYPE II, CLASS 2, DYE GREEN SIMILAR TO COLOR 14187 OF FED-STD-595. c. MATERIAL CODE LETTERS J, K, R AND S - PASSIVATE PER AMS-QQ-P-35, TYPE VI OR VII. d. MATERIAL CODE LETTER T - FLUORIDE PHOSPHATE CONVERSION COAT PER AMS 2486 OR ANODIZE PER AMS 2488, TYPE 2. e. MATERIAL CODE LETTER W - ANODIZE PER AMS 2472 OR MIL-A-8625, TYPE II, CLASS 2, DYE BROWN SIMILAR TO COLOR 10080 OF FED-STD-595. /4/ PROCUREMENT SPECIFICATION: AS18280 EXCEPT AS SPECIFIED ON THIS STANDARD. THIS PRODUCT SHALL BE QUALIFIED IN ACCORDANCE WITH SPECIFICATION AS18280. CHANGE-OVER FROM USER-QPL SHALL BE PERFORMED IN ACCORDANCE WITH AS18280 AND COMPLETED WITHIN ONE YEAR FROM THE DATE OF ISSUE OF PRI-QPL-AS18280. USERS OF THIS STANDARD SHALL PROCURE THIS PRODUCT FROM ACCREDITED MANUFACTURER(S), OR THEIR PERFORMANCE REVIEW INSTITUTE (PRI) ACCREDITED DISTRIBUTOR(S), LIST QPL-AS18280 FOR THIS STANDARD. /5/ IDENTIFICATION AT LOCATION SHOWN: MARK PER AS478 CLASS C OR D OR METHOD 7A3, 15A3, OR 15B. a. FOR SIZE 06 AND SMALLER MANUFACTURER'S NAME, CAGE CODE OR TRADEMARK, LETTERS "AS" AND MATERIAL CODE LETTER. b. FOR SIZE 08 AND LARGER, MANUFACTURER'S NAME, CAGE CODE OR TRADEMARK, BASIC PART NUMBER AND MATERIAL CODE LETTER. 6. INVENTORIED PARTS CONFORMING TO THE PREVIOUS ISSUE MAY BE USED TO DEPLETION. 7. INTENDED USE: THIS PART IS DESIGNED FOR USE IN TUBING CONNECTION SYSTEMS WITH NOMINAL OPERATION PRESSURES AS FOLLOWS: a. SIZES 02 THROUGH 24 IN ALL OTHER MATERIALS AT 3000 psi. b. SIZES 02 THROUGH 20 IN ALUMINUM ALLOY AND SIZE 20 THROUGH 32 IN ALL OTHER MATERIALS AT 1500 psi. c. SIZE 24 IN ALUMINUM ALLOY AT 1000 psi. d. SIZE 32 IN ALUMINUM ALLOY AT 600 psi. THIS PART MAY BE SUITABLE FOR USE AT OPERATING PRESSURES OF 4000 OR 5000 psi PER AS4444. THIS PART SHOULD THEN BE QUALIFIED TO AS4444 AND THE USER IS ADVISED TO CONTROL SOURCE APPROVAL. 8. FOR REDUCER CONFIGURATIONS, THE PRESSURE RATING IS DETERMINED BY THE LARGEST PORT. 9. THE NON-REDUCER CONFIGURATION WITHOUT A SUFFIX PART NUMBER CODE IS THE FUNCTIONAL EQUIVALENT OF AS21904 FOR THE CORRESPONDING FORGING SIZE AND IS INTENDED TO BE SUITABLE AS A REPLACEMENT STANDARD. 10. WHEN MACHINING FROM BAR STOCK OR OVERSIZED FORGING, THE CENTER BODY DIMENSIONS SHALL CONFORM TO AS1376, TABLE 2. /11/ THE DIMENSIONS IN THE TABLE ARE FOR FINAL MACHINED PARTS. THE FORGING SIZE IS DETERMINED AS THE SIZE NECESSARY TO MAKE THE LARGEST FITTING END. /12/ WEIGHTS ARE FOR NON-REDUCERS ONLY. REDUCER FITTINGS WILL HAVE LOWER WEIGHTS. /13/ REDUCER FITTINGS WHICH FALL IN THE SHADED AREA OF TABLE 2 SHOULD BE AVOIDED. IF THEY MUST BE USED, SPECIAL ATTENTION SHOULD BE GIVEN TO CLAMPING OR OTHER MEANS TO PROTECT THE SMALLER PORT OR TUBE. 14. THE 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. 15. INTERPRETATION OF DRAWING PER ARP4296. 16. SURFACE TEXTURE: SYMBOLS PER ASME Y14.36M; REQUIREMENTS PER ASME B46.1. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACES TO BE 125 µin Ra. FORGED SURFACES MAY BE 250 µin Ra. 17. BREAK ALL SHARP EDGES .003 TO .015 UNLESS OTHERWISE SPECIFIED. 18. DIMENSIONING AND TOLERANCING: ASME Y14.5M-1994. 19. DIMENSIONING IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: LINEAR DIMENSIONS ±.016, ANGULAR DIMENSIONS ±0°30'.				
 An SAE International Group		AEROSPACE STANDARD (R) FITTING, ELBOW, 90°, STANDARD AND REDUCER, FLARELESS	AS1004 SHEET 4 OF 5	REV. E