

MIL-P-46593A (ORD)

12 OCTOBER 1962

SUPERSEDING
MIL-P-46593 (ORD)
1 MARCH 1962

MILITARY SPECIFICATION

PROJECTILE, CALIBERS .22, .30, .50 AND 20 MM FRAGMENT-SIMULATING

1. SCOPE

1.1 Scope. This specification covers fragment-simulating projectiles used in ballistic testing.

1.2 Classification. The fragment-simulating projectiles are classified as follows:

Caliber—.22 Type 1 Projectile for Armor Plate (see fig. 1)

Caliber—.22 Type 2 Projectile for Body Armor (see fig. 1a)

Caliber—.30 (see fig. 2)

Caliber—.50 (see fig. 3)

2MM— (See fig. 4)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids, form a part of this specification to the extent specified herein.

SPECIFICATIONS**FEDERAL**

QQ-S-624 —Steel Bars, Alloy, Cold Finished and Hot Rolled, (General Purpose)

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MIL-L-644 —Lubricating Oil, General Purpose, Preservative, Water Displacing, Low Temperature

MIL-I-45208 —Inspection Requirements General Specification for

STANDARDS**FEDERAL**

FED-STD- —Metals: Test Methods
151

MILITARY

MIL-STD- —Sampling Procedures and
105 Tables for Inspection
by Attributes

MIL-STD- —Inspection Terms and
109 Definitions

MIL-STD- —Marking for Shipment
129 and Storage

MIL-STD- —Surface Roughness
639 Values Preferred for
Army Ordnance
Material

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

3. REQUIREMENTS

3.1 Material composition. The fragment-simulating projectile shall be manufactured from material as noted below:

Caliber .22—Type 1	} Cold rolled, annealed steel conforming to compositions 4327H or 4340H.
Caliber .30	
Caliber .50	
20MM	
Caliber .22—Type 2	Same as above or other steels capable of hardness uniformity within hardness values indicated in table I.

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3.2 Hardness. The fragment-simulating projectile shall be fully quenched and tempered to a Rockwell hardness value as shown in table I.

TABLE I

Projectile	Rockwell hardness
Caliber .22—Type 1	30 ± 1
Caliber .22—Type 2	27 ± 3
Caliber .30	30 ± 1
Caliber .50	30 ± 1
20MM	30 ± 1

3.3 Weight. The fragment-simulating projectiles shall be of the weight shown in table II.

TABLE II

Projectile	Weight in grains
Caliber .22—Type 1	17.0 ± 0.5
Caliber .22—Type 2	17.0 ± 0.5
Caliber .30	44.0 ± 0.5
Caliber .50	207.0 ± 2.0
20MM	870.0 ± 4.0

3.4 Dimensions. Dimensions and tolerances shall be as shown in figures 1, 1a, 2, 3, and 4.

3.5 Finish. The fragment-simulating projectiles shall have a surface finish as shown in figures 1, 1a, 2, 3, and 4.

4. QUALITY ASSURANCE PROVISIONS

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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.

4.1.1 Inspection terms and definitions. Reference shall be made to Standard MIL-STD-109 to define the inspection terms used.

4.1.2 Inspection. Inspection shall be in accordance with Specification MIL-I-45208, except as specified herein.

4.2 Inspection provisions.

4.2.1 Lot. A lot shall consist of all fragment-simulating projectiles of the same caliber and millimeter, fully quenched and tempered in the same batch.

4.2.1.1 Submittal of product. The contractor shall submit the product in accordance with Standard MIL-STD-105.

4.2.2 Examination. Examination shall be performed for the requirements of 3.3, 3.1 and 3.5 in accordance with Standard MIL-STD-105 with an acceptable quality level (AQL) of 2.5 percent defects per hundred. All nonconforming material shall be rejected. Standard MIL-STD-639 shall be used as a basis of comparison for surface roughness determination.

4.2.3 Inspection testing. The following tests shall be performed in accordance with the provisions of 4.3 except as provided in Specification MIL-I-45208.

4.2.3.1 Material composition. A sample shall be selected for chemical analysis from the bars used for manufacturing of the fragment-simulating projectiles prior to machining or from sufficient parts prior to heat-treating, to form a sample of at least 2 ounces. Failure to comply to the requirements of 3.1 shall be cause for rejection of the lot.

4.2.3.2 Hardness. The hardness of the fragment-simulating projectiles shall be tested for compliance with 3.2 in accordance with Standard MIL-STD-105 with an acceptable quality level (AQL) of 2.5 percent defect per hundred. All nonconforming material shall be rejected.

4.2.4 Inspection equipment. The examination and tests shall be made using equipment approved by the Government.

4.3 Test methods.

4.3.1 Material composition. Chemical analysis for conformance to the material composition requirement of 3.1 shall be conducted on the sample selected by Methods 111.1 and 112.1 of Federal Test Methods Standard No. 151.

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1.3.2 Hardness. A hardness testing machine shall be used to determine compliance with the hardness requirement of 3.2.

5. PREPARATION FOR DELIVERY

5.1 Preservation. Fragment-simulating projectiles shall be coated with a rust inhibiting material as specified in Specification MIL-I-644.

5.2 Level C packaging. Preservation and packaging shall be such as to afford protection against corrosion, deterioration, and damage during direct shipment from the supply source to the first receiving activity for immediate use or for controlled humidity storage or as required by contract.

5.3 Level C packing. Packing shall be such as to afford protection against damage during direct shipment from the supply source to the first receiving activity in a manner to insure carrier acceptance. Containers shall be in accordance with carrier rules or regulations applicable to the mode of transportation. The gross weight of any one container shall not exceed 70 pounds.

5.4 Marking. Marking for shipment and storage shall be in accordance with Standard MIL-STD-129.

6. NOTES

6.1 Intended use. The fragment-simulating projectiles covered by this specification are intended for use in ballistic testing of various materials.

6.2 Ordering data. Procurement documents should specify the following:

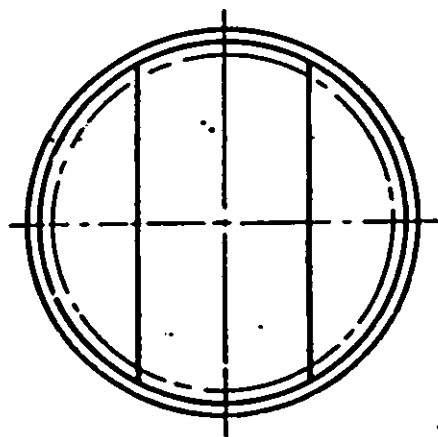
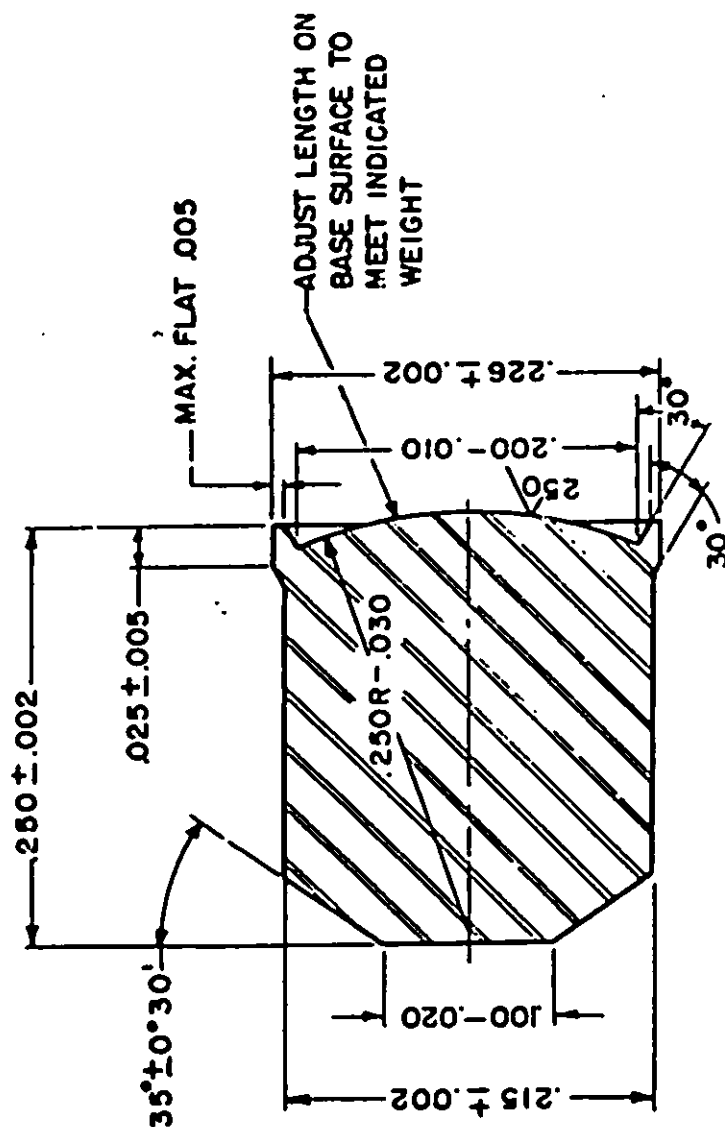
- (a) Title, number and date of this specification.
- (b) Caliber, type and millimeter required (see 1.2).
- (c) Type and level of packaging and packing.

Notice: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

Custodian:
Army—Ord

Preparing activity:
Army—Ord

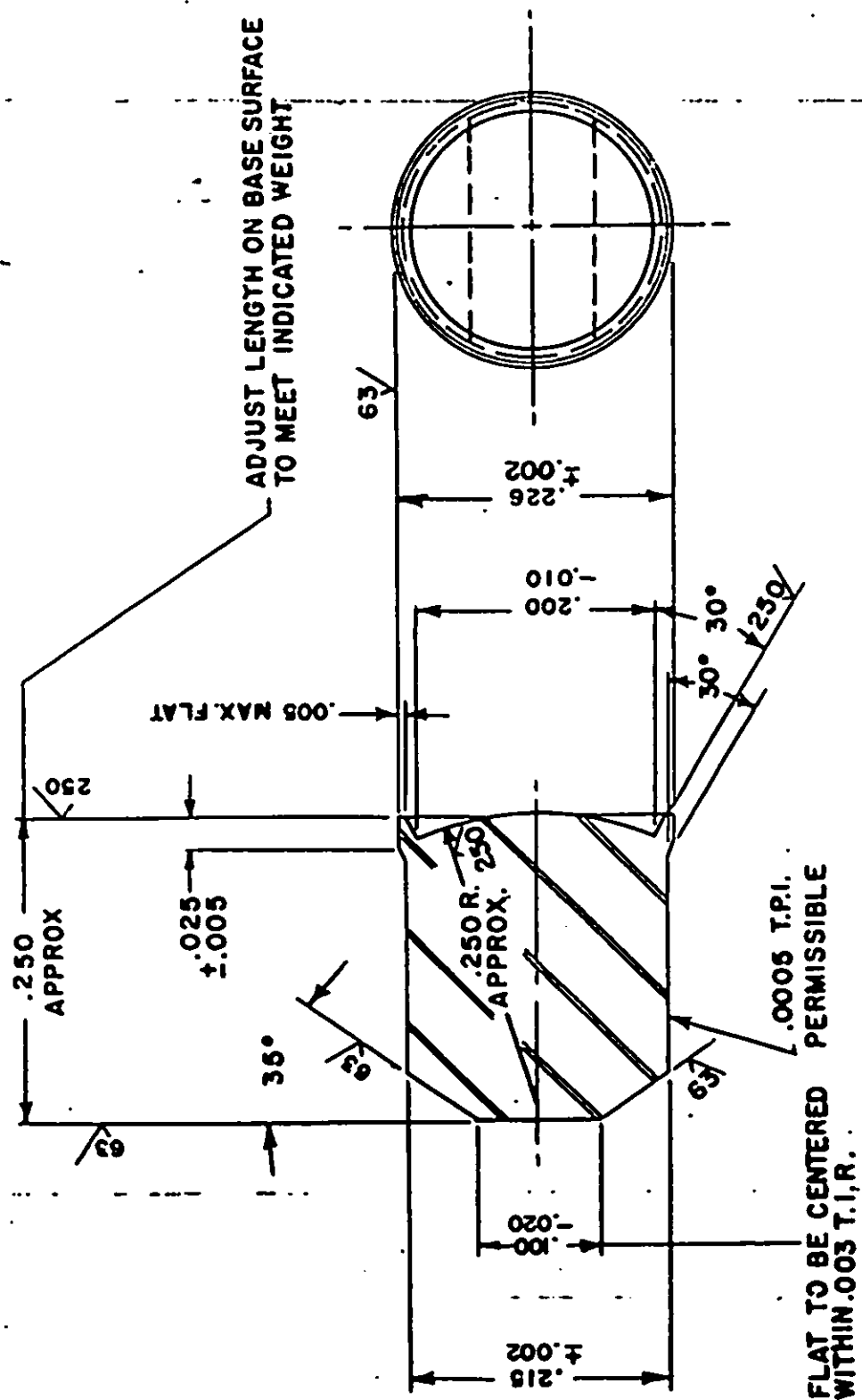
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- NOTE:-
1. NO SUBSTITUTES FOR STEEL
 2. FINISH 63/ EXCEPT AS NOTED

FIGURE 1.—Frequency simulator calibration type 1 (common parts)

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NOTES:

1. NO SUBSTITUTES FOR STEEL
2. FINISH 125/ EXCEPT AS NOTED
3. TOLERANCES ON ANGLES $\pm 1^\circ$

FIGURE 10. Fragment simulator caliber .22, type 2 body removed.

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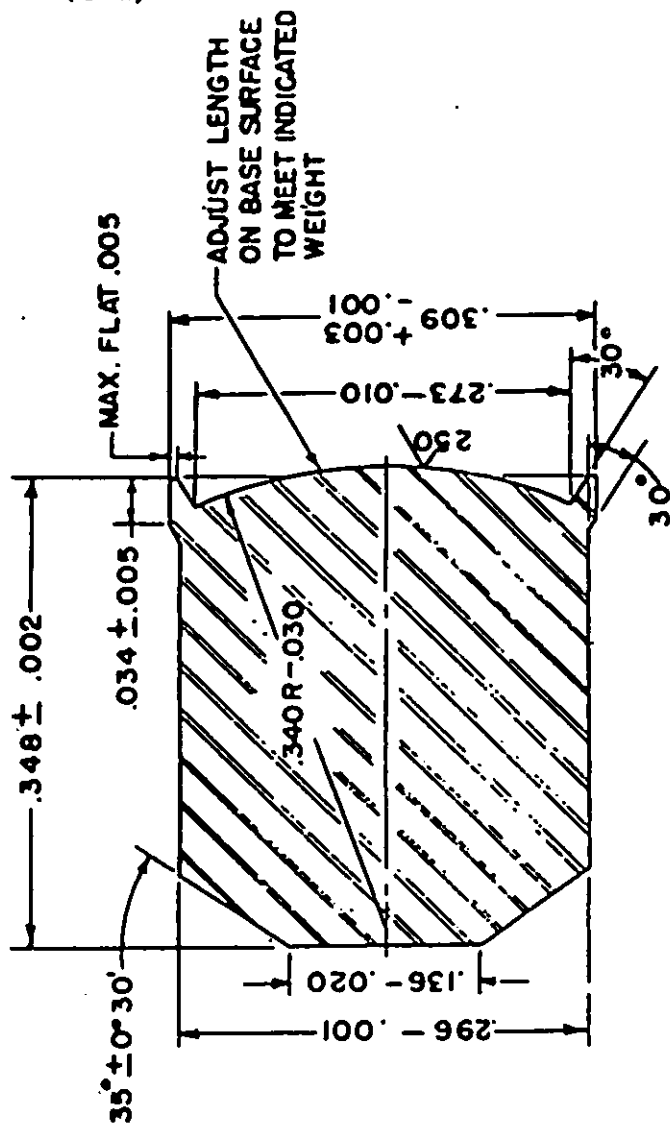
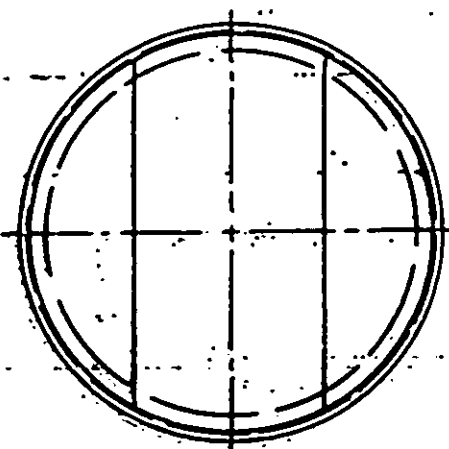


FIGURE 2. Form of simulated caliber .30.



NOTE:

1. NO SUBSTITUTES FOR STEEL
2. FINISH 63/EXCEPT AS NOTED

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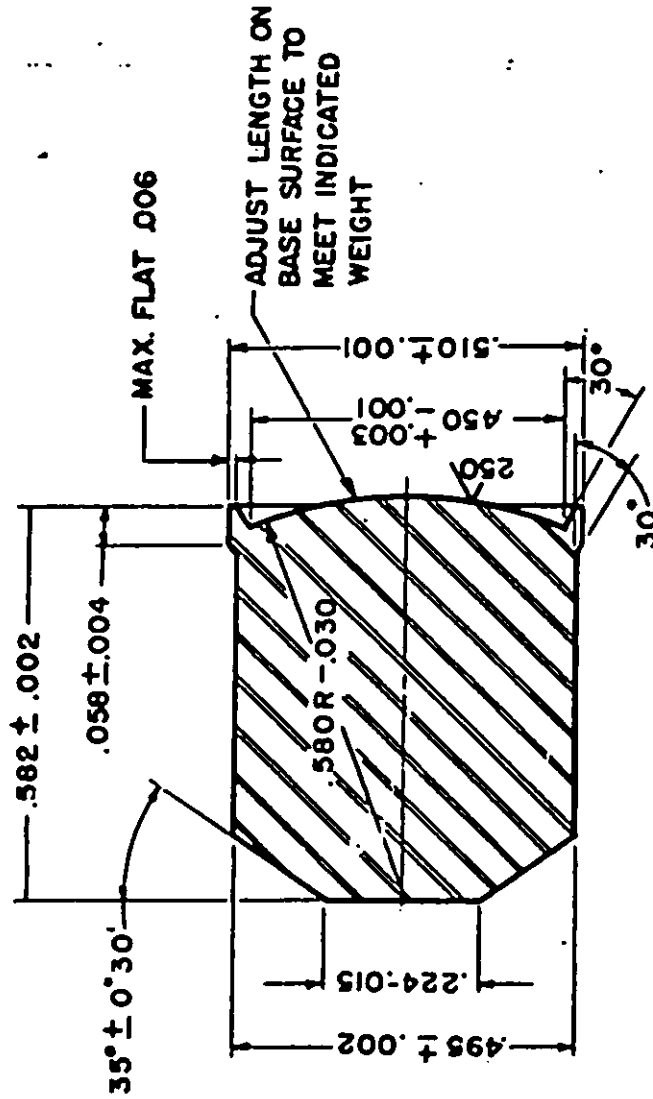
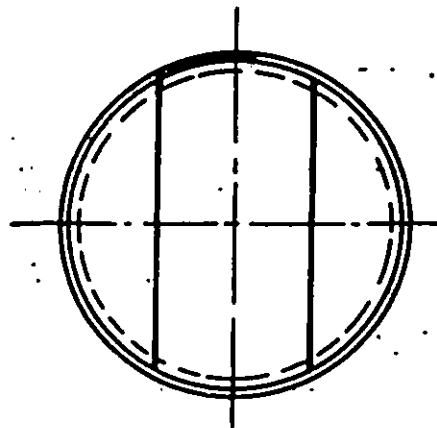


FIGURE 3.—Fragment simulator caliber .50.



NOTE:
1. NO SUBSTITUTES FOR STEEL
2. FINISH  EXCEPT AS NOTED

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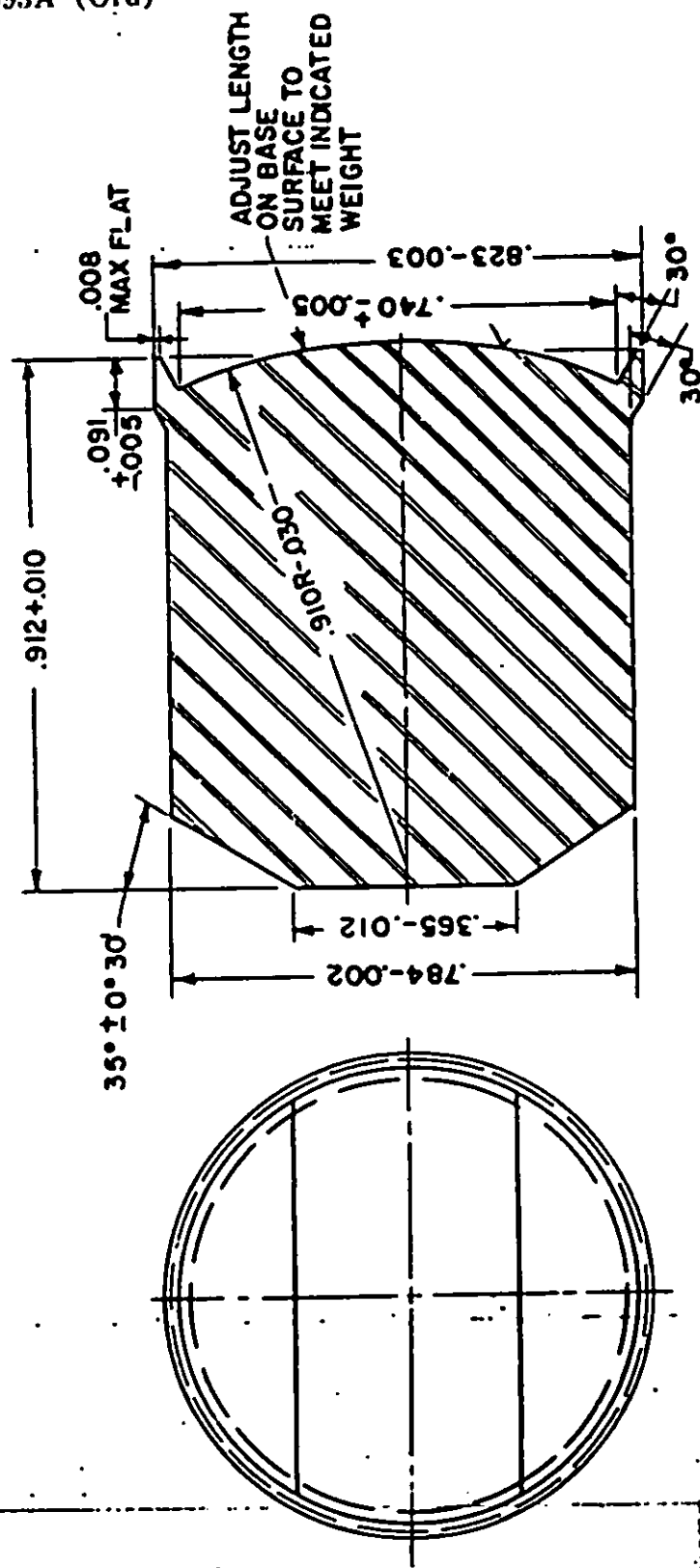


FIGURE 4.—Fragment insulator 20mm.

NOTE:
1-NO SUBSTITUTES FOR STEEL
2-FINISH '63 EXCEPT AS NOTED

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 116-10004INSTRUCTIONS

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 minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (of submitter)

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