Designation: F 2062 – 00

Standard Specification for Square Drive Interconnections on Surgical Instruments[1]

This standard is issued under the fixed designation F 2062; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification applies to interconnections of surgical instruments used for drilling, tapping, driving, or placing of medical devices during surgery.

1.2 This specification includes dimensions and tolerances for both driving and driven elements.

1.3 The values stated in SI units are to be regarded as the standard. Inch-pound values are in separate tables.

1.4 The specifications given in ASME B107.4M-1995 are designed for industrial applications and are considered to loose for surgical applications. Springs used for industrial applications are generally made from carbon steel and are capable of higher loads than their stainless steel counterparts. The specifications given in this standard have been written to lessen the chance of accidental disengagement of surgical instruments. This accidental disengagement could injure the patient or end user, or damage or contaminate the instrument.

2. Referenced Documents

2.1 *ASTM Standards:*

F 899 Specification for Stainless Steel Billet, Bar, and Wire for Surgical Instruments[2]

2.2 *Other Standard:*

ASME B107.4M-1995 (Revision of ANSI B107.4-1982), Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools Percussion Tools Excluded[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *drilling*—the act of forming a hole.

3.1.2 *driving*—the act of turning, pushing, or pulling a surgical instrument to place a medical device during surgery.

3.1.3 *square drive*—a male or female interconnection with four driving surfaces that are of equal width and perpendicular to each other.

3.1.4 *tapping*—the act of forming threads.

4. Material

4.1 This specification is intended to apply only to stainless steel instruments that conform to Specification F 899. If other types of materials are used to interconnect with stainless steel instruments, then they should adhere to this specification.

5. Gage Use and Design

5.1 Tables 1-8 are descriptive and not restrictive, and are not intended to preclude the manufacture of product or gages which are otherwise in accordance with this specification.

5.2 Manufacturers may use gages with tighter dimensions or tolerances than shown herein to ensure device acceptance.

5.3 The extreme size for all limit (GO and NO-GO) gages shall not exceed the extreme limits of interconnections specified within this specification. All variations (manufacturing tolerance, calibration error, wear allowance, and so forth) in the gages, whatever their cause or purpose, shall bring these gages within the extreme limits of the gage size specified in this specification. Thus, a gage representing a minimum limit may be larger, but never smaller, than the minimum size specified for the interconnection in this specification; likewise, a gage representing a maximum limit may be smaller, but never larger, than the maximum size specified for the interconnection in this specification.

6. Keywords

6.1 instrument; interconnection; square drive; surgical

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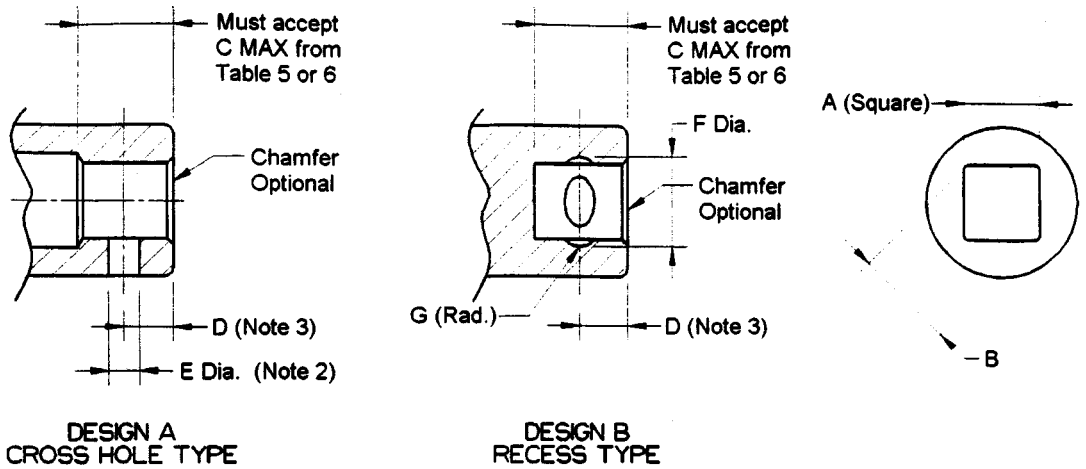
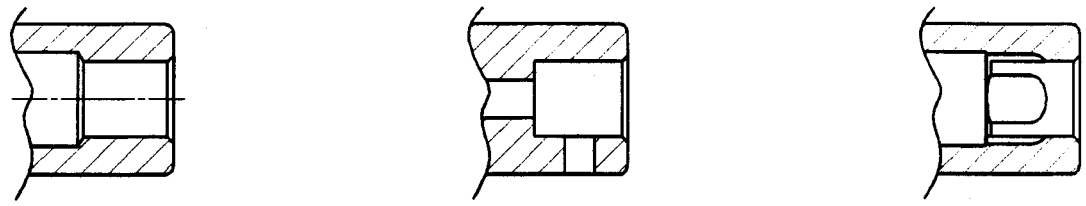
[1] This specification is under the jurisdiction of ASTM Committee F04 on Medical and Surgical Materials and Devices and is the direct responsibility of Subcommittee F04.33 on Medical/Surgical Instruments.

Current edition approved Nov. 10, 2000. Published February 2001.

[2] *Annual Book of ASTM Standards*, Vol 13.01.

[3] Available from American Society of Mechanical Engineers, 345 E. 47th St. New York, NY 10017





OPTIONAL CROSS SECTIONS

NOTES:

(1) Square tolerances shall be such as to insure acceptance when gauged with gages conforming to Table 2.

(2) Design A requires cross hole to be on one, two, or four sides. Recess Design B must require radius G to be on all four sides.

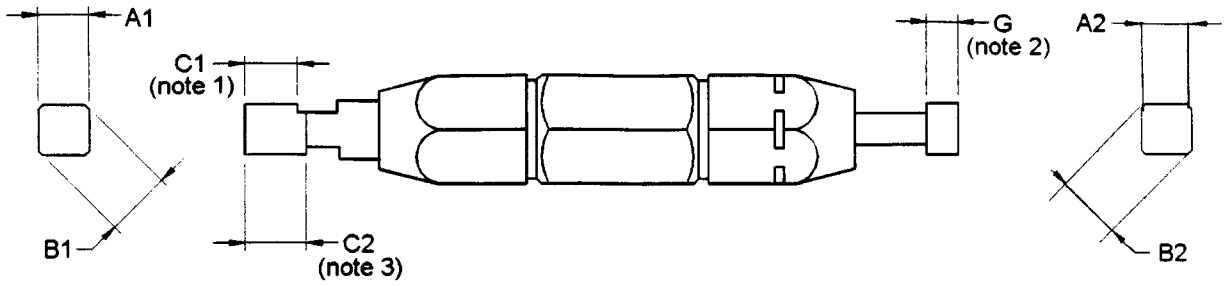
(3) D MAX (Tables 1 & 2) doesn't equal D MIN (Tables 5 & 6); however, due to edge radius, plunger diameter, and square dimension interactions, no interference or interchangeability problem exists.

TABLE 1 Square Drive Specifications – Female End, mm

Drive Size		A (square)		B	D (Note 3)		E (Note 2)	F (diameter)		G (radius)	
mm	in.	max	min	min	max	min	min	max	min	max	min
4.76	0.1875	4.88	4.80	6.68	3.30	3.05	1.98	6.25	6.15	1.32	1.07
6.35	0.2500	6.48	6.38	8.51	3.94	3.43	2.29	7.75	7.49	1.73	1.47
9.53	0.3750	9.70	9.60	13.13	5.84	5.33	4.32	10.92	10.41	2.41	2.16

TABLE 2 Square Drive Specifications – Female End, in.

Drive Size		A (square)		B	D (Note 3)		E (Note 2)	F (diameter)		G (radius)	
in.	mm	max	min	min	max	min	min	max	min	max	min
0.1875	4.76	0.192	0.189	0.263	0.130	0.120	0.078	0.246	0.242	0.052	0.042
0.2500	6.35	0.255	0.251	0.335	0.155	0.135	0.090	0.305	0.295	0.068	0.058
0.3750	9.53	0.382	0.378	0.517	0.230	0.210	0.170	0.430	0.410	0.095	0.085



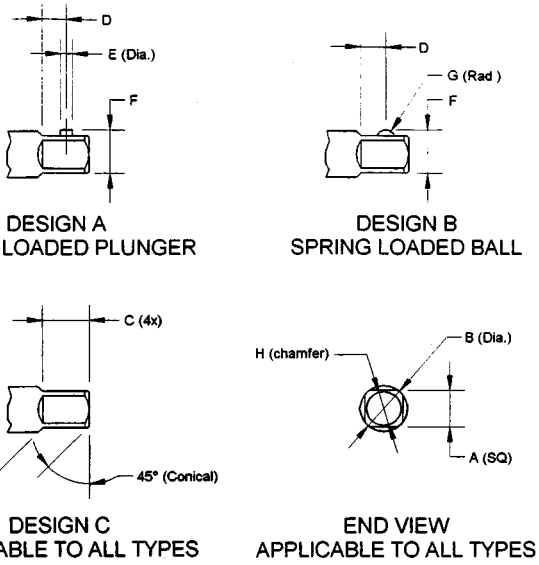
NOTES:
(1) Minimum length requirement from table 5 or 6.
(2) Minimum length for NO GO gage.
(3) Optional maximum length gage from table 5 or 6.

TABLE 3 Square Drive Gage Specifications – Female End, mm

Drive Size		A1	A2	B1	B2	C1	C2	G
mm	in.	+0.005 –0.000	+0.000 –0.005	+0.005 –0.005	+0.038 –0.038	+0.005 –0.000	+0.000 –0.005	min
4.76	0.1875	4.801	4.877	6.680	6.553	6.350	6.604	1.981
6.35	0.2500	6.375	6.477	8.509	8.331	7.366	7.874	2.286
9.53	0.3750	9.601	9.703	13.132	13.005	10.592	11.100	4.318

TABLE 4 Square Drive Gage Specifications – Female End, in.

Drive Size		A1	A2	B1	B2	C1	C2	G
mm	in.	+0.0002 –0.0000	+0.0000 –0.0002	+0.0002 –0.0002	+0.0015 –0.0015	+0.0002 –0.0000	+0.0000 –0.0002	min
0.1875	4.76	0.1890	0.1920	0.2630	0.2580	0.2500	0.2600	0.0780
0.2500	6.35	0.2510	0.2550	0.3350	0.3280	0.2900	0.3100	0.900
0.3750	9.53	0.3780	0.3820	0.5170	0.5120	0.4170	0.4370	0.1700



DESIGN A
SPRING LOADED PLUNGER

DESIGN B
SPRING LOADED BALL

DESIGN C
APPLICABLE TO ALL TYPES

END VIEW
APPLICABLE TO ALL TYPES

TABLE 5 Square Drive Specifications – Male End, mm

Drive Size		A (square)		B (dia)	C		D (Note 1)		E	F (lock height)		G (radius)		H
mm	in.	max	min	±0.002	max	min	max	min	min	max	min	max	min	max
4.76	0.1875	4.75	4.70	6.35	6.60	6.35	3.43	3.18	5.33	5.59	5.33	1.30	1.17	4.50
6.35	0.2500	6.35	6.30	7.92	7.87	7.37	4.19	3.81	6.86	7.36	6.86	1.70	1.57	6.10
9.53	0.3750	9.53	9.45	12.70	11.10	10.59	5.56	5.44	10.34	10.97	10.34	2.49	2.36	9.27

TABLE 6 Square Drive Specifications – Male End, in.

Drive Size		A (square)		B (dia)	C		D (Note 1)		E	F (lock height)		G (radius)		H
in.	mm	max	min	±0.002	max	min	max	min	min	max	min	max	min	max
0.1875	4.76	0.187	0.185	0.250	0.260	0.250	0.135	0.125	0.210	0.220	0.210	0.051	0.046	0.177
0.2500	6.35	0.250	0.248	0.312	0.310	0.290	0.165	0.150	0.270	0.290	0.270	0.067	0.062	0.240
0.3750	9.53	0.375	0.372	0.500	0.437	0.417	0.219	0.214	0.407	0.432	0.407	0.098	0.093	0.365

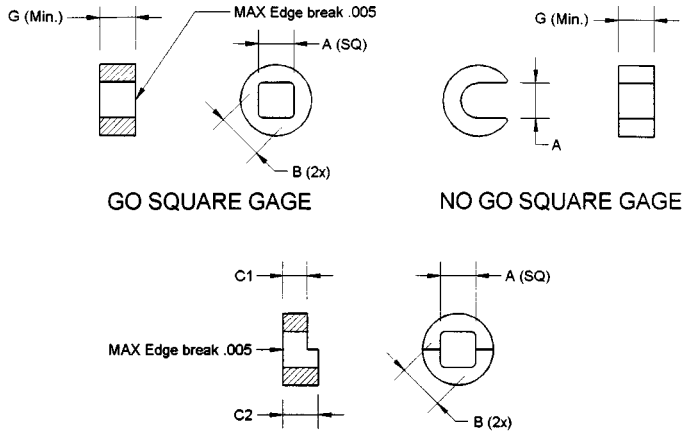


TABLE 7 Square Drive Gage Specifications – Male End, mm

Drive Size		A1	A2	B1	C1	C2	G
mm	in.	+0.005 –0.000	+0.000 –0.005	min	+0.005 –0.000	+0.000 –0.005	min
4.76	0.1875	4.750	4.699	6.680	6.350	6.604	1.981
6.35	0.2500	6.350	6.299	8.509	7.366	7.874	2.286
9.53	0.3750	9.525	9.449	13.132	10.592	11.100	4.318

TABLE 8 Square Drive Gage Specifications – Male End, in.

Drive Size		A1	A2	B	C1	C2	G
mm	in.	+0.0002 –0.0000	+0.0000 –0.0002	min	+0.0002 –0.0000	+0.0000 –0.0002	min
0.1875	4.76	0.1870	0.1850	0.2630	0.2500	0.2600	0.0780
0.2500	6.35	0.2500	0.2480	0.3350	0.2900	0.3100	0.0900
0.3750	9.53	0.3750	0.3720	0.5170	0.4170	0.4370	0.1700

APPENDIX

(Nonmandatory Information)

X1. RATIONALE

X1.1 The objective of this specification is the provision of guidelines for the physical characteristics of square drive interconnections specifically used for medical device applications. This specification identifies those factors felt to be important to ensure compatibility of square drive interconnections made by various manufacturers.

X1.2 Not all stainless steels listed in Specification F 899 may be appropriate for this application.