MIL-B-1083C
3 MARCH 1964
SUPERSEDING
MIL-B-1083B
3 NOVEMBER 1959
MIL-B-3168A
3 NOVEMBER 1959

MILITARY SPECIFICATION

BALLS, BEARING, FERROUS AND NON FERROUS (FOR USE IN BEARINGS AND VALVES)

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 **Scope.** This specification covers the procurement requirements for ferrous and nonferrous balls. (See 6.1)

1.2 **Classification.** The balls shall be of the following compositions and grades, as specified in the contract or order (see 6.2):

COMPOSITIONS:

Composition 1—Chrome alloy steel
Composition 2—Corrosion resisting steel
Composition 3—Carbon steel
Composition 4—Silicon molybdenum steel
Composition 5—Brass
Composition 6—Bronze
Composition 7—Aluminum bronze
Composition 8—Copper-beryllium alloy
Composition 9—Nickel-copper alloy (Monel)
Composition 10—Nickel-copper-aluminum alloy (K-Monel)
Composition 11—Aluminum alloy
Composition 12—Tungsten carbide

GRADES:

Grade 5
Grade 10
Grade 15
Grade 25
Grade 50
Grade 100
Grade 200
(See 6.4.1 and Table III.)

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

None

MILITARY

MIL-B-197 —Bearing, Anti-Friction, Associated Parts and Sub-Assemblies; Packaging of

STANDARDS

FEDERAL

FED. STD. NO. 66 —Steel: Chemical Composition and Hardenability
FED. STD. NO. 151 —Metals; Test Methods

MILITARY

MIL-STD-10 —Surface Roughness, Waviness, and Lay
MIL-STD-105 —Sampling Procedures and Tables for In-

spection by Attributes

MIL-STD-430 —Macrograph Standards for Steel Bars, Billets, and Blooms

(Copies of specifications and standards required by contractors 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 documents form 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.

AMERICAN SOCIETY FOR TESTING MATERIALS

Carbon-Chromium Ball—and Roller Bearing Steels, ASTM Standard A295

Recommended Practice for Evaluating Cemented Carbides for Apparent Porosity, ASTM Standard B276

(Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.)

3. REQUIREMENTS

3.1 **Material.** All material specified herein shall be free from pipes, seams, cracks, porosity, laminations, bursts, flakes, and excessive segregation.

3.2 **Compositions**

3.2.1 *Composition 1 balls.* Composition 1 balls shall be manufactured from chrome alloy steel conforming to the chemical composition of steel number E50100, E51100, E52100 of Federal Standard No. 66. The steel balls shall have a fracture grain size of 8 or finer. The balls shall be free from surface decarburization.

3.2.2 *Composition 2 balls.* Composition 2 balls shall be manufactured from corrosion resisting steel conforming to the chemical composition of steel number 440A, 440B, or 440C of Federal Standard No. 66. The steel balls shall have a fracture grain size of 7½ or finer. The balls shall be free from surface decarburization.

3.2.3 *Composition 3 balls.* Composition 3 balls shall be manufactured from carbon steel conforming to the chemical composition of steel numbers 1010 to 1022 of Federal Standard No. 66. The steel balls shall be case hardened as specified in 3.3.3. The balls shall be free from surface decarburization.

3.2.4 *Composition 4 balls.* Composition 4 balls shall be manufactured from selected silicon molybdenum steel of the through hardening type conforming to the chemical composition shown in Table I. The balls shall be properly heated and be free from surface decarburization.

3.2.5 *Composition 5 balls.* Composition 5 balls shall be manufactured from brass conforming to the chemical composition shown in Table I.

3.2.6 *Composition 6 balls.* Composition 6 balls shall be manufactured from bronze conforming to the chemical composition shown in Table I.

3.2.7 *Composition 7 balls.* Composition 7 balls shall be manufactured from aluminum bronze conforming to the chemical composition shown in Table I.

3.2.8 *Composition 8 balls.* Composition 8 balls shall be manufactured from copper-beryllium alloy conforming to the chemical composition shown in Table I.

3.2.9 *Composition 9 balls.* Composition 9 balls shall be manufactured from nickel-copper alloy (Monel) conforming to the chemical composition shown in Table I.

3.2.10 *Composition 10 balls.* Composition 10 balls shall be manufactured from nickel-copper-aluminum alloy (K-Monel) conforming to the chemical composition shown in Table I.

3.2.11 *Composition 11 balls.* Composition 11 balls shall be manufactured from aluminum alloy conforming to the chemical composition shown in Table I.

3.2.12 *Composition 12 balls.* Composition 12 balls shall be manufactured from tungsten carbide material conforming to the chemical composition shown in Table I.

3.2.13 *Inclusion rating.* Composition 1 and

TABLE I. *Chemical compositions (percent by weight)*

Element	Composition number								
	4	5	6	7	8	9	10	11	12
Carbon	.45–.55			Remainder	Remainder	25–30	25–30	3.5–4.5	
Copper		60–70	60–70					.25 max	
Zinc		30–40	29–39						
Tin			.5–1.0						
Aluminum				9–14			2–4	Remainder	
Manganese	.30–.60			1.5 max				.40–1.0	
Nickel				5.5 max		65–70	65–70		
Iron				2.10–4.00				1.0 max	
Beryllium					1.80–2.05				
Nickel or cobalt or both					.20 min				
Nickel plus cobalt plus iron					.60 max				
Iron plus zinc						5.0 max	5.0 max		
Silicon	.90–1.15							.5 max	
Magnesium								.20–.8	
Chromium								.10 max	
Other elements, total	.25 max					5.0 max	.15 max	.15 max	.5 max
Other elements, each		.5 max	.5 max					.05 max	
Tungsten carbide (WC)									93.5–94.5
Cobalt									5.5–6.5
Phosphorus	.030 max								
Sulphur	.030 max								
Molybdenum	.30–.50								

TABLE II. *Case depth*

Nominal size	Case depth (Minimum)	Nominal size	Case depth (Minimum)
Inch	*Inch*	*Inch*	*Inch*
1/16	0.015	3/8 to 13/32	0.055
3/32	0.020	7/16 to 15/32	0.065
1/8 to 5/32	0.025	1/2	0.070
3/16	0.030	9/16 to 11/16	0.075
7/32	0.035	3/4 to 1	0.080
1/4 to 11/32	0.045		

2, chrome alloy and corrosion resisting steel balls shall not exceed the inclusion rating specified for billets to be used for wire and rods in the manufacture of balls and rollers, as specified in American Society for Testing Materials (A.S.T.M.) Standard A295.

3.3 **Hardness**

3.3.1 *Composition 1 balls.* Composition 1, chrome alloy steel balls shall have a hardness of 60 to 67 Rockwell C or equivalent. The balls within any unit container shall have a uniform hardness from ball to ball within three points Rockwell C or equivalent.

3.3.2 *Composition 2 balls.* Composition 2, corrosion resisting steel balls shall have a hardness of 58 to 65 Rockwell C or equivalent.

3.3.3 *Composition 3 balls.* Composition 3, carbon steel balls shall have a minimum surface hardness of 60 Rockwell C or equivalent and shall be case hardened to the respective depth specified in Table II.

3.3.4 *Composition 4 balls.* Composition 4, silicon molybdenum steel balls shall have a hardness of 52 to 60 Rockwell C or equivalent.

3.3.5 *Composition 5 balls.* Composition 5, brass balls shall have a hardness of 75 to 87 Rockwell B or equivalent.

3.3.6 *Composition 6 balls.* Composition 6, bronze balls shall have a hardness of 75 to 95 Rockwell B or equivalent.

3.3.7 *Composition 7 balls.* Composition 7, aluminum bronze balls shall have a hardness of 15 to 20 Rockwell C or equivalent.

3.3.8 *Composition 8 balls.* Composition 8, copper-beryllium alloy balls shall have a minimum hardness of 38 Rockwell C or equivalent.

3.3.9 *Composition 9 balls.* Composition 9, nickel-copper alloy (Monel) balls shall have a hardness of 85 to 95 Rockwell B or equivalent.

3.3.10 *Composition 10 balls.* Composition 10, nickel-copper-aluminum alloy (K-Monel) balls shall have a minimum hardness of 27 Rockwell C or equivalent.

3.3.11 *Composition 11 balls.* Composition 11, aluminum alloy balls shall have a hardness of 54 to 72 Rockwell B or equivalent.

3.3.12 *Composition 12 balls.* Composition 12, tungsten carbide balls shall have a hardness of 87.5 to 90.4 Rockwell A or equivalent.

3.4 **Dimensions.** The basic diameter of the balls shall be as specified in the contract or order (see 6.2). The balls shall be within the tolerance specified in Table III for the specified grade (see 1.2).

3.5 **Surface finish**

3.5.1 *Visual appearance.* The surface of the balls shall be free from cracks, pits, corrosion and indications of soft spots.

3.5.2 *Surface roughness.* The surface roughness of the balls shall not exceed the value specified in Table III for the specified grade. Surface roughness shall be interpreted in accordance with Standard MIL-STD-10.

3.5.3 *Passivation.* Composition 2 Corrosion resisting steel balls shall be passivated and shall be capable of passing the test specified in 4.4.2.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 **Responsibility for inspection.** Unless otherwise specified in contract or purchase order, the supplier is responsible for the performance of all inspections requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set

TABLE III. *Dimensional data*

Grade	Out-of-roundness		Basic diameter tolerance	Diameter variation per unit container	Marking increments	Surface roughness (maximum)
	Dia. tol per ball	"V" block out-of-round				
	Inch	*Inch*	*Inch*	*Inch*	*Inch*	*Microinches (R.H.A.)*[1]
5	0.000005	0.000005	±0.00015	0.00001	0.000005	0.7
10	0.000010	0.000010	±0.0001	0.00002	0.000010	1.0
15	0.000015	0.000015	±0.0001	0.00003	0.000015	1.2
25	0.000025	0.000025	±0.0001	0.00005	0.000025	1.5
50	0.00005	0.00005	±0.0002	0.0001	0.00005	3
100	0.0001	0.0001	±0.0005	0.0002	0.0001	5
200	0.0002	0.0002	±0.0010	0.0004	0.0002	8

[1] Roughness height average (see 3.5.2)

forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 **Lot.** A lot shall consist of balls of the same composition, grade and basic diameter, manufactured under essentially the same conditions, and submitted for acceptance at the same time.

4.3 **Sampling**

4.3.1 *For examination.* For each test specified in 4.4.1.1, 4.4.1.2.1, 4.4.1.2.2 and 4.4.1.2.3, a sample of the balls shall be selected from each lot in accordance with the procedures of Standard MIL–STD–105, Table III-B, inspection level S4 (acceptable quality level (AQL) 0.4 percent defective).

4.3.1.1 *Surface roughness.* A sample of balls shall be selected in accordance with the procedures specified in 4.3.2.

4.3.2 *For tests.* Except as otherwise specified in 4.4.3.2 and 4.4.3.3, a sample of the balls shall be selected in accordance with the procedures of Standard MIL–STD–105, Table III-B inspection level S2.

4.3.3 *For inspection of unit package contents.*

4.3.3.1 *Diameter variation per unit container and specific diameter marking.* A sample of unit packages shall be selected from each lot in accordance with the procedures of standard MIL–STD–105, Table III-B, inspection level S4 (AQL) 0.4 percent defective). A sample of not less than 5 balls (or the total number of balls in the unit package, if less than 5) shall be randomly selected from each sample unit package containing less than 111 balls. For unit packages containing over 110 balls, a sample of balls shall be randomly selected from each sample unit package in accordance with Table III-B, Standard MIL–STD–105, inspection level S4. The balls selected from each sample unit package shall be kept separate from the balls selected from other sample unit packages.

4.3.3.2 *Hardness variation per unit container.* For composition 1 balls, a sample of unit packages shall be selected from each lot in accordance with the procedures of Standard MIL–STD–105, Table III-B, inspection level S2. A sample of 5 balls (or all of the balls in a unit package, if less than 5) shall be randomly selected from each sample unit package. The balls selected from each sample unit package shall be kept separate from the balls selected from other sample unit packages.

4.4 **Lot acceptance inspection**

4.4.1 ***Examination***

4.4.1.1 *Measurement accuracy.* All measurements shall be made using equipment and

gaging methods ensuring accuracy of results within 1/5 of the tolerance specified in Table III for the specified grade (see 1.2) and their pertinent dimension.

4.4.1.2 *Out-of-roundness*

4.4.1.2.1 *Diameter tolerance per ball.* The sample balls, selected in accordance with 4.3.1 shall be dimensionally examined to determine compliance with 3.4. All determinations shall be based on ten measurements taken in random orientation on each ball. Any unit of the sample which does not comply with the requirements specified in 3.4 shall be rejected. Lot acceptance shall be in accordance with 4.3.1.

4.4.1.2.2 *"V" block out-of-round.* The procedure and requirements shall be as specified in 4.4.1.2.1.

4.4.1.2.3 *Basic diameter.* The procedure and requirements shall be as specified in 4.4.1.2.1.

4.4.1.3 *Surface finish*

4.4.1.3.1 *Visual appearance.* The sample balls, selected in accordance with 4.3.1, shall be visually examined to determine compliance with 3.5.1. Any unit of the sample containing one or more defects shall be rejected. Lot acceptance shall be in accordance with 4.3.1.

4.4.1.3.2 *Surface roughness.* The sample balls, selected in accordance with 4.3.1.1, shall be examined to determine compliance with 3.5.2. If any unit of the sample does not comply with the requirements specified in 3.5.2, the lot shall be rejected.

4.4.2 *Tests*

4.4.2.1 *Hardness.* Composition 1 and 2 sample balls, selected in accordance with 4.3.2, shall be tested for compliance with requirements of 3.3. The test procedures shall be in accordance with Federal Standard No. 151. For hardness readings refer to tests made on parallel flats. If any unit of the sample does not comply with the requirements of 3.3 through 3.3.12, the lot shall be rejected.

4.4.2.2 *Passivation.* Composition 2 balls selected in accordance with 4.3.2, shall be immersed in distilled water at 100° F±5° F for a period of 1 hour, followed by air drying at 100° F ±5° F for a period of 1 hour. This cycle shall be repeated for a total period of 24 hours. At the end of the 24 hour test, the sample balls shall be examined for surface corrosion. If any unit of the sample exhibits corrosion visible with the aid of 10 power magnification, the lot shall be rejected.

4.4.2.3 *Decarburization.* Transverse sections through the center of sample composition 1, 3 and 4 balls (selected in accordance with 4.3.2) shall be polished, microetched, and examined at a magnification of 100 diameters. If any of the test specimens exhibits surface decarburization, the lot shall be rejected.

4.4.2.4 *Case depth.* Transverse sections through the center of sample composition 3 balls, selected in accordance with 4.3.2, shall be polished, microetched, and examined to determine compliance with the case depth requirements specified in 3.3.3. If any unit of the sample does not comply with the requirements of 3.3.3, the lot shall be rejected.

4.4.2.5 *Porosity test.* Composition 12, tungsten carbide sample balls, selected in accordance with 4.3.2, shall be prepared and examined for porosity in accordance with American Society for Testing Materials Standard B276. If any unit of the sample exceeds the condition for types A-2, B-2, and C-2 apparent porosity, the lot shall be rejected. Other methods of preparing the sample balls for examination may be used upon approval of the procuring activity.

4.4.2.6 *Density test.* Composition 12, Tungsten carbide sample balls, selected in accordance with 4.3.2, shall be density tested by weighing the balls in air and dividing the weight of each sample ball by the computed volume of the ball in cubic centimeters. The diameter used in computing the volume of the ball shall be determined in accordance with the procedures of 4.4.1.2.1. The weight of each sample ball shall be determined to an accuracy of 0.001 grams or 0.10 percent of the weight, whichever is greater. If any unit

of the sample fails to comply with the density test, the lot shall be rejected.

4.4.3 *Inspection of material.* The material used in the manufacture of the balls furnished under this specification shall have been inspected in accordance with and shall have passed the following examination and tests.

4.4.3.1 *Chemical analysis.* A chemical analysis shall be made on each lot of steel. The samples for analysis shall be selected from the billets, rods, or wire used in the manufacture of the balls. The chemical analysis shall be conducted in accordance with Method No. 111 of Federal Standard No. 151. The chemical composition determined by the above procedures shall be within the check analysis tolerances specified in Federal Standard No. 66. A certified chemical analysis submitted by the mill supplier is acceptable in lieu of test.

4.4.3.2 *Composition 5 through 11 balls.* For composition 5 through 11 balls, a chemical analysis shall be made on each lot of material used in the manufacture of the balls furnished under this specification. The samples for analysis shall be selected from the billets, rods, or wire used in the manufacture of the balls. The chemical analysis shall be conducted in accordance with Method No. 111 of Federal Standard No. 151. The chemical composition determined by the above procedures shall be within the tolerances specified in Table I for the applicable composition. A certified chemical analysis submitted by the mill supplier is acceptable in lieu of test.

4.4.3.3 *Composition 12 balls.* For composition 12, tungsten carbide balls, a chemical analysis shall be made on a representative sample of balls selected from each lot. The sample balls shall consist of a minimum of two ounces of material and may include balls used for hardness test. The chemical analysis shall be conducted in accordance with Method No. 111 of Federal Standard No. 151. A certified chemical analysis submitted by the mill supplier is acceptable in lieu of test.

4.4.3.4 *Macro-examination*

4.4.3.4.1 *Composition 1 and 2.* Specimens $\frac{3}{8}$-inch thick (representative of the cross section of rolled billets 4 inches square) for forged sections 4 inches square (for forging and re-rolling into coils, tube-rounds and bars) shall be taken from locations representing the top and bottom of the first, middle and last usable ingots of a heat and shall be normalized, annealed, hardened and fractured. Hardened discs shall be RC 60 minimum and have a fine fracture grain size 8 or finer for chrome alloy balls and 7½ or finer for corrosion resisting balls. The specimen shall not have external indentations sufficient to guide the fracture. All fractured surfaces shall be examined visually and those shall be considered defective which show any of the following:

1. Presence of more than one non-metallic inclusion $\frac{1}{16}$ to $\frac{1}{8}$ inch long.
2. Presence of one non-metallic inclusion over $\frac{1}{8}$ inch long.
3. Presence of porosity, pipe or internal ruptures.

If more than two discs exceed these limits, the heat shall be rejected or may be retested after additional discard.

4.4.3.4.2 *Composition 3.* A macro-examination shall be made on each heat of steel. The samples for examination shall be selected from the billets for the wire or rods used in the manufacture of the balls. The samples shall be selected in accordance with Method 321 of Federal Standard No. 151. The macro-examination shall be conducted in accordance with Standard MIL-STD-430. The quality of the steel as indicated by the results of the macro-examination shall be equal to or better than macrographs A3-B2-C2 of Standard MIL-STD-430, with defects D1 through D8 unacceptable. A certified chemical analysis submitted by the mill supplier is acceptable in lieu of test.

4.4.3.5 *Fracture grain size.* For compositions 1 and 2, a fracture grain size test shall be made by fracturing three balls made from each heat of steel. The fracture shall be compared with Shepherd fracture grain size

standards (or equivalent) and shall be 8 or finer for composition 1 and 7½ or finer for composition 2.

4.4.3.5.1 *Inclusion rating.* For composition 1 material, an inclusion rating test shall be made on each heat of steel. The samples for test shall be selected from the billets for the wire or rods used in the manufacture of the balls. The test shall be conducted in accordance with the inclusion rating test specified in A.S.T.M. Standard A295.

4.4.4 *Preservation, packaging, packing, and marking.* The inspection shall ascertain that the preservation, packaging, packing, and marking for balls furnished under this specification are in accordance with the requirements of Section 5 herein. In addition, the following examinations and test shall be performed.

4.4.4.1 *Diameter variation per unit container.* Sample balls of the same composition, grade and basic diameter, selected in accordance with 4.3.3.1, shall be dimensionally examined to determine compliance with the diameter variation requirements listed in Table III. All determinations shall be based on ten measurements taken in random orientation on each ball. Any sample unit package, which does not comply with these requirements shall be rejected. Lot acceptance shall be in accordance with 4.3.3.1. The provisions of 4.4.1.1 shall apply to this examination.

4.4.4.2 *Specific diameter marking.* The sample balls, selected in accordance with 4.3.3.1, shall be dimensionally examined for specific diameter marking. This marking shall be within one marking increment of the average diameter of the balls in the unit container. The specific diameter shall be expressed in the marking increment specified in Table III for the grade. All determinations shall be based on ten measurements taken in random orientation on each ball. Any sample unit package, which does not comply with these requirements shall be rejected. Lot acceptance shall be in accordance with 4.3.3.1. The provisions of 4.4.1.1 shall apply to this examination.

4.4.4.3 *Hardness variation per unit container.* The sample balls, selected in accordance with 4.3.3.2 shall be tested for compliance with the hardness requirements specified in 3.3.1. The test procedures shall be as specified in 4.4.2.1. If any sample unit package does not comply with these requirements, the lot shall be rejected.

5. PREPARATION FOR DELIVERY

5.1 Preservation, Packaging and Packing

5.1.1 *Levels.* In accordance with Specification MIL–B–197, the balls shall be cleaned, preserved and packaged (Level A or C) and packed (Level A, B, or C). Unless otherwise specified, the requirements of Level C packaging shall apply. The level or levels required shall be specified in the Invitation for Bid, Contract or order (see 6.2).

5.2 **Marking.** Marking shall be in accordance with Specification MIL–B–197.

6. NOTES

6.1 **Intended use.** The balls covered in this specification are intended for use in bearings, bearing applications and check valves. This specification covers the procurement requirements for Standards MS19059, MS19060, MS19061, MS19062, MS19063 and MS19064.

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

(a) Title, number and date of this specification
(b) Composition, grade, and basic diameter of balls required (see 1.2 and 3.4)
(c) Quantity required
(d) Required levels of packaging and packing (see 5.1.1)
(e) Preservative required, if different from that specified in 5.1.1.
(f) Method of unit packaging required (see 5.1.1)
(g) Number of balls per unit container (see 5.1.1)
(h) Special marking, if required (see 5.2)

6.3 Supersession data. This specification supersedes and includes the requirements of Military Specification MIL-B-3168 dated 3 November 1959. Proj. No. 3110-0065.

6.3.1 *Comparison of classification.* The composition classifications for all composition balls covered by this specification and the classification of similar compositions covered by specifications MIL-B-3168A and MIL-B-1083B are shown in Table IV.

TABLE IV. *Comparison of Classification*

MIL-B-3168A	MIL-B-1083B	MIL-B-1083C
-	1	1
-	2	2
-	3	3
-	-	4
1		5
2		6
3		7
4		8
5		9
6		10
7		11
8		12

6.4 Terminology. When used in connection with this specification, the following terms shall be as defined herein.

6.4.1 *Grade.* The grade designation indicates the allowable out-of-roundness expressed in millionths of an inch.

6.4.1.1 *Nominal size.* The size which is used for the purpose of general identification, e.g., 1/16, 1/8, 3/32 inch, etc.

6.4.1.2 *Basic diameter.* The size ordered which is the basis to which the basic diameter tolerances apply. The basic diameter is specified in inches (in the decimal form) or millimeters.

6.4.1.3 *Specific diameter.* The diameter marked on the unit container and expressed in the grade standard marking increment nearest to the average diameter of the balls in that container.

6.4.1.4 *Out-of-roundness.* Out-of-roundness is defined by the following characteristics and each characteristic is measured independently of the other:

(a) Diameter tolerance per ball is the difference between the largest diameter and the smallest diameter measured on the same ball.

(b) "V" block out-of-round is the maximum variation in the rise of the ball obtainable through repositioning while the ball is supported in a 120 degree "V" block.

6.4.1.5 *Basic diameter tolerance.* The maximum allowable deviation from the specified basic diameter for the indicated grade.

6.4.1.6 *Diameter variation per unit container.* The allowable variation between the average diameter of the largest ball and the average diameter of the smallest ball within a unit container.

6.4.1.7 *Unit container.* Any container identified as containing balls of the same composition, grade, and basic diameter, and within the allowable diameter variation per unit container for the specified grade.

6.4.1.8 *Marking increments.* The standard unit steps used to express the specific diameter (see Table III and 5.2).

6.4.1.9 *Case depth.* The thickness measured radially from the surface of the hardened case to a point where carbon content or hardness becomes the same as the ball core.

6.4.1.10 *Passivation.* A treatment for corrosion-resisting steel to eliminate corrodible surface impurities and provide a protective film.

6.5 **Changes from previous issue.** The outside margins of this specification have been marked to indicate where changes (deletions, additions, etc.) from the previous issue have been made. This has been done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content as written irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army—Weapons Command
Navy—Weps
Air Force—ASD

Review Activity:
Army—GL
Navy—Weps, Ship
Air Force—ASD, WRAMA
DSA—IS

User Activity:
Army—MI, EL, WC, MO
Navy—Docks
NSA

Preparing Activity:
Navy—Weps
Project No. 3110-0066

Review/user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current DODISS.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)*:
b. ADDRESS *(Street, City, State, ZIP Code)*	

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 1426 PREVIOUS EDITION IS OBSOLETE