

INCH - POUND

MIL-S-24149/2D(SH)

27 March 1989

SUPERSEDING

MIL-S-24149/2C

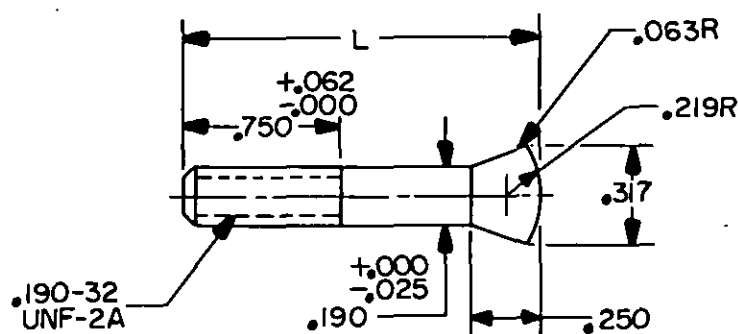
1 June 1981

MILITARY SPECIFICATION SHEET

STUDS, WELDING, AND ARC SHIELDS (FERRULES);
TYPE III, CLASS 1, 2, 3, AND TYPE IV, CLASS 1, 2,
3, 4, 5, 6, ALUMINUM ALLOY, FOR DIRECT ENERGY ARC WELDING

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation: MIL-S-24149(SH).



SH 11898

FIGURE 1. Type III, class 1, stud with threaded end.

AMSC N/A

FSC 5307

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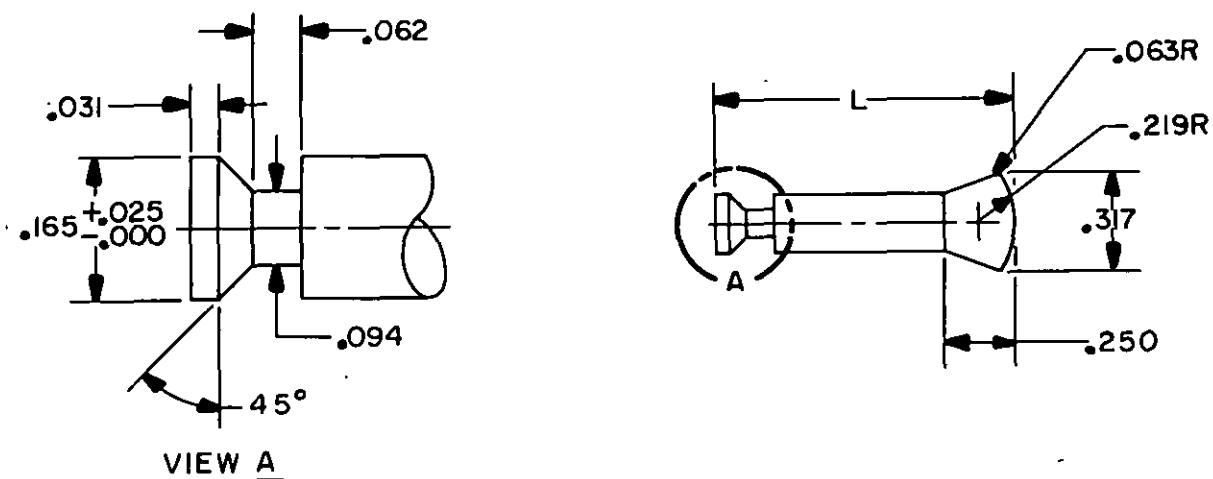
TABLE I. Length part numbers.

L ±0.031	M24149/2 dash no.
1.250	-1
1.375	-2
1.500	-3
1.625	-4
1.750	-5
1.875	-6
2.000	-7
2.250	-8
2.500	-9
2.750	-10
3.000	-11
3.250	-12
3.500	-13

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Dimensions are in inches. Unless otherwise specified, tolerance: *decimals plus or minus 0.015.*

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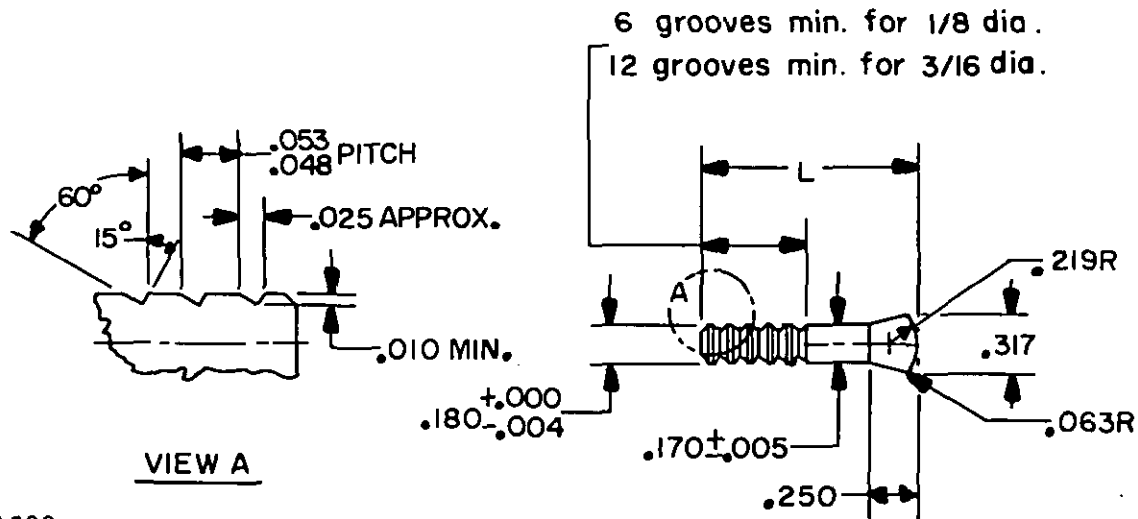
FIGURE 2. Type III, class 2, stud with notched end.TABLE II. Length part numbers.

L ±0.031	M24149/2 dash no.
0.750	-101
.875	-102
1.000	-103
1.125	-104
1.250	-105
1.375	-106
1.500	-107
1.625	-108
1.750	-109
1.875	-110
2.000	-111
2.250	-112
2.500	-113
2.750	-114
3.000	-115

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Dimensions are in inches. Unless otherwise specified, tolerances: decimals plus or minus 0.015, angles plus or minus 2 degrees.

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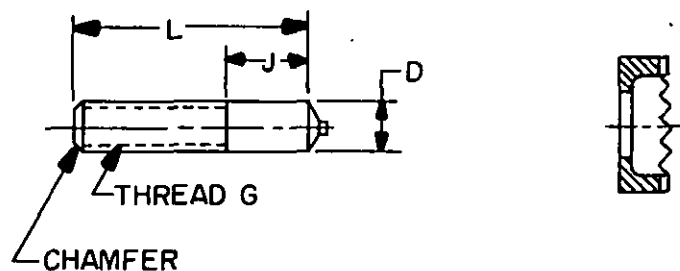
FIGURE 3. Type III, class 3, stud with grooves (annular rings).TABLE III. Length part numbers.

L +0.031	M24149/2 dash no.
0.750	-201
.875	-202
1.000	-203
1.125	-204
1.250	-205
1.375	-206
1.500	-207
1.625	-208
1.750	-209
1.875	-210
2.000	-211
2.250	-212
2.500	-213
2.750	-214
3.000	-215

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Dimensions are in inches. Unless otherwise specified, tolerance: decimals plus or minus 0.015, angles plus or minus 1 degree.

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STUDARC SHIELD (FERRULE)

(SEE NOTE 2)

FIGURE 4. Type IV, class 1, full base threaded stud.TABLE IV. Tabulated dimensions.

G UNC - 2A	D +0.005	J +0.031 -0.000
0.2500-20	0.250	0.313
.3125-18	.312	.375
.3750-16	.375	.406
.3125-18	.312	.343
.3750-16	.375	.390
.5000-13	.500	.515
.4375-14	.437	.468
.5000-13	.500	.500

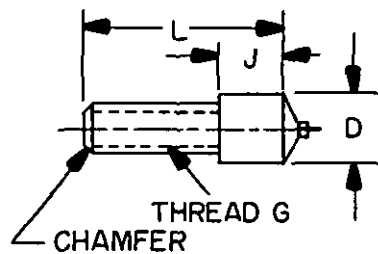
TABLE V. Configuration part numbers.

M24149/2 dash number								
L	0.2500-20	0.3125-18		0.3750-16		0.4375-14	0.5000-13	
+0.031		J= 0.375	J= 0.343	J= 0.406	J= 0.390		J= 0.500	J= 0.515
0.750	-301	---	---	---	---	---	---	---
.875	-302	-309	-337	-316	-344	---	---	---
1.000	-303	-310	-338	-317	-345	-323	-330	-351
1.125	-304	-311	-339	-318	-346	-324	-331	-352
1.250	-305	-312	-340	-319	-347	-325	-332	-353
1.375	-306	-313	-341	-320	-348	-326	-333	-354
1.500	-307	-314	-342	-321	-349	-327	-334	-355
1.625	-308	-315	-343	-322	-350	-328	-335	-356
1.750	---	---	---	---	---	-329	-336	-357

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NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are in inches. Unless otherwise specified, tolerance: decimals plus or minus 0.015.

STUDARC SHIELD (FERRULE)
(SEE NOTE 2)

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FIGURE 5. Type IV, class 2, large shoulder style threaded stud.TABLE VI. Tabulated dimensions.

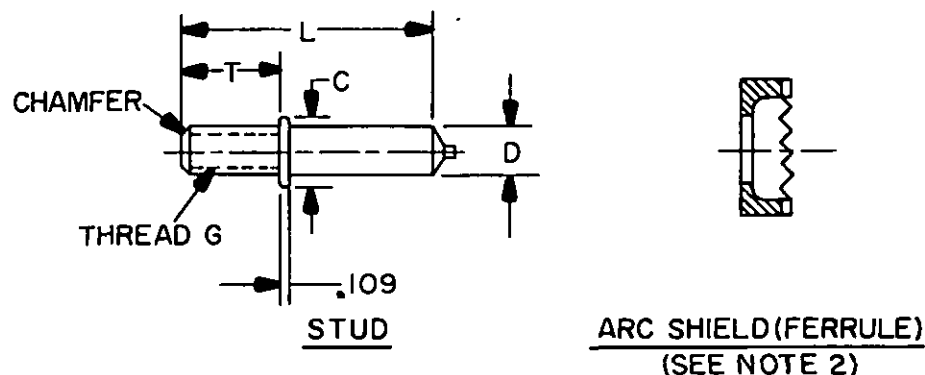
G	D ±0.005	J +0.031 -0.000
0.1900-32UNF-2A	.250	.312
.2500-20UNC-2A	.312	.375
.3125-18UNC-2A	.375	.406
.3750-16UNC-2A	.437	.469
.4375-14UNC-2A	.500	.500

TABLE VII. Configuration part numbers.

L +0.031	M24149/2 dash number				
	0.1900-32	0.2500-20	0.3125-18	0.3750-16	0.4375-14
1.375	--	--	--	-423	--
1.500	-401	--	--	-424	-433
1.625	-402	--	--	-425	-434
1.750	-403	-409	-416	-426	-435
1.875	-404	-410	-417	-427	-436
2.000	-405	-411	-418	-428	-437
2.250	-406	-412	-419	-429	-438
2.500	-407	-413	-420	-430	-439
2.750	-408	-414	-421	-431	-440
3.000	--	-415	-422	-432	-441

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are shown in inches. Unless otherwise specified, tolerance: decimals plus or minus 0.015.



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FIGURE 6. Type IV, class 3, collar stud.

TABLE VIII. Tabulated dimensions.

G UNC-2A	D ±0.005	C 1/ ±0.060
0.2500-20	0.215	0.500
.3125-18	.275	.562
.3750-16	.330	.625
.5000-13	.448	.750

1/ "C" tolerance for the 0.3125-18 size plus .062, minus .000.

TABLE IX. Configuration part numbers.

L +0.031	T		M24149/2 dash number			
	0.3750-16 0.5000-13	0.2500-20 0.3125-18	0.2500-20	0.3125-18	0.3750-16	0.5000-13
1.250	0.500	0.625	-501	--	-510	--
1.375	.625	.625	-502	-506	-511	-533
1.500	.750	.625	-503	-507	-512	-534
1.625	.750	.625	-504	-508	-513	-535
1.750	.750	.625	-505	-509	-514	-536
1.875	.750	--	--	--	-515	-537
2.000	.750	--	--	--	-516	-538
2.250	.750	--	--	--	-517	-539
2.500	.750	--	--	--	-518	-540

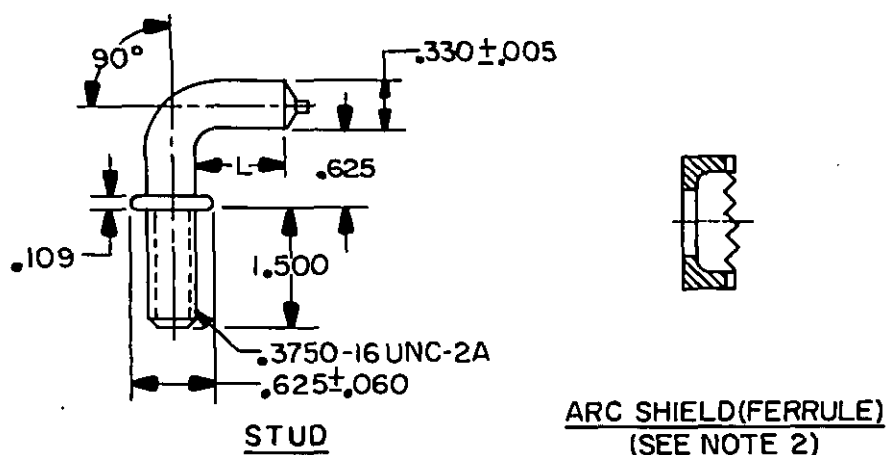
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TABLE IX. Configuration part numbers. - Continued

L +0.031	T		M24149/2 dash number			
	0.3750-16 0.5000-13	0.2500-20 0.3125-18	0.2500-20	0.3125-18	0.3750-16	0.5000-13
2.750	0.750	--	--	--	-519	-541
3.000	.750	--	--	--	-520	--
3.250	.750	--	--	--	-521	--
3.500	.750	--	--	--	-522	--
3.750	.750	--	--	--	-523	--
4.000	.750	--	--	--	-524	--
4.250	.750	--	--	--	-525	--
4.500	.750	--	--	--	-526	--
4.750	.750	--	--	--	-527	--
5.000	.750	--	--	--	-528	--
5.250	.750	--	--	--	-529	--
5.500	.750	--	--	--	-530	--
5.750	.750	--	--	--	-531	--
6.000	.750	--	--	--	-532	--

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are in inches. Unless otherwise specified, tolerance: decimals plus or minus 0.015.



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FIGURE 7. Type IV, class 4, angle collar stud.

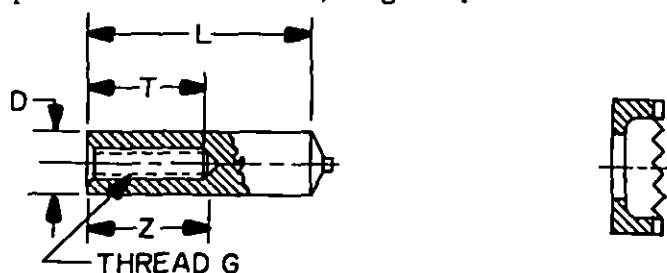
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TABLE X. Length part numbers.

L ± 0.031	M24149/2 dash no.
1.000	-601
1.125	-602
1.250	-603
1.375	-604
1.500	-605
1.625	-606
1.750	-607
1.875	-608
2.000	-609
2.250	-610

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are in inches. Unless otherwise specified, tolerances: decimals plus or minus 0.015, angles plus or minus 2 degrees.



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STUDARC SHIELD(FERRULE)
(SEE NOTE 2)FIGURE 8. Type IV, class 5, internal thread stud, full base.TABLE XI. Tabulated dimensions.

G UNC-2B	D ± 0.005	T min	Z $+0.060$ -0.000
0.2500-20	0.375	0.375	0.515
.3125-18	.437	.468	.624
.3750-16	.500	.562	.733

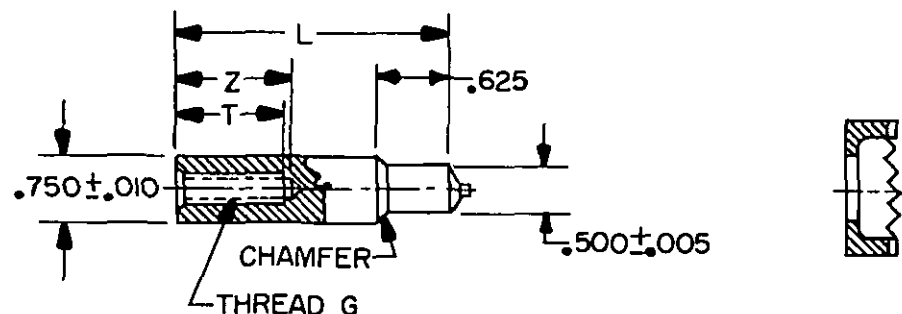
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TABLE XII. Configuration part numbers.

L + 0.031	M24149/2 dash number		
	0.2500-20	0.3125-18	0.3750-16
1.000	--	-711	--
1.125	-701	-712	--
1.250	-702	-713	-722
1.375	-703	-714	-723
1.500	-704	-715	-724
1.625	-705	-716	-725
1.750	-706	-717	-726
1.875	-707	-718	-727
2.000	-708	-719	-728
2.250	-709	-720	-729
2.500	-710	-721	-730
2.750	--	--	-731
3.000	--	--	-732

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are shown in inches. Unless otherwise specified, tolerances: decimals plus or minus 0.015.



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STUDARC SHIELD (FERRULE)
(SEE NOTE 2)

FIGURE 9. Type IV, class 6, internal thread stud reduced base.

TABLE XIII. Tabulated dimensions.

G UNC-2B	T min	Z +0.060 -0.000
0.3750-16	0.563	0.734
.4375-14	.656	.843
.5000-13	.750	.953

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TABLE XIV. Configuration part numbers.

L +0.031 -0.000	M24149/2 dash number		
	0.3750-16	0.4375-14	0.5000-13
1.750	-801	--	--
1.875	-802	-809	--
2.000	-803	-810	-816
2.250	-804	-811	-817
2.500	-805	-812	-818
2.750	-806	-813	-819
3.000	-807	-814	-820
3.250	-808	-815	-821

NOTES:

1. Length "L" shown is the overall length of the stud before welding. The stud will be approximately 1/8 to 3/16 inch shorter after welding.
2. Part number includes the stud and the arc shield (ferrule).
3. Dimensions are in inches. Unless otherwise specified, tolerances: decimals plus or minus 0.015.

REQUIREMENTS:

1. Materials:
 - (a) Studs - Aluminum alloy
 - (b) Arc shields (ferrules) - Heat-resistant ceramic
2. Tensile strength of stud - 35,000 lb/in², minimum.
3. Chemical composition - Studs shall be of the chemical compositions indicated in table XV at the option of the contractor.

TABLE XV. Chemical composition (single values are maximum).

Alloy no.	Copper	Mag- nesium	Man- ganese	Sil- icon	Iron	Zinc	Tita- nium	Chro- mium	Others		Alumi- num
									Each	Total	
5083	0.10	4.0/4.9	0.30/1.0	0.40	0.40	0.40	0.15	0.05/.25	0.05	0.15	Remainder
5086	.10	3.5/4.5	.20/.70	.40	.50	.25	.15	.05/.25	.05	.15	Remainder
5356	.10	4.5/5.5	.05/.20	.25	.46	.10	.06/.20	.05/.20	.05	.15	Remainder
5456	.10	4.7/5.5	.50/1.0	.25	.46	.25	.20	.05/.20	.05	.15	Remainder

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4. Weld-end design - The stud manufacturer shall be responsible for design of weld ends that will provide a sound weld when used with the proper ferrule.
5. Part number - The part number consists of the prefix letter "M" and the specification sheet number plus the applicable dash number.

Examples:

M24149/2-7	Type III, class 1 welding stud, 0.1900-32 UNF-2A thread, 2.000 inch length.
M24149/2-708	Type IV, class 5 welding stud, 0.2500-20 UNC-2B thread, 2.000 inch length.

NOTES:

1. Changes from previous issue - Revision letters are not used to denote changes due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project 5307-N025)