

MIL-B-5046D (ASG)

19 SEPTEMBER 1968

Superseding
MIL-B-5046C (ASG)
30 September 1954

MILITARY SPECIFICATION

BOARD, CHART-PLOTTING, MARK 7

This specification has been approved by the Department of the Air Force and by the Naval Air Systems Command.

1. SCOPE

1.1 Scope.- This specification covers design and all performance requirements for procurement of kneepad type, lighted chart-plotting boards.

1.2 Classification.- The chart-plotting board covered by this specification is designated as Mark 7.

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:

SPECIFICATIONS

Federal

QQ-P-416	Plating, Cadmium (Electrodeposited)
PPP-B-601	Boxes, Wood, Cleated-Plywood
PPP-B-621	Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	Box, Fiberboard
PPP-T-60	Tape: Pressure Sensitive Adhesive, Waterproof, for Packaging

Military

MIL-W-76	Wire and Cable, Hook-Up, Electrical, Insulated
MIL-P-116	Preservation, Methods of
MIL-T-5422	Testing, Environmental, Aircraft Electronic Equipment
MIL-E-5557	Enamel; Heat-Resisting, Glyceryl-Phthalate, Black
MIL-E-5558	Enamel; Wrinkle-Finish, for Aircraft Use
MIL-P-8585	Primer Coating; Zinc Chromate, Low-Moisture-Sensitivity
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-L-10547	Liners, Case, and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible

FSC 6660

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STANDARDS

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-143	Specifications and Standards, Order of Precedence for the Selection of

DRAWINGSNaval Aircraft Factory Drawings

402383	Ruler - Navigational
501424	Chart Plotting Board - Grid and Face Plate, Mark 7
63A122H1 (Buweps)	Chart Plotting Board Mark 7

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.- 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 bids or request for proposal shall apply.

Uniform Classification Committee

Uniform Freight Classification Rules

(Application for copies of the above publication should be addressed to the Uniform Classification Committee, 202 Chicago Union Station, Chicago, Ill. 60606.)

3. REQUIREMENTS

3.1 Materials.- Materials shall conform to applicable specifications as specified on Drawings 402383, 501424, and 63A122H1. Materials which are not covered by applicable specifications or which are not specifically described herein shall be of the best quality, of the lightest practicable weight, and suitable for the purpose intended. The materials shall be capable of withstanding the effects of conditions likely to occur during service usage.

3.1.1 Selection of materials.- Specifications and standards for all materials, parts, and Government certification and approval of processes and equipment, which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with MIL-STD-143, except as provided in 3.1.1.1.

3.1.1.1 Standard parts.- Standard parts (MS or AN) shall be used wherever they are suitable for the purpose, and shall be identified on the drawing by their part numbers. Commercial utility parts, such as screws, bolts, nuts, and cotter pins may be used, provided they possess suitable properties and are replaceable by the standard parts (MS or AN) without alteration, and provided the corresponding standard part numbers are referenced in the parts list and, if practicable, on the contractor's drawings. In the event there is no suitable corresponding standard part in effect on date of invitation for bids, commercial parts may be used provided they conform to all requirements of this specification.

3.2 Design and construction.- The chart-plotting board shall conform to Drawings 501424 and 63A122H1, and shall consist of a plastic plotting-board assembly securely attached to a hinged cover of the metal chartboard. The chartboard shall be capable of being secured to the leg by means of an elastic leg strap and a swivel disk-type mounting assembly. The leg strap shall be provided with a quick detachable-type buckle, as shown on Drawing 63A122H1. The plotting-board assembly shall be provided with a lighting system, the details of which shall conform to Drawing 63A122H1. The boards shall be supplied without batteries.

3.2.1 Plotting board.- The upper surface of the plotting board, as shown on Drawing 501424, shall be so finished that it will readily take pencil markings and continue to do so after repeated erasures. The plotting-board face shall be sufficiently transparent to render the rotatable grid disk markings clearly visible. The general arrangement and location of the scales shall be as shown on Drawing 501424.

3.2.1.1 Compass rose scale.- The compass rose scale shall be a circular scale graduated in 1-degree markings beginning with the letter "N" placed at the top and on the vertical centerline of the plotting board. The scale graduations shall be accurate to within 1/10 degree.

3.2.1.2 YE-ZB ring.- The YE-ZB ring shall be marked off in 30-degree segments, and shall be located at the upper-left-hand corner of the face plate.

3.2.1.3 Slide rule scale.- The portion of the slide rule scale placed on the underside of the plotting-board surfaces shall have the numeral "60" of the scale placed at the top and on the vertical centerline of the plotting board. The angular values used to lay out the slide rule shall be as specified in table I, using the vertical centerline of the plotting board as the reference point. Scale markings shall be so located as not to interfere with the scale graduations. A prominent black index shall be placed at the 60-minute mark to facilitate computations. A transparent, circular window shall be provided adjacent to the slide rule scale, in order that the matching slide rule scale of the rotatable grid disk will be visible. The window shall be transparent through 360 degrees.

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3.2.1.4 Altitude correction scale.- The altitude correction scale shall consist of the air-temperature scale, located on the rotatable grid disk, and the pressure-altitude scale, located on the face of the plotting board. The range of the pressure altitude scale shall be from -2,000 to 34,000 feet, graduated every 2,000 feet. An index shall be located at a point on the pressure-altitude scale equivalent to 35,332 feet, as shown on Drawing 501424. A transparent window shall be provided in the face of the plotting board, in order that the air-temperature scale on the rotatable grid disk shall be clearly visible. The angular values used to lay out the pressure-altitude scale shall be as specified in table II, using the vertical centerline of the plotting board as the reference point.

3.2.1.5 True airspeed scale.- The true airspeed scale shall consist of the "Air-temperature scale"; located on the face of the plotting board, and the pressure-altitude scale, located on the rotatable grid disk. The range of the air-temperature scale shall be from -80° C to +50° C, graduated every 5 degrees. A transparent window shall be provided in the face of the plotting board, in order that the pressure-altitude scale on the rotatable grid disk will be visible. The angular values used to lay out the air-temperature scale shall be as specified in table III, using the vertical centerline of the plotting board as the reference point.

3.2.1.6 Density altitude scale.- The density altitude scale shall be located on the rotatable grid disk, and shall be visible through a transparent window provided in the face of the plotting board.

3.2.1.7 Data card.- The data card shall be in accordance with Drawing 501424.

3.2.2 Rotatable grid disk.- The rotatable grid disk shall be of white opaque vinyl-copolymer resin, or other suitable plastic material, having minimum water-absorption qualities. The two sides of the disk shall be provided with markings conforming to Drawing 501424. The surface of each side of the grid disk shall be suitably treated to take pencil markings for writing in an optional scale along the "true index" line. The surface area, so treated on each side of the disk, shall be limited to a 1/2-inch wide strip centered over the "true index" line.

3.2.2.1 Slide rule scale.- The slide rule scale of the rotatable grid disk shall conform to the requirements specified herein for the scale, as specified in 3.5.1, except for the markings. The markings shall conform to Drawing 501424. Prominent indexes shall be placed at the markings corresponding to 33, 38, and 61, and shall be labeled "NAUT.", "STAT.", AND "KM", respectively. The numeral "60" shall be placed exactly opposite one end of the "true index" line.

3.2.2.2 Altitude correction scale.- The range of the air-temperature scale shall be from -80° C to +50° C, and shall be graduated every 5 degrees. The angular values used to lay out the air-temperature scale shall be as specified in table IV, using the "60" end of the "true index" line as the reference point.

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TABLE I. Slide rule scale

Number miles and minutes	Angular position		Number miles and minutes	Angular position	
	Degrees	Minutes		Degrees	Minutes
600	00	00	100	79	52
610	02	35	101	81	25
620	05	08	102	82	58
630	07	38	103	84	29
640	10	06	104	86	00
650	12	31	105	87	30
660	14	54	106	88	59
670	17	15	107	90	27
680	19	34	108	91	54
690	21	51	109	93	21
700	24	06	110	94	46
710	26	19	111	96	11
720	28	30	112	97	35
730	30	40	113	98	59
740	32	47	114	100	21
750	34	53	115	101	43
760	36	58	116	103	04
770	39	00	117	104	25
780	41	01	118	105	45
790	43	01	119	107	04
800	44	59	120	108	22
810	46	55	122	110	57
820	48	50	124	113	30
830	50	44	126	116	00
840	52	37	128	118	28
850	54	28	130	120	53
860	56	17	132	123	16
870	58	06	134	125	37
880	59	53	136	127	56
890	61	39	138	130	13
900	63	24	140	132	28
910	65	07	142	134	41
920	66	50	144	136	53
930	68	31	146	139	02
940	70	12	148	141	10
950	71	51	150	143	16
960	73	29	152	145	20
970	75	06	154	147	22
980	76	43	156	149	23
990	78	18	158	151	23

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TABLE I. Slide rule scale (continued)

Number miles and minutes	Angular position		Number miles and minutes	Angular position	
	Degrees	Minutes		Degrees	Minutes
160	153	21	240	216	45
162	155	18	242	218	03
164	157	13	244	219	20
166	159	06	246	220	36
168	160	59	248	221	52
170	162	50	250	223	08
172	164	40	255	226	13
174	166	28	260	229	15
176	168	15	265	232	14
178	170	01	270	235	09
180	171	46	275	238	02
182	173	30	280	240	51
184	175	12	285	243	37
186	176	53	290	246	20
188	178	34	295	249	00
190	180	13	300	251	38
192	181	51	305	254	13
194	183	29	310	256	45
196	185	05	315	259	16
198	186	40	320	261	43
200	188	14	325	264	09
202	189	48	330	266	32
204	191	20	335	268	53
206	192	52	340	271	12
208	194	22	345	273	29
210	195	52	350	275	44
212	197	21	355	277	57
214	198	49	360	280	08
216	200	16	365	282	17
218	201	43	370	284	25
220	202	68	375	286	31
222	204	33	380	288	35
224	205	57	385	290	38
226	207	21	390	292	39
228	208	43	395	294	39
230	210	05	400	296	37
232	211	27	405	298	33
234	212	47	410	300	28
236	214	07	415	302	22
238	215	26	420	304	14

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TABLE I. Slide rule scale (continued)

Number miles and minutes	Angular position		Number miles and minutes	Angular position	
	Degrees	Minutes		Degrees	Minutes
425	306	05	515	336	07
430	307	55	520	337	38
435	309	43	525	339	07
440	311	31	530	340	36
445	313	17	535	342	04
450	315	01	540	343	32
455	316	45	545	344	58
460	318	28	550	346	24
465	320	09	555	347	49
470	321	49	560	349	13
475	323	29	565	350	36
480	325	07	570	351	59
485	326	44	575	353	21
490	328	20	580	354	42
495	329	56	585	356	03
500	331	30	590	357	22
505	333	03	595	358	42
510	334	36			

TABLE II. Pressure-altitude scale (plotting-board face)

Pressure altitude Feet (thousands)	Angular position	
	Degrees	Minutes
-2	53	08
0	51	00
2	48	50
4	46	38
6	44	25
8	42	09
10	39	51
12	37	32
14	35	10
16	32	46
18	30	20
20	27	52
22	25	21
24	22	47
26	20	11
28	17	33
30	14	52
32	12	08
34	09	21
35,332 (Index)	07	28

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TABLE III. Air-temperature scale (true airspeed)

Air temperature Degrees C	Angular position	
	Degrees	Minutes
50	197	02
45	198	15
40	199	30
35	200	45
30	202	02
25	203	20
20	204	39
15	206	00
10	207	22
5	208	46
0	210	11
-5	211	38
-10	213	06
-15	214	36
-20	216	08
-25	217	41
-30	219	17
-35	220	54
-40	222	34
-45	224	16
-50	226	00
-55	227	46
-60	229	35
-65	231	26
-70	233	20
-75	235	17
-80	237	17

3.2.2.3 True airspeed scale.- The range of the pressure-altitude scale shall be from -2,000 to +60,000 feet, graduated every 1,000 feet. The angular values used to lay out the pressure-altitude scale shall be as specified in table V, using the "60" end of the "true index" line as a reference point.

3.2.2.4 Density-altitude scale.- The range of the density-altitude scale shall be from -10,000 to +65,000 feet, graduated every 1,000 feet. The angular values used to lay out the density-altitude scale shall be as specified in table VI, using the "60" end of the "true index" line as the reference point.

3.2.3 Chart board.- The chart board shall conform to Drawing 63A122H1, and shall consist of a hinged cover supporting the plotting-board assembly, a metal tray, a swivel disk-type mounting assembly, an elastic leg strap and buckle assembly, and necessary components for internal-and external-lighting systems.

3.2.3.1 Swivel disk assembly.- The swivel disk-type mounting shall provide sufficient friction to hold the chart board in any desired position after rotation in azimuth.

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TABLE IV. Air-temperature scale (altitude correction)

Air temperature Degrees C	Angular position	
	Degrees	Minutes
+50	68	56
+45	66	30
+40	64	01
+35	61	30
+30	58	56
+25	56	20
+20	53	41
+15	51	00
+10	48	16
+ 5	45	28
0	42	38
- 5	39	45
-10	36	48
-15	33	48
-20	30	45
-25	27	37
-30	24	26
-35	21	11
-40	17	52
-45	14	29
-50	11	01
-55	07	28
-60	03	50
-65	03	50
-70	356	19
-75	352	25
-80	348	25

TABLE V. Pressure-altitude scale (true air speed)

Pressure altitude Feet (thousands)	Angular position	
	Degrees	Minutes
-2	200	23
-1	203	11
0	206	00
1	208	50
2	211	42
3	214	34
4	217	28
5	220	23
6	223	19
7	226	17
8	229	15
9	232	16

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TABLE V. Pressure-altitude scale (true air speed) (continued)

Pressure altitude Feet (thousands)	Angular position	
	Degrees	Minutes
10	235	17
11	238	20
12	241	24
13	244	30
14	247	36
15	250	45
16	253	55
17	257	06
18	260	19
19	263	33
20	266	49
21	270	06
22	273	25
23	276	46
24	280	08
25	283	32
26	286	58
27	290	25
28	293	55
29	297	26
30	300	58
31	304	53
32	308	09
33	311	48
34	315	28
35	319	11
36	322	55
37	326	39
38	330	23
39	334	07
40	337	51
41	341	35
42	345	19
43	349	03
44	352	47
45	356	31
46	0	15
47	3	59
48	7	43
49	11	27
50	15	11
51	18	55
52	22	39
53	26	23
54	30	07
55	33	51
56	37	35
57	41	19
58	45	03
59	48	48
60	52	32

TABLE VI. Density-altitude scale

Density altitude Feet (thousands)	Angular position	
	Degrees	Minutes
-10	117	52
- 9	120	01
- 8	122	11
- 7	124	21
- 6	126	33
- 5	128	45
- 4	130	59
- 3	133	12
- 2	135	27
- 1	137	43
0	140	00
1	142	18
2	144	37
3	146	56
4	149	17
5	151	39
6	154	01
7	156	25
8	158	50
9	161	16
10	163	43
11	166	11
12	168	40
13	171	10
14	173	42
15	176	14
16	178	48
17	181	23
18	183	59
19	186	36
20	189	15
21	191	55
22	194	36
23	197	18
24	200	02
25	202	47
26	205	34
27	208	22
28	211	11
29	214	02
30	216	54
31	219	48
32	222	43
33	225	40
34	228	39
35	231	39
36	235	08

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TABLE VI. Density-altitude scale (continued)

Density Altitude Feet (thousands)	Angular position	
	Degrees	Minutes
37	238	52
38	242	36
39	246	21
40	250	05
41	253	49
42	257	33
43	261	17
44	265	01
45	268	45
46	272	29
47	276	13
48	279	57
49	283	41
50	287	25
51	291	09
52	294	53
53	298	37
54	302	21
55	306	05
56	309	49
57	313	33
58	317	17
59	321	01
60	324	45
61	328	29
62	332	13
63	335	57
64	339	41
65	343	25

3.2.3.2 Elastic leg strap and buckle assembly.- The two pieces of the elastic leg strap and buckle shall be so fastened to the swivel disk assembly that, when folded back, the chart board will lie flat on a desk top or similar surface.

3.2.3.3 Lighting system.- The internal- and external-lighting systems shall conform to Drawing 63A122H1 and figure 1. Each system shall provide sufficient illumination of the lighted surface to produce a minimum brightness of 100 microlamberts when each lamp is operated at 3 volts.

3.2.3.3.1 Battery case.- The battery case shall conform to Drawing 63A122H1. In addition to the space provided for the battery, the case shall also contain a combination on-off switch and rheostat to control the intensities of the lighting systems. This rheostat must be a commercially available item.

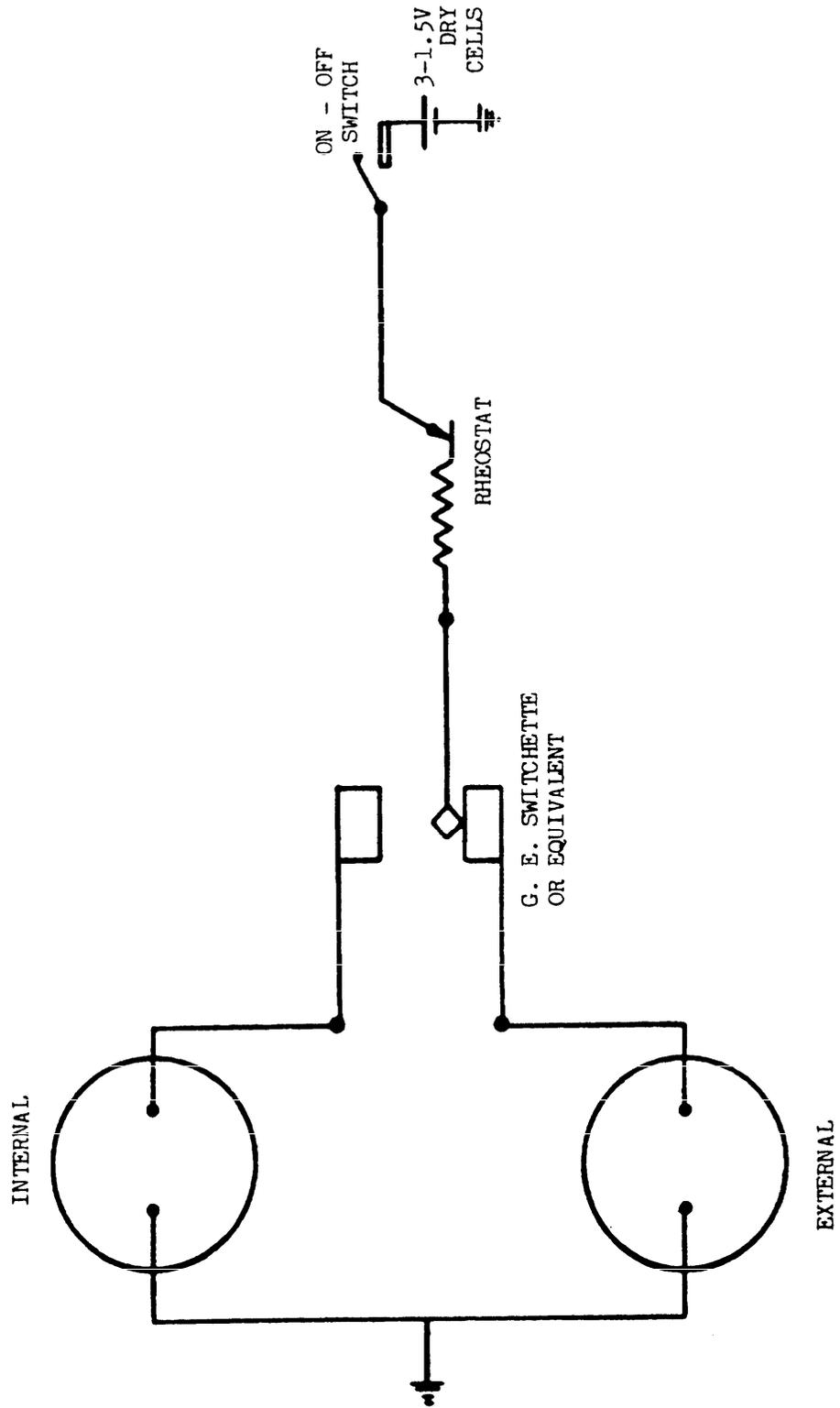


FIGURE 1. Schematic diagram for lighting systems

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3.2.3.3.2 Wiring.- All wiring used in the internal- and external-wiring systems shall be securely and permanently attached to the case in such manner as not to interfere with the normal use of the chart-plotting board. The wire used shall conform to type LW-1(7)-20-J-0 of MIL-W-76.

3.2.3.4 Pencil and ruler.- Each chart board shall be supplied with two eraser-equipped lead pencils at least 6 inches long, sharpened on one end, and a navigational ruler conforming to Drawing 402383.

3.2.3.5 Writing pad.- Each chart board shall be supplied with a 4- by 5-inch writing pad secured to the underside of the metal cover of the chart board.

3.2.3.6 Pencil sharpener.- Each chart board shall be supplied with a commercially available pencil sharpener, permanently attached to the chart board.

3.3 Protective treatment.- When materials are used in the construction of the clipboard that are subject to atmospheric or environmental conditions likely to cause corrosion in normal service life, they shall be protected against corrosion in a manner that will in no way prevent compliance with the performance requirements of this specification. Finishes and protective coatings which will crack, chip, or scale during normal service life or are affected by extremes of atmospheric or environmental conditions shall not be used.

3.3.1 Aluminum-alloy parts.- Aluminum-alloy parts shall be covered with an anodic film conforming to MIL-A-8625.

3.3.2 Steel and brass parts.- Steel and brass parts shall be cadmium plated, where practicable, in accordance with QQ-P-416.

3.3.3 Chart board.- The chart board shall be finished in black, except the surface of the metal cover upon which the grid disk rotates. The latter surface shall be anodized in accordance with MIL-A-8625, but shall not be painted. All other metal surfaces not exposed to wear shall be anodized in accordance with MIL-A-8625 and finished with one coat of MIL-P-8585 zinc-chromate primer, followed by one full wet coat of instrument black color paint conforming to MIL-E-5557, type IV, baked as prescribed by the specification. All metal surfaces exposed to wear shall be similarly finished, except that the black paint and its application shall conform to MIL-E-5558.

3.4 Performance.- The chart-plotting board shall satisfy the performance requirements as specified in section 4, when subjected to the following tests:

- (a) Scale accuracy
- (b) Computation

3.5 Markings.- All markings shall be durable to withstand usage encountered in service, shall be as shown on Drawing 501424, and as specified herein.

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3.5.1 Plotting board.- The lettering, numerals, lines, and scales on the plotting board shall be placed on the underside of the plotting surface, and shall be protected by a layer of vinyl at least 0.005 inch thick.

3.5.2 Rotatable grid disk.- The lettering, numerals, lines, and scales on the rotatable grid disk shall be printed in black on a vinyl-copolymer resin disk, and shall be protected by a layer of transparent vinyl resin 0.005 inch thick. The lines and scales on the rotatable grid disk shall be of hairline thickness.

3.6 Identification of product.-

3.6.1 Nameplate.- A nameplate shall be securely attached to the chart-plotting board, and shall be legibly and permanently marked with the following information in accordance with MIL-STD-130:

BOARD, CHART-PLOTTING, MARK 7
 Specification MIL-B-5046D
 Stock No. (USAF or Navy, as applicable)
 Manufacturer's part No.
 Contract or order No.
 Manufacturer's name or trade-mark
 US

3.6.1.1 Personal nameplate.- A personal nameplate with a suitable writing surface shall be securely attached to the swivel disk assembly, as shown on Drawing 63A122H1.

3.7 Installation instructions.- The contractor shall furnish, with each chart-plotting board, one printed copy of instructions with illustrations and diagrams if necessary. Prior to printing, two copies shall be furnished to the procuring activity for approval. The instructions shall be printed on paper 8-1/2 by 11 or 17 by 11 inches.

3.8 Workmanship.- All details of workmanship shall be in accordance with high-grade instrument manufacturing practice.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the 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 supplies and services conform to prescribed requirements.

4.2 Classification of inspection.- Inspection of the chart-plotting boards shall be classified as follows:

- (a) Preproduction inspection (4.3)
- (b) Quality conformance inspection (4.4)

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4.3 Preproduction inspection.- The preproduction inspection of the chart-plotting boards shall consist of all of the examinations and tests of this specification performed in the order listed herein.

4.3.1 Preproduction inspection sample.- Preproduction inspection samples shall consist of three chart-plotting boards manufactured in accordance with this specification. The samples shall be forwarded at the contractor's expense for preproduction inspection and shall have been previously subjected only to the individual inspection. The samples shall be forwarded to the laboratory designated by the procuring activity (see 6.2).

4.3.1.1 Preproduction inspection sample identification.- The preproduction inspection samples shall be plainly identified by durable tags, securely attached, and marked with the following information:

Sample for preproduction inspection
BOARD, CHART-PLOTTING, MARK 7
Submitted by (manufacturer's name, date)
for preproduction inspection in accordance with
MIL-B-5046D(ASG) under contract or order number
Manufacturer's part number

4.4 Quality conformance inspection.- The quality conformance inspection shall consist of individual tests and sampling tests.

4.4.1 Individual tests.- Each chart-plotting board shall be subjected to the following tests:

- (a) Examination of product (4.6.1)
- (b) Scale accuracy (4.6.2)

4.4.2 Sampling tests.- A random sample from each lot of chart boards shall be selected by the Government inspector in accordance with MIL-STD-105, using inspection level II and acceptable quality level 1.5 percent. Each test sample shall be subjected to computation test (see 4.6.6).

4.4.3 Rejection and retest.-

4.4.3.1 Deterioration.- Corrosion or deterioration on any internal or external components of the chart board which would in any manner prevent the equipment from meeting operational requirements during service life shall be cause for rejection.

4.4.3.2 Rejected chart board samples either shall be replaced with other chart boards or shall be reworked to correct the defects, after which all specified tests shall be repeated. They shall not be resubmitted for inspection without full particulars concerning previous rejection and measures taken to overcome the defects being furnished by the contractor. Lots rejected under the sampling provisions of the specification shall be given 100-percent inspection by the contractor prior to resubmission for inspection.

4.4.3.3 When tests are specified on a quantity of chart boards that are selected as representative of a certain lot, and one or more of this number fails to meet the requirements, additional chart boards of the lot represented shall be tested immediately to determine the cause of failure. Individual performance tests shall not be interrupted, unless the defect is of such nature that it will seriously affect the performance or safe use of the chart boards. When the cause of failure has been determined, the contractor shall incorporate the changes necessary to correct the defects in all the chart boards in that lot.

4.5 All parts, specimens, or assemblies destroyed in making tests required by this specification and drawings, shall be in addition to the quantity specified in the contract or purchase order and shall be furnished without increasing the cost of the contract or order.

4.6 Test methods.-

4.6.1 Examination of product.- Each chart-plotting board shall be carefully examined to determine conformance with the requirements of this specification not covered by tests.

4.6.2 Scale accuracy.- The accuracy of the slide rule scales shall be tested on each chart-plotting board by successively aligning markings on the miles scale with the 10 index on the minutes scale and checking the coincidence of the 2 scales at points in each quadrant. The two scales shall be accurate to within 0.2 percent as specified in table VII.

4.6.3 Buckle strength.- The leg strap shall be cut from the chart-plotting board at the buckle pin. The buckle shall be engaged. One end of the coupled strap shall be clamped in the fixed jaw of a suitable tensile testing machine and the other end clamped in the movable jaw. The movable jaw shall travel at a rate not to exceed 12 inches per minute until a pull of 75 pounds is reached, at which point a tension of 75 pounds shall be maintained for 10 seconds.

4.6.4 Salt spray and humidity tests.- One complete chart-plotting board shall be subjected to the salt spray test of MIL-T-5422. Another complete unit shall be subjected to the humidity test of MIL-T-5422. Both units shall be examined for deterioration of the protective coating applied to the aluminum surfaces. Any cracking or peeling of the protective coating shall be scored as a defect. These environmental tests are not to be regarded as a test of any other characteristic of the chart-plotting board.

4.6.5 Switch cycles.- The light assembly shall be clamped in a horizontal or vertical position. The switch knob shall be connected to a motor-driven gear reducer by means of a flexible coupling (heavy wall rubber tubing, for example) so that there is no strain on the switch. The speed reducer shall run at a speed of 50 to 60 RPM in a clock-wise direction as viewed from the switch end. A lug attached to the speed reducer shaft shall operate a revolution counter. The test may be discontinued by alternately running and stopping the rotation of the switch for periods of equal time of not less than 5 minutes. The test may be discontinued overnight or the weekend. For testing only the light assembly shall be equipped with batteries and light bulb. Failure of the bulb to light shall be indicative of switch failure, provided the bulb has not failed. At the completion of 20,000 cycles the light assembly shall be operative.

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TABLE VII. Scale accuracy

		Maximum	Minimum
Set 10 miles opposite 10 minutes	Opposite 20 minutes read 20 miles	20.04	19.96
	Opposite 40 minutes read 40 miles	40.08	39.92
	Opposite 60 minutes read 60 miles	60.12	59.88
Set 20 miles opposite 10 minutes	Opposite 20 minutes read 40 miles	40.08	39.92
	Opposite 40 minutes read 80 miles	80.16	79.84
	Opposite 60 minutes read 120 miles	120.24	119.76
Set 30 miles opposite 10 minutes	Opposite 20 minutes read 60 miles	60.12	59.88
	Opposite 40 minutes read 120 miles	120.24	119.76
	Opposite 60 minutes read 180 miles	180.36	179.64
Set 50 miles opposite 10 minutes	Opposite 20 minutes read 100 miles	100.20	99.80
	Opposite 40 minutes read 200 miles	200.40	199.60
	Opposite 60 minutes read 300 miles	300.60	299.40

4.6.6 Computation.- The accuracy of the correction scales shall be tested by the solution of the problems of typical atmospheric conditions as shown below. A total error of 0.5 percent shall be allowed as specified in table VIII.

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TABLE VIII. Computation accuracy

True airspeed computations	Maximum	Minimum
Set 0 ft. pressure altitude opposite +15° C; opposite 10 on minutes scale, read 10 on mile scale	10.05	9.95
Set 10,000 ft. pressure altitude opposite 0° C; opposite 315 CAS, read 370 on true A.S. scale	271.85	268.15
Set 40,000 ft. pressure altitude opposite -60° C; opposite 200 CAS, read 400 on true A.S. scale	402.00	398.00
Density altitude computations		
Set 0 ft. pressure altitude opposite +15° C; opposite density altitude scale index, read 0 ft.	+5	-5
Set 17,000 ft. pressure altitude opposite -10° C; opposite index, read 18,000 ft. on density altitude scale	18,100	17,900
Set 40,000 ft. pressure altitude opposite -40° C; opposite index, read 41,393 ft. on density altitude scale	41,600	41,186
Calibrated altitude computations		
Set 15° C opposite 0 ft. pressure altitude; opposite 10 on minute scale, read 10 on mile scale	10.05	9.95
Set 40° C opposite 0 ft. pressure altitude; opposite calibrated altitude 4,600 ft., read 5,000 on corrected altitude scale	5,025	4,975
Set -40° C opposite index for pressure altitude; opposite calibrated altitude 40,000, read 42,750 on corrected altitude scale	42,964	42,536
Compass rose		
Set one end of the true index successively to "N," 45 degrees, 90 degrees, and 135 degrees. While on each of these settings, read opposite the other end of the true index 180 degrees, 225 degrees, and 315 degrees respectively. The error shall be within 1/2 degree.		

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5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging.-

5.1.1 Levels A and B.- Each plotting board shall be packaged in accordance with Method III of MIL-P-116.

5.1.2 Level C.- Each plotting board shall be packaged in a manner which will afford protection against corrosion, deterioration, and physical damage during shipment from supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

5.2 Packing.-

5.2.1 Level A.- A quantity of plotting boards, packaged as specified in 5.1.1, shall be packed in a container conforming to PPP-B-601, PPP-B-621, or PPP-B-636. Unless otherwise specified, shipping containers shall have case liners conforming to MIL-L-10547. Case liners for fiberboard containers conforming to PPP-B-636, weather resistant, may be omitted, provided all center and edge seams and manufacturer's joint of the container are sealed with minimum 2-inch wide tape conforming to PPP-T-60.

5.2.2 Level B.- A quantity of plotting boards, packaged as specified in 5.1.1, shall be packed in a domestic type container conforming to PPP-B-601, PPP-B-621, or PPP-B-636.

5.2.3 Level C.- A quantity of plotting boards, packaged as specified in 5.1.2, shall be packed in a shipping container to insure carrier acceptance and safe delivery at destination. Containers shall be in accordance with Uniform Freight Classification Rules or regulations of other carriers applicable to the mode of transportation.

5.3 Marking.- In addition to any special marking required by the contract or order (see 6.2), shipping containers shall be marked in accordance with MIL-STD-109.

6. NOTES

6.1 Intended use.- The chart-plotting boards covered by this specification are intended for use by pilots for speed-time-distance computations, for calibrated attitude, density altitude, and calibrated airspeed corrections, and for the solution of drift and relative movement problems by vector methods.

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6.2 Ordering data.- Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) The quantity desired.
- (c) The laboratory to which preproduction inspection samples shall be forwarded (see 4.3.1).
- (d) Levels of packaging (see 5.1) and packing (see 5.2) desired.
- (e) Any special marking required (see 5.3).

6.3 Preproduction test provisions.- The manufacture of chart-plotting boards on contract shall not commence until the samples submitted are pronounced satisfactory by the procuring activity. When a contractor is in continuous production of the board from contract to contract, the submission of further preproduction samples on the subsequent contracts may be waived at the discretion of the procuring activity. Approval of preproduction samples or the waiving of preproduction tests does not reduce the requirements for quality conformance inspection.

6.4 Marginal indicia.- Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:
Navy - AS
Air Force - 71

Preparing activity:
Navy - AS

Project No. 6660-0138

Reviewer activities:
Air Force - 11

SPECIFICATION ANALYSIS SHEET

Form Approved Budget
Bureau No. 119-ROO4INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION

MLL-B-5046D(ASG) Board, Chart-Plotting, Mark 7

ORGANIZATION

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

 Direct Government Contract Subcontract

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID.

3. IS THE SPECIFICATION RESTRICTIVE?

 YES NO

IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.)

SUBMITTED BY (Printed or typed name and activity)

DATE

FOLD

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Aeronautical Standards Group
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