MIL-L-22624A (Wep)
13 June 1964
SUPERSEDING
MIL-L-22624 (Wep)
15 August 1960

MILITARY SPECIFICATION

LINK, AMMUNITION, 20MM, MARK 6 MODS 4, 5, AND 6

(ASSEMBLY)

1. SCOPE

1.1 Scope. This specification covers the 20MM Ammunition Link Mark 6 Mods 4, 5, and 6, referred to herein as the Link.

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

Military

MIL-P-16232	Phosphate Coatings, Heavy, Manganese or Zinc Base (for Ferrous Metals).

STANDARDS

Federal

Federal Test Method Standard No. 151	Metals; Test Methods

Military

MIL-STD-105	Sampling procedures and Tables for Inspection by Attributes.
MIL-STD-129	Marking for Shipment and Storage.

DRAWINGS

Bureau of Naval Weapons
(Code Ident. 10001)

LD 522056	Pod, Gun, Mark 4 Mod 0 (Assembly).
LD 615425	Link, Ammunition, 20MM, . Mark 6 Mod 4 (Assembly).
LD 615433	Kit, Tool, Gun Pod Ammunition.
LD 615434	Link, Cartridge, 20MM, Leading, Mark 6 Mod 5 (Assembly).
LD 615435	Link, Cartridge, 20MM, Trailing, Mark 6 Mod 6 (Assembly).
LD 615436	20MM Link Packaging, Mark 6 Mod 4.
LD 615437	20MM Link Packaging, Mark 6 Mod 5 Leading Link.
LD 615438	20MM Link Packaging, Mark 6 Mod 6 Trailing Link.
982519	Target Practice Round, 20MM, Mark 105 Mod 0.
1445196	Dummy Round, 20MM, Mark 104 Mod 0.

PUBLICATIONS

Bureau of Naval Weapons
(Code Ident. 10001)

OP 2719	Gun Pod Mk 4 Mod 0; Description, Operation, and Maintenance e.

(Copies of documents 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 Preproduction sample. Unless otherwise specified in the contract or order, a preproduction sample of links shall be delivered for testing at a facility designated in the contract or order (see 6.2). The links shall be delivered as follows:

(a) 486 links shall be Mod 4 links.
(b) 36 links shall be Mod 5 links.
(c) 36 links shall be Mod 6 links.

Fifty-two of the Mod 4 links shall be delivered unbelted. The remainder shall be belted into one belt of 60 links, seven belts of 50 links, one belt of 13 links, and one belt of 11 links. The preproduction sample shall be manufactured using the methods proposed for production. Any production by the supplier prior to approval of the preproduction sample shall be at the suppliers risk.

3.2 Compliance with documents. Unless otherwise specified, the link shall be in accordance with the requirements specified herein and in the applicable documents listed in section 2.

3.3 Materials. Materials used in the manufacture of the link shall conform to the material specifications listed In the applicable drawings (see section 2).

3.4 Construction. The link shall meet the requirements specified in 3.4.1 to 3.4.8, inclusive. Nomenclature for link component parts shall be as specified in Figure 1.

3.4.1 Round retention. When tested as specified in 4.6.1.3, the link detent shall retain the stud simulating the ammunition round at the extractor groove.

3.4.2 Round separation. When tested as specified in 4.6.1.4, the link shall permit the stud simulating the ammunition round to separate from the link.

3.4.3 Flange strength. When the link is tested as specified in 4.6.1.5, the carrier flanges shall not be deformed to an extent that would permit them to pass beyond the extractor groove in the test stud.

3.4.4 Linking. The lug of any link shall engage completely with the spring and rivet of any link when assembled using the linking tool assembly shown in drawings listed in Lists of Drawings (LD) 615433.

3.4.5 Unlinking. The lug of one link shall not disengage from the spring and rivet of an adjacent link when the links are subjected to the test of 4.6.1.7 (a). Mating parts of two adjacent links shall disengage when the links are subjected to the test of 4.6.1.7 (b).

3.4.6 Pitch distance. Pitch distance shall be defined as shown In Figure 1. The pitch distance for the Mark 6 Mod 4 link shall be 1.601 inches plus or minus 0.024 inch.

3.4.7 Belt strength. When tested as specified in 4.6.1.9, the ammunition belt formed by the links shall not separate. The increase in average pitch distance of the links shall not exceed 0.010 inch.

3.4.8 Belt flexibility.

3.4.8.1 Twist. The belt formed by the links shall be capable of being twisted 360 degrees in not more than 13 links.

3.4.8.2 Fanning. projectile end out. Belted links, loaded with dummy ammunition rounds (see 3.7), shall be fanned in a circular pattern with the flanged ends of the carriers touching. The diameter of the circle, measured across the tips of the projectiles, shall be not more than 40.0 inches.

3.4.8.3 Fanning. case end out. Twenty-five belted links, loaded with dummy ammunition rounds. shall be fanned in a circular pattern-on a smooth surface with the projectile ends of the rounds pointing Inward. The loop formed shall not exceed 20 inches overall (flanged end to flanged end).

3.4.8.4 Stacking. There shall be sufficient flexibility in roll to assure feeding a loaded belt into a stacked configuration and withdrawing the belt from that configuration. Roll is defined as belt flexibility about the longitudinal centerline of the individual links.

3.5 Performance characteristics. Links formed into belts and loaded with 20MM, Mark 100 series ammunition shall be capable of fitting into and functioning with the Mark 4 Gun Pod and its components (Mark 11 Gun Mechanism and Mark 2 Loader). See 3.7 and 3.8.

3.5.1 Belt feeding. Belted links shall be capable of being withdrawn from the gun pod magazine or from stowage containers at the prescribed rate of fire of the gun. The belted links shall pass through feed chutes without catching or binding.

3.5.2 Link positioning. The belted links of 3.5.1 shall engage the sides of the loader link guide rail and pass between the guide rail and the loader sprockets without catching or binding. During the loader ramming operation,

the links shall permit stripping of ammunition rounds.

3.5.3 Link and case election. When an empty cartridge case or a cartridge is ejected from the gun mechanism revolver, the link receiving the case or cartridge shall unlink from its adjacent link. The link containing the case or cartridge shall clear the loader without blocking succeeding ejected links.

3.6 Environmental requirements.

3.6.1 Resistance to salt spray. Each link tested in accordance with 4.6.1.2 shall be examined visually for evidence of rust. Rust staining and rust drainage shall not be considered when measuring the area of rust spots. Each carrier assembly shall show not more than six rust spots, each measuring not more than 1/8 Inch in diameter or equivalent area. Each loop shall show not more than three rust spots of the specified diameter. Each lug and each spring shall show not more than one rust spot of the specified diameter. Not more than one rust spot, detectable using a 15 power reading lens, Is permissible on the rivet.

3.6.2 Temperature extremes. The belted links shall feed ammunition into the loader, permit ramming of ammunition rounds, accept and retain ejected cartridge cases or cartridges, and unlink from adjacent links at any temperature between minus 65 degrees Fahrenheit (F.) and plus 165 degrees F.

3.7 Government-furnished property. The following, In quantities specified in the contract or order, are required to determine compliance of the link with the requirements of this specifications

(a) Target Practice Rounds, 20MM Mark 105 Mod 0.
(b) Dummy Rounds, 20MM, Mark 104 Mod 0.

3.8 Government-loaned property. The following are required to determine link conformance to the requirements of this specification:

(a) Loader, Gun, 20MM, Mark 2 Mod 1.
(b) Gun Mechanism, 20 MM, Mark 11 Mod 5.
(c) Pod Assembly (for Gun Pod Mark 4 Mod 0).
(d) Ejector Rack Assembly. Aero 7A-1.

3.9 Packaging, packing and marking. Packaging, packing and marking of the link shall conform to the requirements of section 5 of this specification.

3.10 Workmanship. Links shall be uniform in quality and temper and shall be free from splits, cracks, scale, scrapes and other defects. The quality of workmanship shall assure conformance to all requirements of this specification and the applicable documents listed in section 2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responisibility 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, 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 forth In this specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Classification of tests. The inspection and testing of the link shall be classified as follows:

(a) Preproduction tests.
(b) Acceptance tests.

4.3 Lot. A lot shall consist of all links manufactured by the same process at the same plant location and submitted for Government acceptance at the same time, except that the lot size shall not exceed 25,000 links.

4.4 Sampling. Unless otherwise specified herein, the provisions set forth in Standard MIL-STD-105 shall govern the establishment of sampling plans and procedures for inspection by attributes.

4.5 Examination.

4.5.1 Components. Prior to assembly of the link, it shall be ascertained that all components procured under separate documents have been inspected, tested, and accepted In accordance with their respective documents.

4.5.2 Packing and marking. It shall be ascertained that packing and marking of the links conform to the requirements of this specification.

4.6 Tests.

4.6.1 Acceptance tests.

4.6.1.1 Visual and mechanical inspection. Link samples selected in accordance with 4.4 shall be tested for conformance to 3.2, 3.3, and 3.10. Lot quality shall be judged as specified in 4.6.2.

4.6.1.2 Salt spray resistance test. After components of the Mod 4 link have received the phosphate coating of Specification MIL-P-16232, 10 samples of the assembled link shall be subjected to the test of Federal Test Method Standard No. 151, Method 811.1. The link shall meet the requirements of 3.6.1. Test links shall not be reused for other tests nor shall they be delivered to the Government as units of production.

4.6.1.3 Round retention test. Ten Mod 4 links, 10 Mod 5 links and 10 Mod 6 links shall be selected for the round retention test. The test shall be performed using the equipment shown in Figure 3. The test fixture weight of 2.0 pounds shall be allowed to fall freely a distance of 4.0 inches and strike the test stud. The link shall meet the requirements of 3.4.1.

4.6.1.4 Round separation test. The sample links and test equipment of 4.6.1.3 shall be reused for this test. The weight shall be allowed to fall freely a distance of 11.0 inches and strike the test stud. The link shall meet the requirements of 3.4.2.

4.6.1.5 Flange strength test. The test samples of 4.6.1.3 and 4.6.1.4 shall be used with the equipment shown in Figure 4. The test fixture stud shall be positioned to rest against the upper edges of the carrier detents. The weight of 20.0 pounds shall be allowed to fall freely a distance of 30 inches and strike the stud. The link shall meet the requirements of 3.4.3.

4.6.1.6 Linking test. Twenty Mod 4 links, 10 Mod 5 links and 10 Mod links shall be selected for the linking test. The test shall be performed using the hand linking tool of 3.4.4. Ten Mod 4 links shall be Joined as a single belt. The Mod 5 and Mod 6 links will be joined by a Mod 4 link for 10 groups of three. The lug slot of one link shall be positioned to receive the spring and rivet of another link. The link shall meet the requirements of 3.4.4.

4.6.1.7 Unlinking test. Link samples used in the test of 4.6. 1.6 shall be tested using the equipment shown in Figure 2. The test shall be performed in two stages, as follows:

(a) The test fixture weight of 2.0 pounds shall be allowed to fall freely a distance of 3.0 inches and strike the test stud. Test samples unlinking from each other are defective. If partial disengagement occurs, the links shall be restored to their original test position for test (b).

(b) The same weight shall be allowed to fall freely a distance of 12.0 inches. Test samples failing to disengage completely are defective.

4.6.1.8 Pitch distance test. Eleven Mod 4 links shall be linked and loaded with dummy rounds (see 3.7) and suspended vertically from an appropriate holding device. The pitch distance (defined as shown in Figure 1) shall be measured between the rivet of the second link and the rivet of the last link. The link shall meet the requirements of 3.4.6.

4.6.1.9 Belt strength test. The belted links of 4.6.1.8 shall be reused with the test equipment shown In Figure 5. The test arbors shall be used to attach the weight assembly to the center link and to attach the first and last links to their mounting brackets. Measure the distance from the bottom of the weight assembly to the reference line. Raise the 8.0 pound weight 18 inches and release it. Again measure the distance between the weight assembly and the reference line. If the change in measurement exceeds 0.288 inch, the increase in link pitch does not meet the requirements of 3.4.7.

4.6.1.10 Twist test. Thirteen Mod 4 links shall be belted and tested for conformance to 3.4.8.1.

4.6.1.11 Fanning test, projectile ends out. Sixty Mod 4 links shall be belted, loaded with dummy rounds, and placed on a plane surface. The links shall be fanned in a circle with the flanged ends of the carriers touching. The belt may be separated to provide the number of belted links necessary to determine conformance to 3.4.8.2.

4.6.1.12 Fanning test, case ends out. A 25 round belt separated from the belt of 4.6.1.11 shall be used. The test shall be performed using a horizontal plane surface of plate glass or equivalent. The links shall be fanned in a circular pattern by applying manual pressure to each of the end links. Manual pressure shall be released slowly to minimize spring-back. The links shall then be examined for conformance to 3.4.8.3.

4.6.1.13 Stacking test. Each Mark 6 Mod 4 link intended for delivery to the Government shall be belted into belts of 50 links and the belt placed on a plane surface. One end of the belt shall be lifted from the surface, moved over the adjoining links and toward the opposite end of the belt. If each link subassembly (Drawing 2471117) does not rotate completely, one at a time, as the belt is so lifted and drawn, the link does not meet the requirements of 3.4.8.4. The tests shall be repeated by moving the opposite end of the belt over adjoining links. Defective links shall be discarded and the tests shall be repeated.

4.6.2 Acceptance criteria. Lot quality for the acceptance tests of 4.6.1.1 shall be judged in accordance with Standard MIL-STD-105, Acceptable Quality Level (AQL) 1.0 percent defective. Failure of the link to meet the requirements of 3.4.1 through 3.48.3 shall be cause for rejection of the lot represented. Resubmittal of unacceptable lots shall be as specified in the contract or order (see 6.2).

4.6.3 Reproduction tests. The preproduction tests shall include all of the acceptance tests of 4.6.1.1 to 4.6.1.13, inclusive, and the function tests of 4.6.3.3 to 4.6.3.5, inclusive. Preproduction tests shall be performed as specified herein and in Table I.

4.6.3.1 Temperature-conditioning. The Government-loaned property of 3.8 (a), (b), and (c) shall be assembled into the Gun Pod Mark 4 Mod 0. Link samples shall be belted Into four belts of 25 links, each composed as follows: one Mod 5 leading link, followed in order by 23 Mod 4 links and one Mod 6 trailing link. The belts shall be loaded with Mark 105 target practice rounds, except that each leading link shall remain empty. Two belts shall be loaded into the ammunition magazine as specified in Publication OP 2719, and the assembled gun pod shall be temperature-conditioned at minus 65 degrees F. plus 10.0 degrees F. minus 5.0 degrees F. until all components have been thermally stabilized at the specified temperature. The gun pod shall then be fired as specified in 4.6.3.3. After firing, any required gun pod maintenance shall be performed as specified in Publication

Table I. Preproduction inspection.

Examination or test	Requirement paragraph	Method paragraph	Number of sample units to be inspected	Number of defectives allowed
Group I				
Material and workmanship	3.2, 3.3, and 3.10	4.6.1.1	12 Mod 4 10 Mod 5 10 Mod 6	0 0 0
Group II				
Salt spray	3.6.1	4.6.1.2	10 Mod 4	0
Group III				
Round retention Round separation Flange strength	3.4.1 3.4.2 3.4.3	4.6.1.3 4.6.1.4 4.6.1.5	10 Mod 4 10 Mod 5 10 Mod 6	0
Group IV				
Linking Unlinking	3.4.4 3.4.5	4.6.1.6 4.6.1.7	20 Mod 4 10 Mod 5 10 Mod 6	0
Group V				
Pitch distance Belt strength	3.4.6 3.4.7	4.6.1.8 4.6.1.9	11 Mod 4	0
Group VI				
Twist	3.4.8.1	4.6.1.10	13 Mod 4	0
Group VII				
Fanning, projectile end out Fanning, case end out	3.4.8.2 3.4.8.3	4.6.1.11 4.6.1.12	60 Mod 4	0
Group VIII				
Stacking	3.4.8.4	4.6.1.13	350 Mod 4	0
Group IX				
Belt feeding	3.5.1	4.6.3.3	256 Mod 4 from GR VIII	
Link positioning Link and case ejection	3.5.2 3.5.3	4.6.3.4 4.6.3.5	2 Mod 5 2 Mod 6	0
Group X				
Temperature extremes	3.6.2	4.6.3.3 through 4.6.3.5	92 Mod 4 from GR VIII 4 Mod 5 4 Mod 6	0

OP 2719. The two remaining belts shall be loaded into the magazine, and the gun pod shall be temperature-conditioned at 165 degrees F. plus 5.0 degrees F. minus 10.0 degrees F. until all components have been thermally stabilized at the specified temperature. The gun pod shall be fired as specified in 4.6.3.3.

4.6.3.2 Samples for ambient temperature testing. Sample links shall be belted into two belts of 130 links, each composed as follows: one empty leading link, followed by 128 Mod 4 links and one trailing link. The Mod 4 links and the trailing link shall be loaded with Mark 105 target practice rounds. The belts shall be loaded into the ammunition magazine of the assembled gun pod and shall be subjected to the tests of 4.6.3.3, 4.6.3.4, and 4.6.3.5

4.6.3.3 Belt feeding test. The assembled gun pod shall be prepared for firing as specified in Publication OP 2719. The gun mechanism shall be cycled and each pair of belts composed of 25 links shall be fired through the gun pod in a single burst. The belts composed of 130 links shall be fired in three bursts of approximately 86 rounds per burst. Failure of any link to meet the requirements of 3.5.1 and 3.6.2 shall be cause for rejection of the preproduction sample. The link shall not be judged defective if it is verified to the satisfaction of the Government representative that a stoppage or other malfunction was caused by a component other than the links under test.

4.6.3.4 Link positioning test. Belted and loaded links, fired as specified in 4 .6.3.3, shall be tested for con. formance to 3.5.2 and 3.6.2. Failure to meet these requirements shall be cause for rejection of the preproduction sample. The link shall not be judged defective if it is verified to the satisfaction of the Government representative that a malfunction was caused by a component other than the links under test.

4.6.3.5 Link and case ejection test. Belted and loaded links, fired as specified in 4.6.3.3, shall be tested for conformance to 3.5.3 and 3.6.2. Failure to meet these requirements shall be cause for rejection of the preproduction sample. The link shall not be judged defective if it is verified to the satisfaction of the Government representative that a malfunction was caused by a component other than the links under test.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Preservation application. The supplementary oil finish of Specification MIL-P-16232, applied subsequent to phosphate coating, shall serve as the preservative for each Mod 4 link. Mod 5 and Mod 6 links shall be painted in accordance with their applicable documents. No additional preservation is required for Mods 4, 5, and 6 links.

5.1.1.2 Unit packaging. Not applicable.

5.1.2. Level C.

5.1.2.1 Preservation application. Presentation application shall be as specified in 5.1.1.1.

5.1.2.2 Unit packaging. Not applicable.

5.2 Packing.

5.2.1 Level A.

5.2.1.1 Exterior containers. Mod 4 links, in numbers specified in the contract or order (see 6.2), shall be belted into ammunition belts and packed into containers conforming to drawings listed in LD 615436. Mod 5 links, in quantities specified in the contract or order, shall be packed into containers conforming to LD 615437. Mod 6 links, in quantities specified in the contract or order, shall be packed into containers conforming to LD 615438.

5.2.1.2 Cushioning. The pack shall incorporate sufficient cushioning material, bracing, or other adequate shock absorbing devices, to ensure that the link will meet all of the requirements of section 3.

5.2.2. Level C.

5.2.2.1 Exterior containers. Links shall be packed to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Shipping containers shall conform to the carrier rules and regulations applicable to the mode of transportation.

5.3 Marking.

5. 3.1 Special marking. None, unless otherwise specified.

5.3.2 Normal marking. In addition to the marking required by the contract or order, shipping containers shall be marked in accordance with Standard MIL-STD-129.

6. NOTES

6.1 Intended use. The links covered by this specification are intended for linking into 20MM ammunition belts for use with the 20MM Aircraft Gun Mark 11 Mod 5.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.
(b) Size of preproduction sample if different from 3.1.
(c) Facility designated to evaluate the preproduction sample.
(d) Government-furnished property (see 3.7).
(e) Government-loaned property (see 3.8).
(f) Lot size If different from 4.3.
(g) Procedure for resubmittal of rejected lots.
(h) Preservation, packaging and w.eking levels.
(i) Special marking of shipping containers if required.
(j) Invocation of Specification MIL-Q-9858.

6.3 Reliability. Extreme care must be exercised in establishing the production system and quality control practices for parts covered by this specification to assure an adequate overall gun system reliability. Each subsystem must have considerably higher individual reliability than the overall 7,000 rounds per stoppage needed for the Mark 4 Gun Pods of which this item is a part. These reliabilities cannot be assured by an after the fact inspection to an AQL and are therefore beyond the written requirement of the specification. However, it has been shown that high reliabilities can be achieved even though inspection AQL's are relatively low (ammunition, for example) if a good production system and control Is followed. To Illustrate the component requirement, the subsystems must perform to stoppage rates no greater than those listed below if the 7,000 rounds per stoppage

reliability level of the Mark 4 Gun Pod is to be maintained.

Item	Stoppage/rounds fired
Ammunition	1/100,000
Link	1/100,000
Loader	1/20,000
Gun	1/20,000
Pod	1/50,000

LINK COMPONENTS

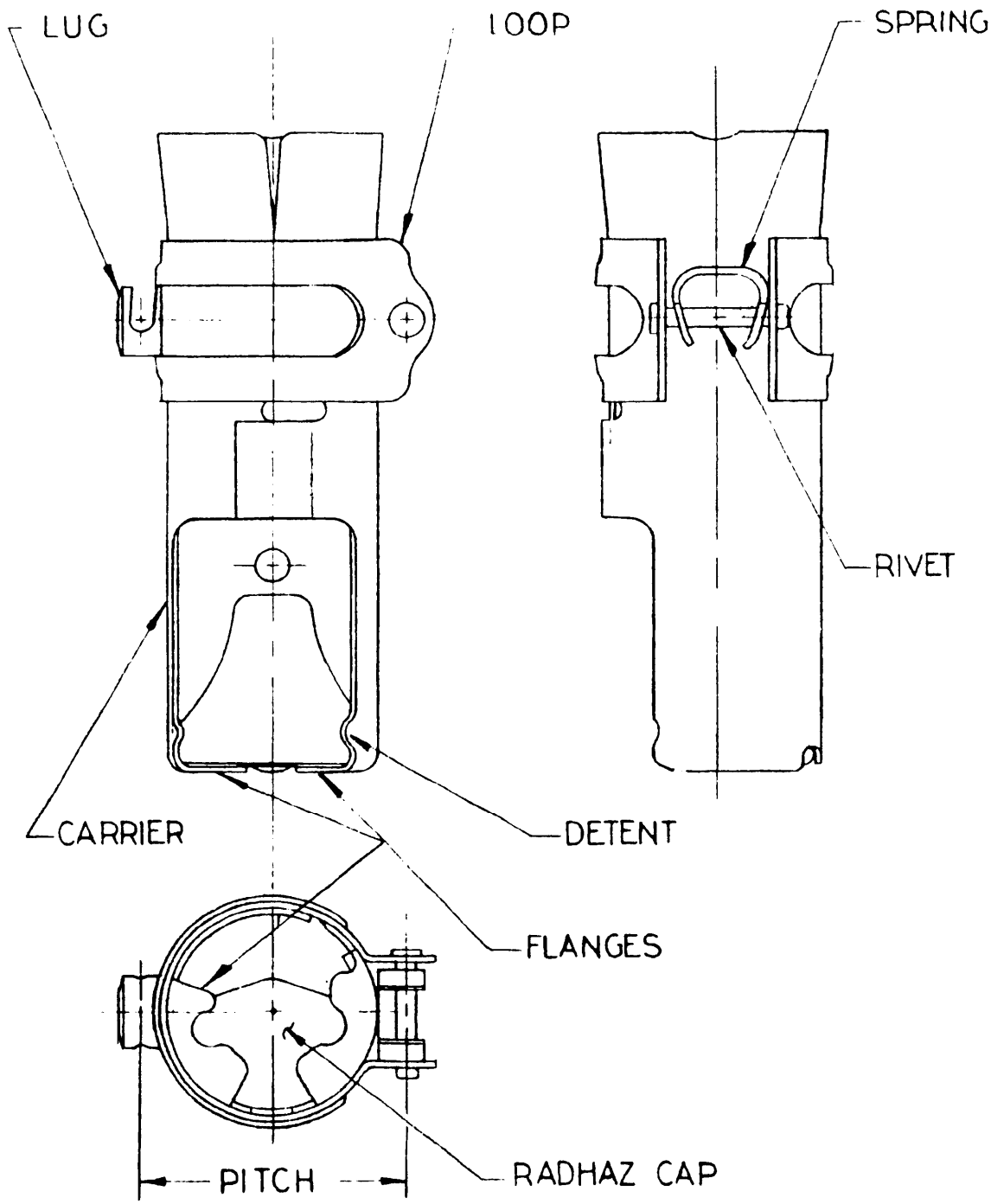


FIGURE 1

BELT UNLINKING TEST

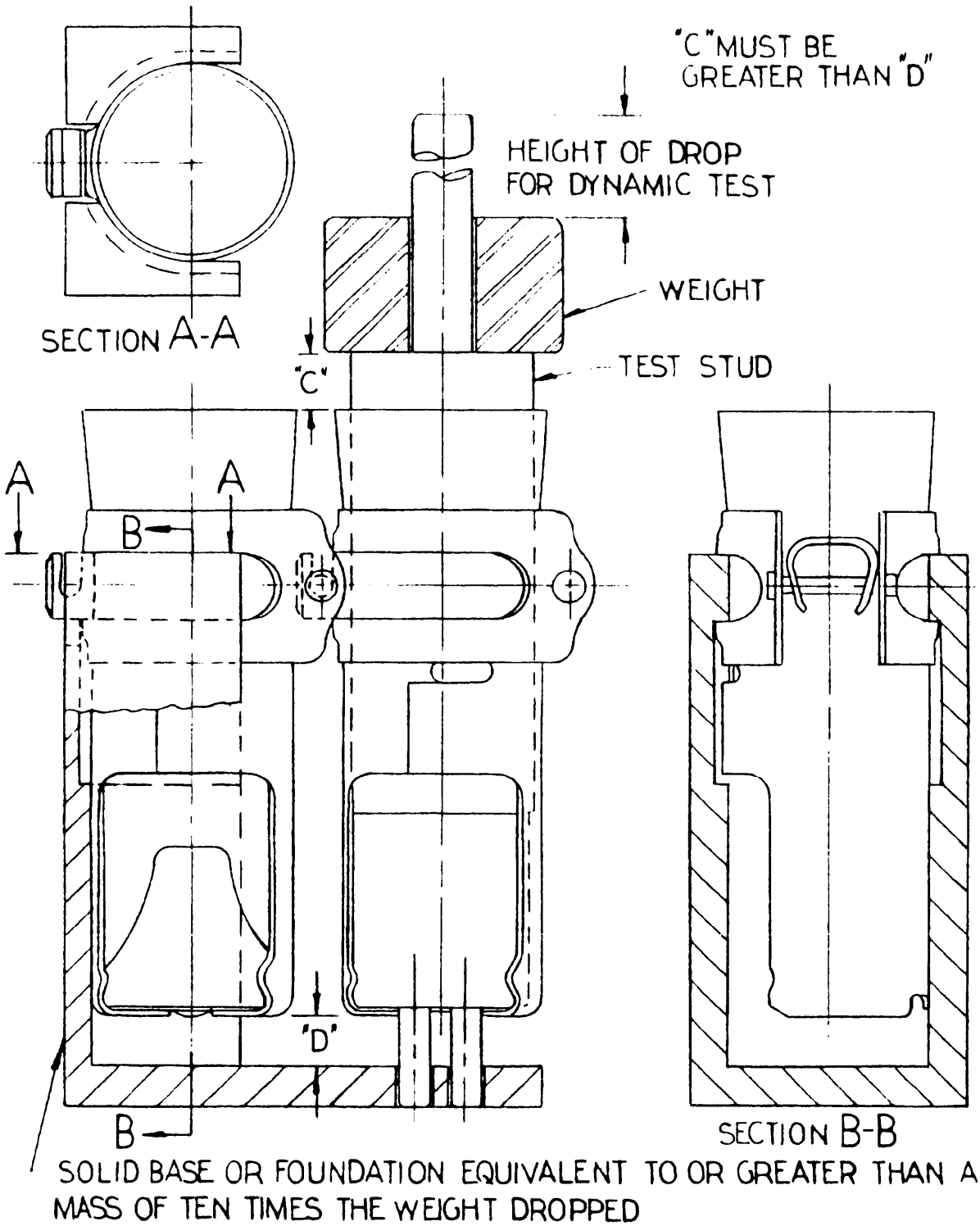


FIGURE 2

ROUND RETENTION TEST

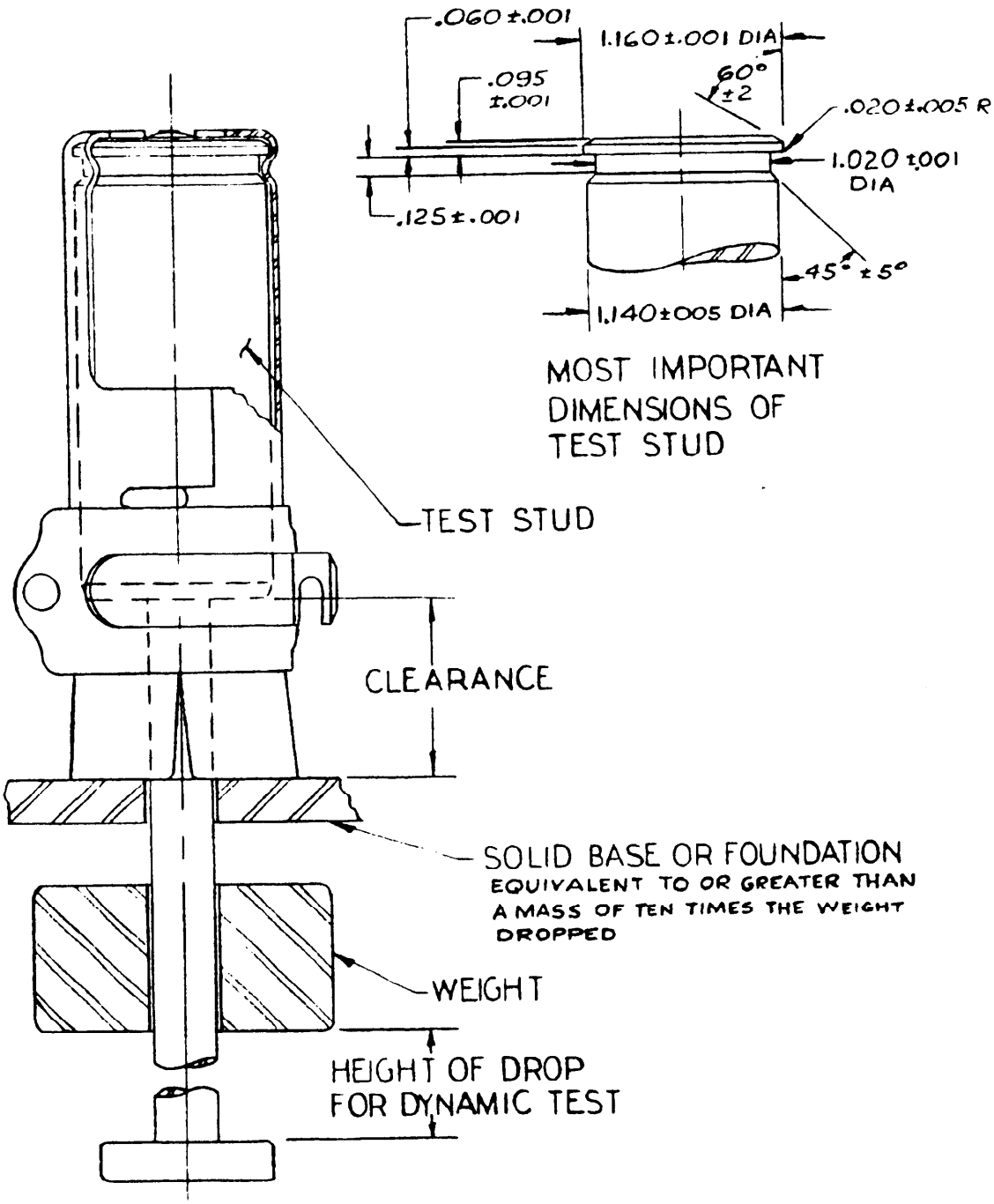


FIGURE 3

FLANGE STRENGTH TEST

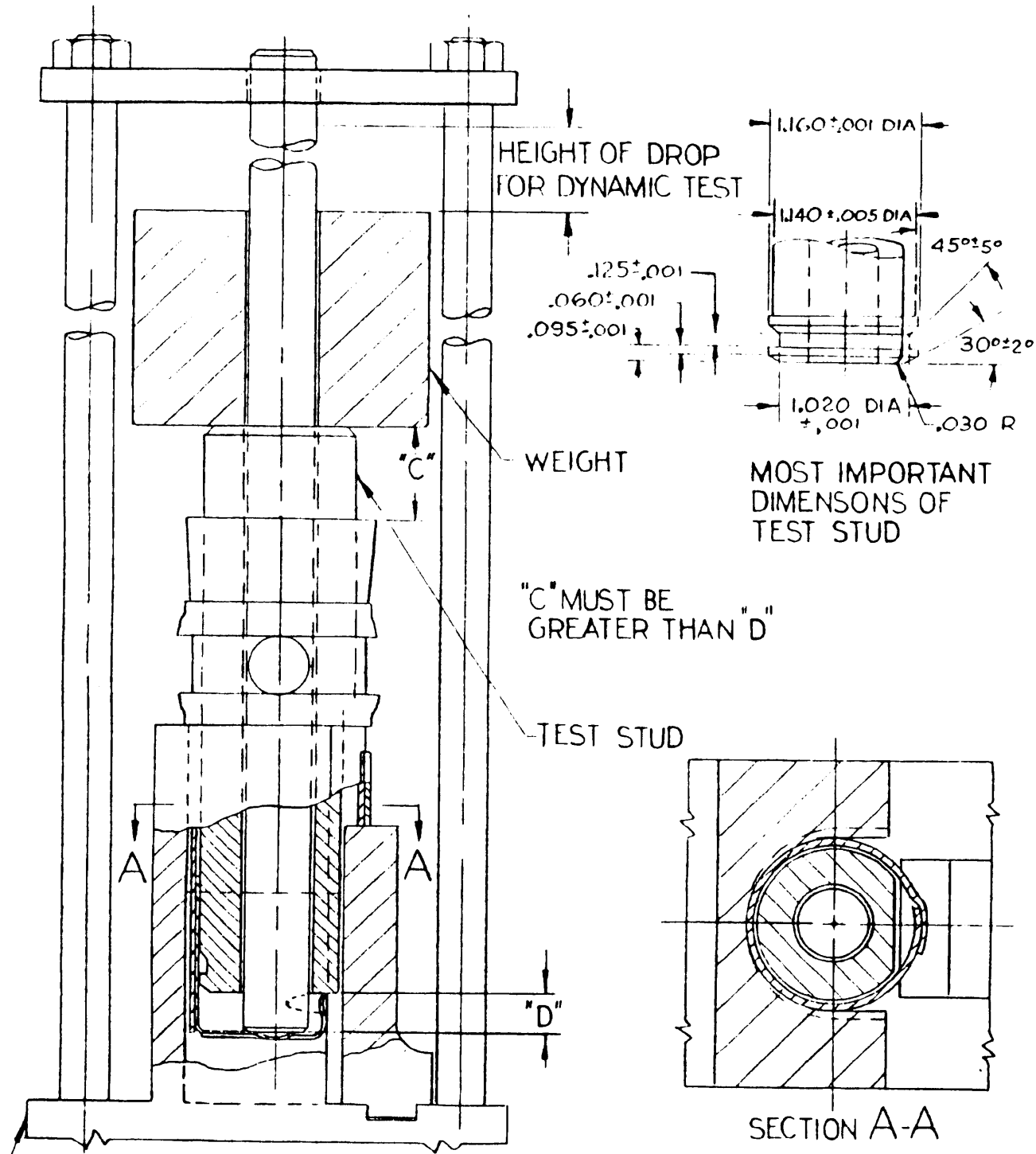
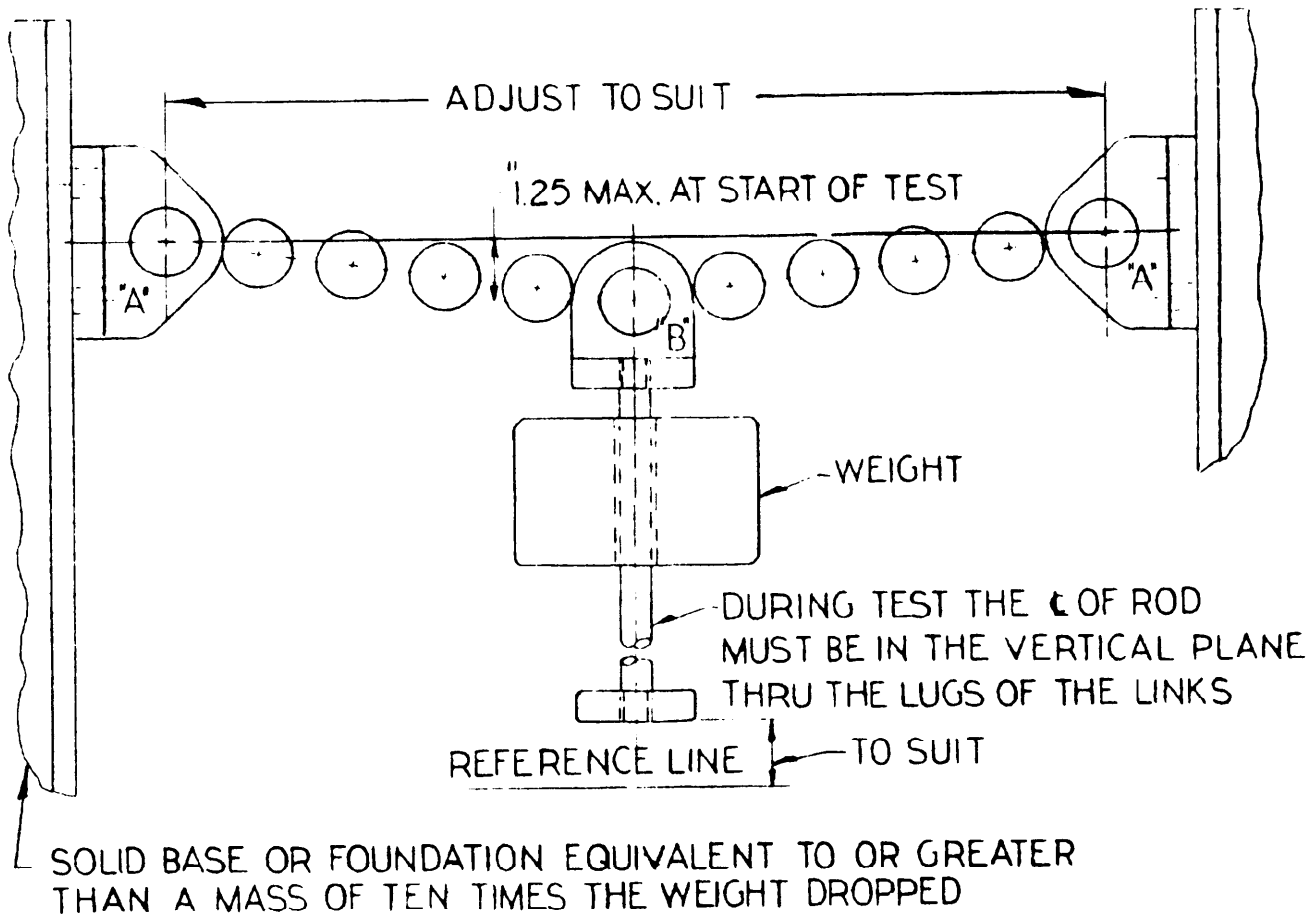
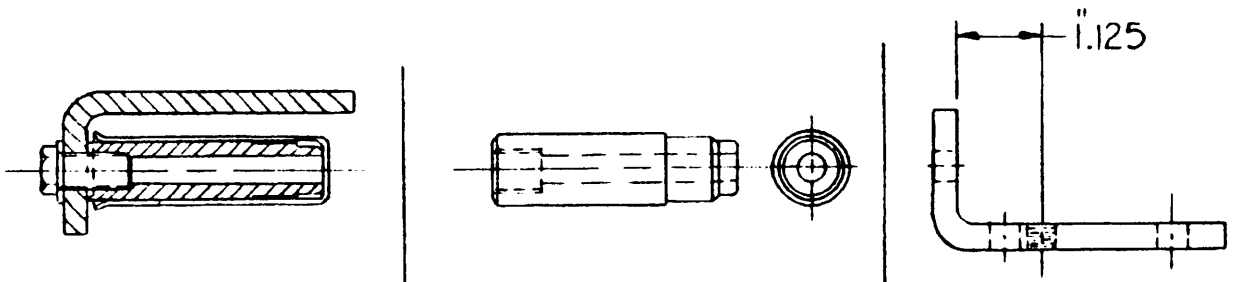


FIGURE 4

BELT STRENGTH TEST



TEST ARBOR (3 REQUIRED)



TYPICAL ASSEMBLY | TEST ARBOR | BRACKETS A & B

FIGURE 5

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

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 *(as indicated on reverse hereof)*.

SPECIFICATION
MIL-L-22624A(Wep) Link, Ammunition, 20mm, Mark 6 Mods 4, 5, and 6 (Assembly)

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

DD, FORM 1 APR 63 1426

FOLD

DEPARTMENT OF THE NAVY
Bureau of Naval Weapons
Washington, D. C. 20360

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