DEPARTMENT OF THE ARMY
UNITED STATES ARMY TANK - AUTOMOTIVE AND ARMAMENTS COMMAND
ARMAMENT AND CHEMICAL ACQUISITION AND LOGISTICS ACTIVITY
ROCK ISLAND, ILLINOIS 61299-7630

April 7, 1998

REPLY TO
ATTENTION OF

Safety Office, Armament and Chemical Acquisition
And Logistics Activity

Ms. Michele L. Burgess
Nuclear Regulatory Commission
Sealed Source Safety Section
Washington, D.C. 20555-0001

Dear Ms. Burgess:

Attached you will find a proposed design modification for the U.S. Army M67 Mortar Sight Unit authorized under Nuclear Regulatory Commission (NRC) Registration Certificate Number NR-0155-D-126-S (Model M67 tritium illuminated mortar sight) and held under NRC License 12-00722-06.

The design modification adds a spacer under the course azimuth dial for improved unit operation as noted in the modification package. The added spacer is a single piece of stainless steel, which is a compatible with the stainless steel body of the M67 Sight Unit. The proposed design modification was forwarded to Ms. Michele Burgess via FAX through John Jankovich on March 10, 1998 and color photographs were supplied to Ms. Burgess via mail the following week. Further modification and clarifications were discussed with Ms. Burgess via phone conference with Messrs. Wai Luk, Mark Lovelace, Rich Fliszar and Mark Lindenbaum of Picatinny Arsenal on April 1, 1998.

The modification package is submitted for your review, certification and addition to the original M67 certification package.

The POC for this amendment is Mr. Timothy J. Mohs, Radiation Safety Officer commercial phone number (309) 782-6228, e-mail mohst@ria.army.mil.

Sincerely,

Vernon E. Vondera

Vernon E. Vondera
Chief, ACALA Safety

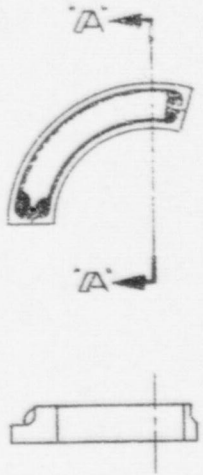
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
X1	REPLACES REV X0 WITH CHANGE, ERR FRAF.5030	76-12-30	
—	PRODUCTION RELEASE ERR FRAF60188	77-02-04	
A	NOR F4J2001/840320	850711	MR
B	NOR M8J3005/880422	890222	

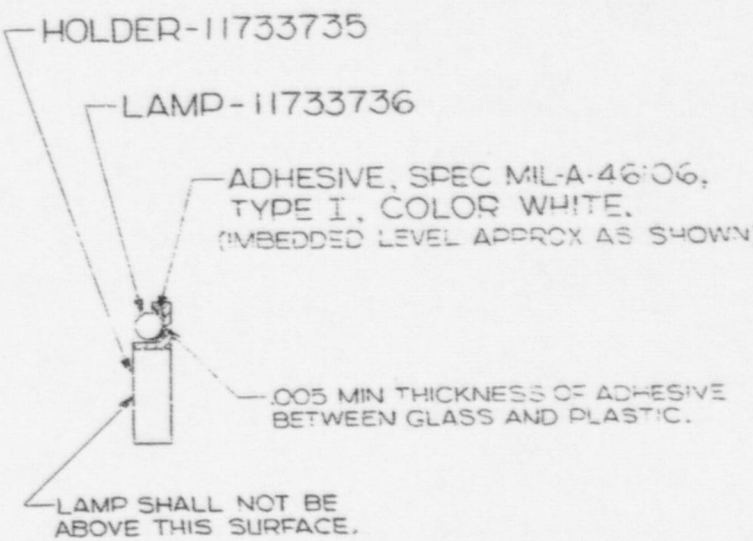
REQUIREMENTS:

1.

2. THERE SHALL BE NO EVIDENCE OF PHYSICAL FAILURE SUCH AS LIGHT LOSS DUE TO EXPOSING THE POTTED LAMP TO -80°F AND +160°F FOR A PERIOD OF 8 HOURS AT EACH TEMPERATURE.

3. REMOVABLE RADIOLOGICAL CONTAMINATION BY WIPING SHALL BE LESS THAN 1000 DPM.





SECTION "A"-"A"

SEE SEPARATE PARTS LIST-11733741

APPLICABLE DOCUMENTS

SQAP 11733741

CURRENT DESIGN ACTIVITY FSCM NO. 19200
U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER
DOVER, NEW JERSEY 07801

PART No. 11733741

MIN. MECHANICAL PROPERTIES		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	ORIGINAL DATE 74 MAR 11
YS		TOLERANCES ON FRAC ± DECIMALS ± ANGLES ±	DRAFT 4C CHK T.J.
TS		MATERIAL	TRACER CHK DDZ
EL %			ENGR ENGR
RA		HEAT TREAT	SUBMITTED M. F. Quaranta
BH		PROTECTIVE FINISH	APPROVED L. Polidoro
BN			

F1174179GMT TLSCP

SEE ENGINEERING RECORDS

NEXT ASSY USED ON

APPLICATION

DO NOT APPLY IDENTIFICATION PER MIL-STD-130

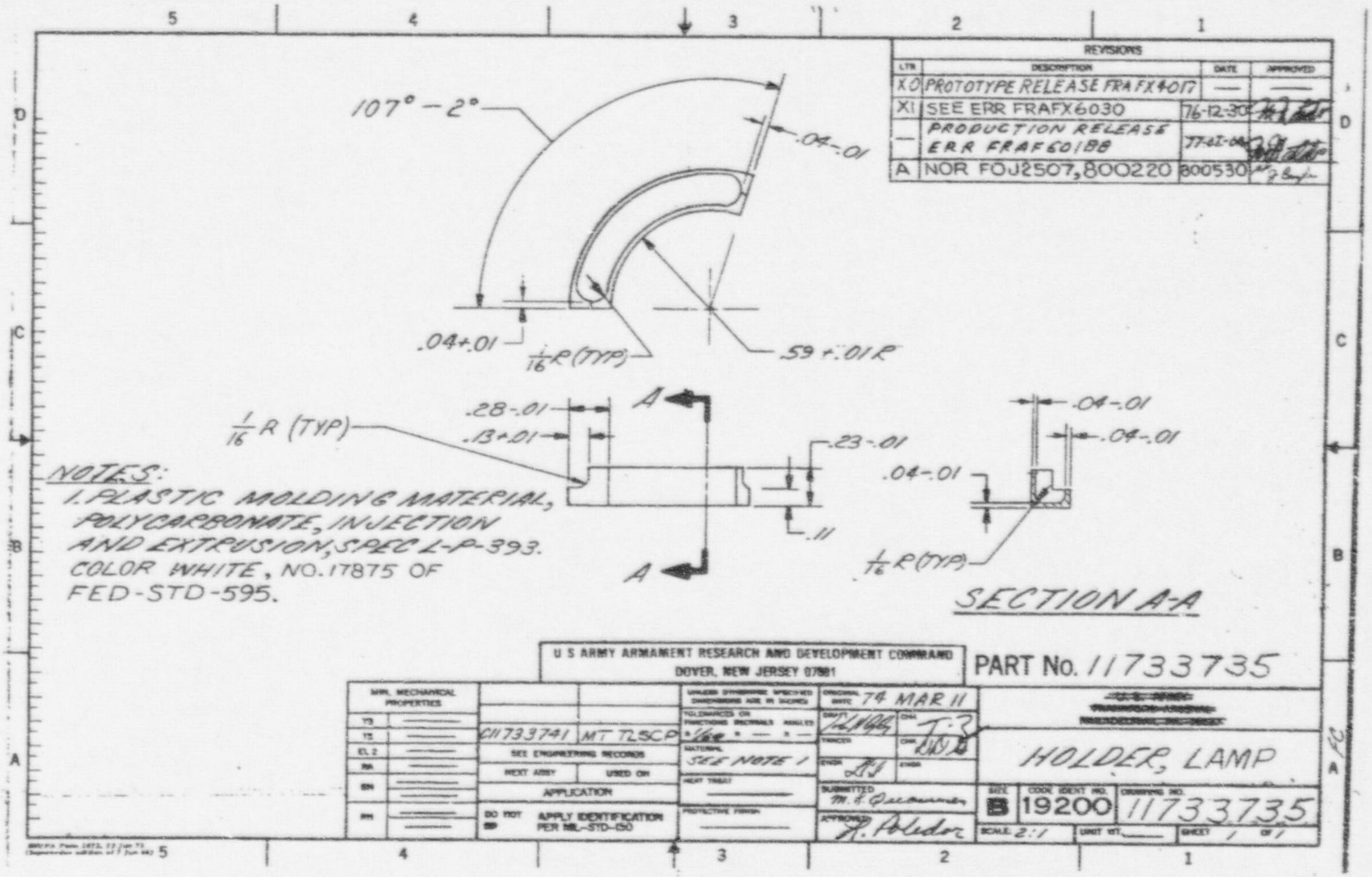
U. S. ARMY
FRANKFORD ARSENAL
PHILADELPHIA, PA. 19137

LAMP RADIOLUMINOUS (POTTED)

SIZE	CODE IDENT NO.	DRAWING NO.
C	19200	11733741

SCALE 2:1 UNIT WT. — SHEET 1 OF 1

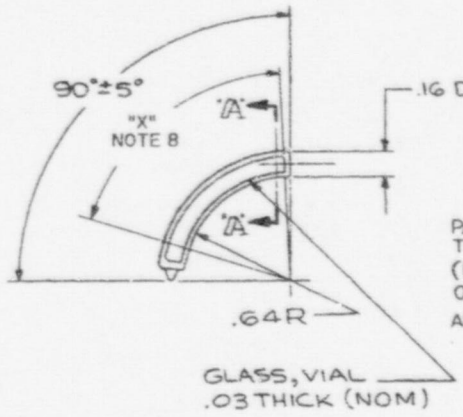
4 REPLACES SHAPA FROM 1973, 15 JUN 73, WHICH WILL BE USED.


REVISIONS
LTR | DESCRIPTION | DATE | APPROVED
XO | PROTOTYPE RELEASE FRA FX4017 | — | —
X1 | SEE ERR FRAFX6030 | 76-12-30
— | PRODUCTION RELEASE ERR FRAF60188
A | NOR FOJ2507,800220 | 800530
107° - 2°
.04-.01
.04+.01
1/16 R (TYP)
.59 +.01 R
A
A
.28-.01
.13+.01
1/16 R (TYP)
.23-.01
.11
.04-.01
.04-.01
.04-.01
1/16 R (TYP)
SECTION A-A
NOTES:
1. PLASTIC MOLDING MATERIAL, POLYCARBONATE, INJECTION AND EXTRUSION, SPEC L-P-393. COLOR WHITE, NO. 17875 OF FED-STD-595.
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND
DOVER, NEW JERSEY 07801
PART No. 11733735
MATL MECHANICAL PROPERTIES
C11733741 | MT T2SCP
SEE ENGINEERING RECORDS
NEXT ASSY | USED ON
APPLICATION
DO NOT APPLY IDENTIFICATION PER MIL-STD-130
MATERIAL SEE NOTE 1
ORIGINAL DATE 74 MAR 11
HOLDER, LAMP
SIZE B
CODE IDENT NO. 19200
DRAWING NO. 11733735
SCALE 2:1
SHEET 1 OF 1

REQUIREMENTS:

1.
2. THERE SHALL BE NO EVIDENCE OF PHYSICAL FAILURE SUCH AS FRACTURING OR LIGHT LOSS DUE TO EXPOSING THE LAMP TO -80°F AND +160°F. FOR A PERIOD OF 8 HOURS AT EACH TEMPERATURE.
3. AFTER SUBMERGING THE LAMP IN ROOM TEMPERATURE WATER FOR 4 HOURS, RADIOACTIVE CONTENT OF THE WATER SHALL NOT EXCEED .005 MICROCURIE.
4. VIAL TO BE FILLED WITH TRITIUM (H_3) OF 94-96% PURITY, LESS THEN 1% TRITIUM OXIDE. TOTAL 1.0 CURIES MAXIMUM.
5. PRIOR TO MAKING BRIGHTNESS MEASUREMENTS, LAMPS SHALL BE ALLOWED TO STABILIZE FOR A PERIOD OF 25 DAYS FROM MANUFACTURE.
6. FOLLOWING THE STABILIZATION PERIOD AND UP TO 120 DAYS FROM DATE OF MANUFACTURE, BRIGHTNESS MEASUREMENTS SHALL NOT SHOW A DECAY IN EXCESS OF 2.5% WHEN MEASURED OVER ANY CONSECUTIVE 30 DAY PERIOD. FURTHER, THE FINAL BRIGHTNESS MEASUREMENT AT TIME OF ACCEPTANCE SHALL BE 600 MICROLAMBERTS MINIMUM.
7. INTERNAL PRESSURE 2.50 ATMOSPHERES (NOMINAL) AT +70°F.
8. PHOSPHOR COATED ARC LENGTH "X" SHALL BE 65° MINIMUM. COLOR OF PHOSPHOR: GREEN SPECTRAL PEAK 5250 Å ± 50 Å 1/2 PEAK WIDTH 700 Å ± 50 Å.
9. THE MANUFACTURER MUST HAVE THE LAMP REGISTERED WITH THE US NUCLEAR REGULATION COMMISSION (NRC) AND HAVE OBTAINED THE LAMP NRC REGISTRATION NUMBER.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
X1	REPLACES REV X0 WITH CHANGE, ERR FRAFX6030	76-12-30	
—	PRODUCTION RELEASE ERR FRAF60188	77-02-04	
A	NOR F8A5041, 790109	800530	
B	NOR F9J2515, 79-11-06 (ECP F0J2501, 80-02-20)	80-08-08	
C	NOR F4J2001/840320 (ECP F4J2002/840321)	860711	
D	NOR M8J3005/880422	890222	
E	NOR D2J2007/920901	921016	
F	NOR D4A2031/950127 (ECP D5J2005/950918) (ECP D5J2007/951122)	960119	FET



PAINT, EPOXY, MIL-C-22750, TYPE I, COLOR 17875 OF FED-STD-595, (180 DEGREES ARC FOR FULL LENGTH OF VIAL), APPLY TWO COATS (MIN). ALTERNATIVE COATING: DWG C11785530.

SECTION A-A

SUGGESTED SOURCE(S) OF SUPPLY	
VENDOR	VENDOR PART NO.
M.B. MICROTEC AG FREIBURGSTRASSE 624 CH-3172-NIEDERWANGEN SWITZERLAND	NOT AVAILABLE

APPLICABLE DOCUMENTS
SQAP 11733736

SPECIFICATION CONTROL DRAWING

CURRENT DESIGN ACTIVITY CAGE CODE 19200
U.S. ARMY
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

PART No. 11733736

DISTRIBUTION STATEMENT A.
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

MIN. MECHANICAL PROPERTIES: YS, TS, EL 2, RA, BH, SH

C11733741 MT. TLSCP
SEE ENGINEERING RECORDS
NEXT ASSY | USED ON
APPLICATION
DO NOT APPLY IDENTIFICATION PER MIL-STD-130

UNLESS OTHERWISE SPECIFIED DIMENSION ARE IN INCHES
TOLERANCES ON FRAC ± —
DECIMALS ± .01 ANGLES ± —
MATERIAL
HEAT TREAT
PROTECTIVE FINISH

ORIGINAL DATE 74 MAR 11
DRAFT LC CHK T.J
TRACER CHK DDJ
ENGR ENGR
SUBMITTED M. P. Quannen
APPROVED A. Polidor

U. S. ARMY
FRANKFORD ARSENAL
PHILADELPHIA, PA. 19137

LAMP, RADIOLUMINOUS

SIZE	FSCM NO.	DRAWING NO.
C	19200	11733736

SCALE: 2:1 UNIT WT. — SHEET 1 OF 1

DAFA-TR FORM 1 NOV 75 — 4 REPLACES DRAFA FORM 1175, 15 JAN 72, WHICH WILL BE USED.

AMSTA-AR-QAW-R 20 Feb. 1998

MEMORANDUM FOR Commander, U.S. Army Armament and Chemical Acquisition and Logistic Activity, ATTN: AMSTA-AC-SF (Mr. Tim Mohs), Rock Island, IL 61299-6000

SUBJECT: Proposed Design Modification to the M67 Mortar Sight Unit

1. Reference MFR, AMSTA-AR-FSF-I, 20 Feb. 1998, Course Azimuth Scale (CAS) Design Change Proposal, encl.

2. Problems presently exist in maintaining proper operation of the course azimuth scale on the M67 mortar sight unit. An engineering design change has been proposed to correct this deficiency. The referenced enclosure documents the safety assessment of the proposed change, which entails the incorporation of a metal spacer ring to that scale assembly. Based on that assessment it does not a appear to this office that the proposed change will have a negative impact on maintaining the structural integrity of the tritium vial that is part of that scale. Also enclosed with the referenced MFR are appropriate drawings, as well as photos, both of the present configuration and of the proposed change, to aid you in your assessment of this matter.

3. It does not appear to this office that further ANSI N540 testing, nor additional live fire testing, will be necessary in regards to this proposed change. It is understood that the final decision in that regard is with your office. Request a decision regarding this matter be received by Mr. Wai's office NLT 10 March 1998. Should you deem it necessary to require further testing, please be specific as to what that testing would need to be, and / or if you feel it necessary to further coordinate this proposal with the NRC. This office is not sure whether the proposed modification will require a change to the registration, even if no further testing is required. Therefore, please provide that guidance also.

4. POC's, should you have any questions regarding this proposed engineering change, are Messrs. Wai Luk, DSN: 880-6925, and Richard Fliszar, DSN: 880-3126.

Richard W. Fliszar

Richard W. Fliszar
Health Physics Manager
Radiation Protection Group
Quality Engineering & Safety Team
Quality Engineering Directorate

CF (w/encl):
AMSTA-AR-FSF-I (Mr. Wai Luk)
AMSTA-AR-QAW (Mr. Geza Pap)

AMSTA-AR-FSF-I

MEMORANDUM FOR RECORD

Subject: Coarse Azimuth Scale (CAS) design change proposal

Objective: To improve the tightness of the CAS on the M67 Sight Unit

Background: During a regular maintenance inspection of M67 Sight Unit, couples of CAS were found loose at Ft. Benning. ARDEC quickly replaced the defected sight units. Since then, the tightness of the CAS has become a concern to the users. PM Mortar was determined to resolve the issue and M67 IPT team was tasked to improve the tightness of the CAS.

Description: After some research and studies, it was found the tightness of the CAS was affected by a few factors. M67 IPT team came up with couple of recommendations to improve the CAS. One of the suggestions requires an addition of a spacer ring on to the retaining ring (12961193). The spacer ring is needed to prevent the plungers from moving side ways. The spacer ring will be secured with a dowel pin and sealing compound. The spacer will sit next to a tritium lamp assembly (11733741) with a gap of 0.03 inches. The tritium lamp assembly consists of a plastic holder (11733735) and a tritium lamp (11733736). The tritium lamp assembly is the configuration for the M67 previously approved by NRC. There will not be any contact between the spacer and the lamp assembly. Referring to the photos:

Fig. 1 shows the present layout of the tritium lamp assembly and plungers.
Fig. 2 shows the spacer ring on the retaining ring without the tritium lamp assembly.
Fig. 3 shows both a spacer ring and the tritium lamp assembly.
Fig. 4 shows the gap between the spacer ring and the tritium lamp assembly.
Fig. 5 show the spacer ring and the dowel pins (note: the spacer ring was sectioned into two pieces for alignment purpose.)

This design change shall make no impact to the tritium lamp from the perspective of the ANSI N540 requirements, which the present M67 design previously passed. In accordance with the criteria of the ANSI N540, the sight unit is subjected to a series of tests—temperature, thermal shock, reduced pressure, impact, vibration, immersion and soak.

Temperature: The sight unit is required to operate at the temperature range of –30 $^{\circ}$C to 65 $^{\circ}$C. The thermal expansion of the spacer ring and the lamp assembly is estimated about 0.008 inches. Since there is a 0.030 inch opening between the spacer and the lamp assembly, they will not touch. No additional stress will be induced to the lamp assembly by the spacer.

Thermal Shock: Similar to temperature test, the spacer has no effect to the lamp assembly.

Reduced Pressure: The reduced pressure test is to test the internal structure integrity of the lamp. The presence of the spacer does not affect the lamp.

Impact: When dropping the sight unit, the probability of hitting the lamp assembly at the retaining ring is the same whether the spacer is installed or not. As a matter of fact, it has been proved in prior ANSI N540 testing that the tritium lamp is very well protected by other feature of the sight unit. Moreover, the additional mass of the spacer does not increase the G force, which is exerted on the lamp assembly.

Vibration: Once the spacer is installed, it will be secured with a dowel pin and sealing compound and become stationary. In accordance with ANSI N540, frequency of 10 Hz to 55 Hz is used for the vibration test. Since the majority of the sight unit is made out of steel, the stiffness is estimated about 1x 10 E 6 lb/in. With the addition of the spacer, the natural frequency of the sight unit is estimated about 1717 Hz. This value should not be any cause for concern to the stability of the tritium lamp.

Immersion & Soak: Since the spacer is made out of steel, there is not any water absorption. For the lamp holder, it will absorb 0.15% of water for 24 hr. soak. The increment of the size is very minimal and will not affect the tritium lamp.

Besides the ANSI N540 test, the live firing test is not required. That is because the shock from the live fire is the same. With the additional mass/weight of the spacer, the G force exerting on the sight unit will be decreased.

Wai Luk
Mechanical Engineer
FSAC

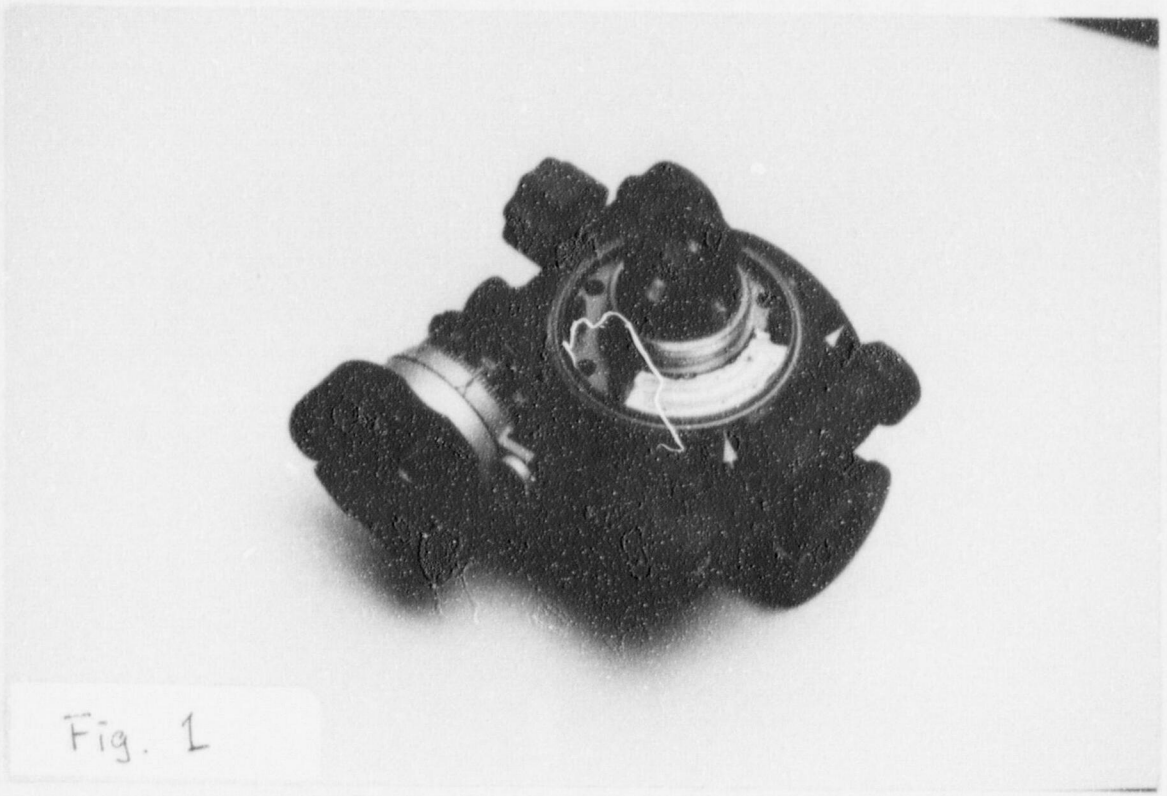


Fig. 1

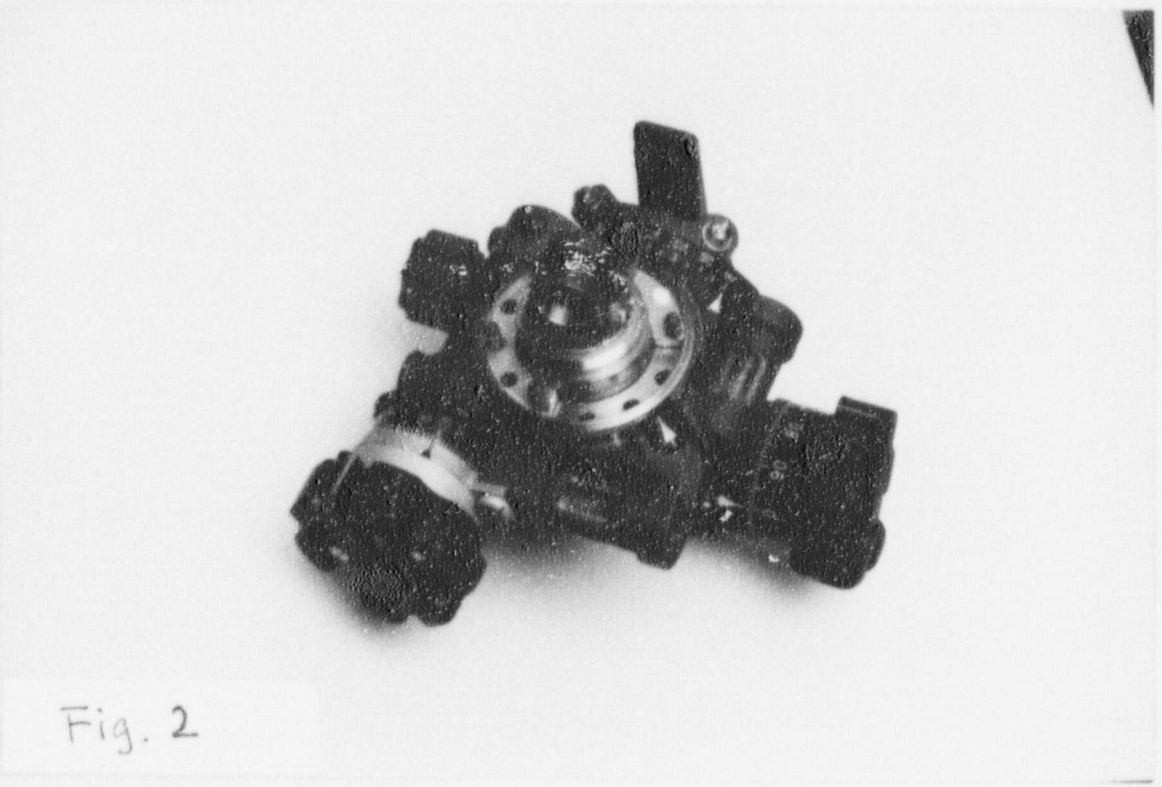


Fig. 2

Fig. 3

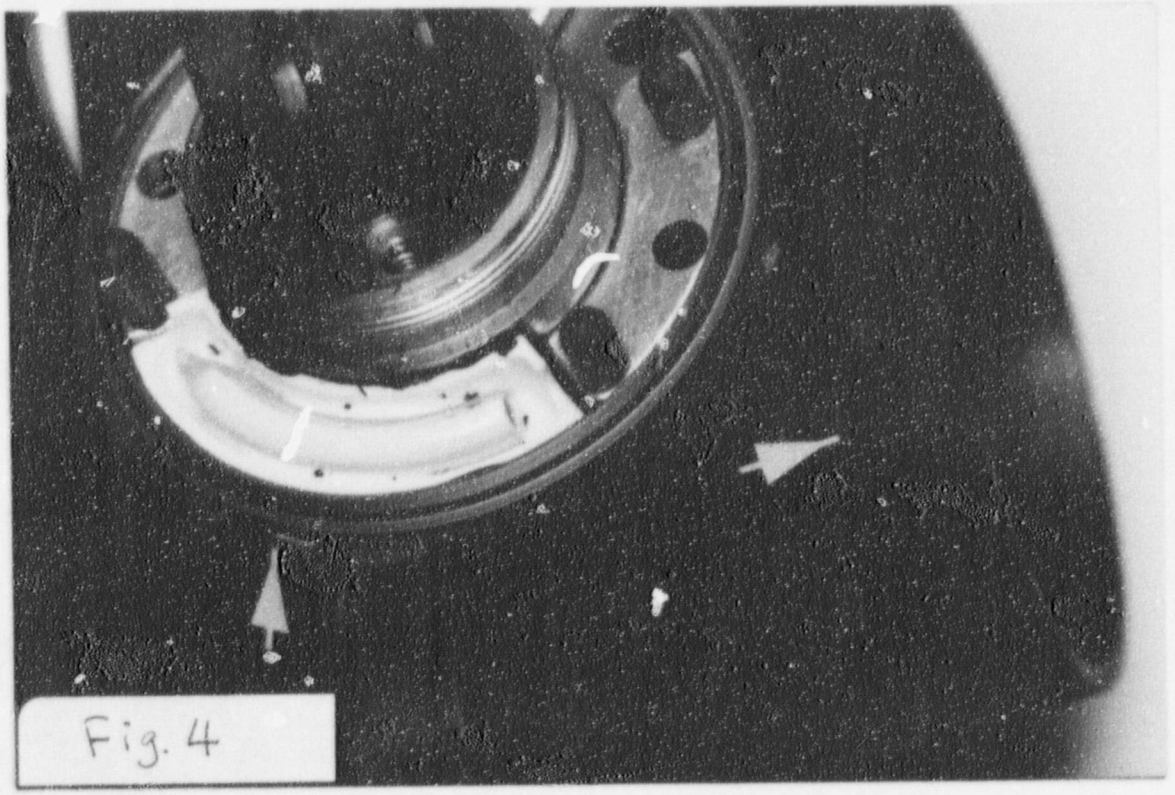


Fig. 4

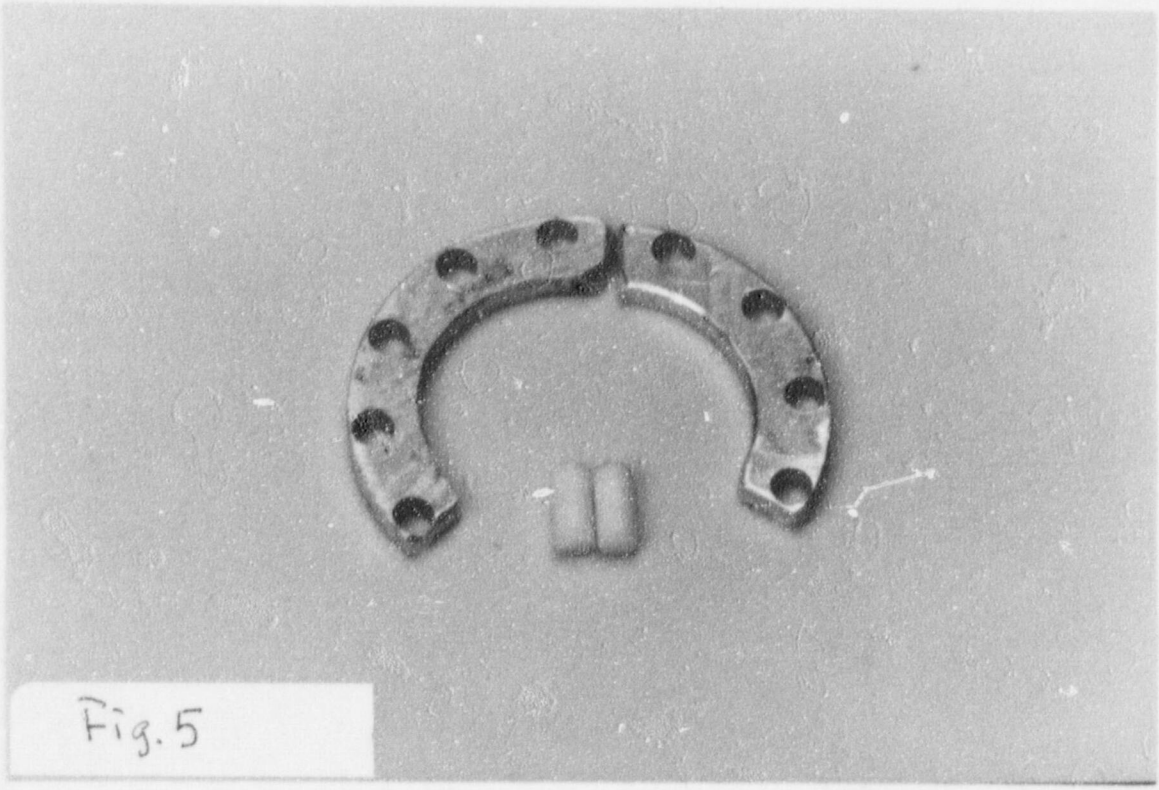
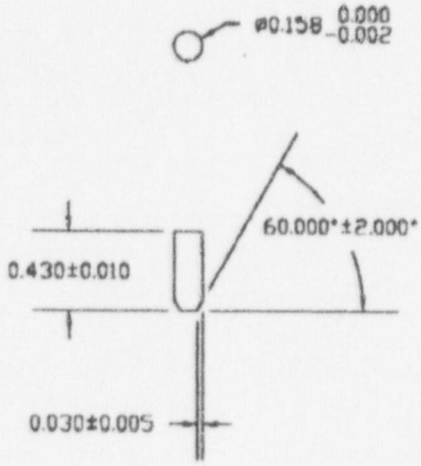


Fig. 5

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

Material: Nylon



ARDEC

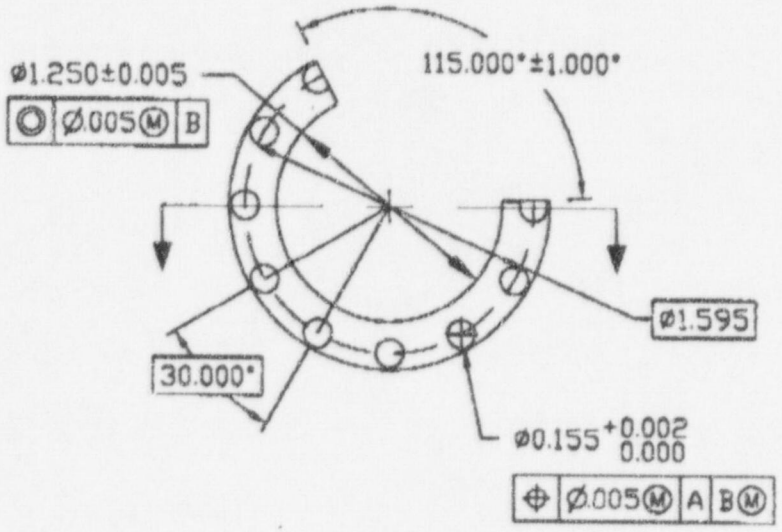
DOWEL PIN

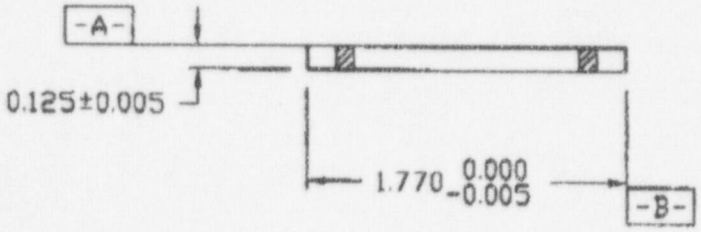
SIZE	FSCM NO.	DWG NO.	REV

SCALE		SHEET

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

Material: Stainless Steel – 400 series





ARDEC

SPACER RING

SIZE	FSCM NO.	DWG NO.	REV
A			

SCALE SHEET

ZONE	LTR	REVISIONS DESCRIPTION	DATE(YR M DA)	APPROVED
	-	PRODUCT BASELINE ERR 04A2006	940805	RR

NOTES: -

1 APPLICABLE STANDARDS/SPECIFICATIONS:
MIL-STD-100E
ANSI Y14.5M-1982
MIL-F-13926

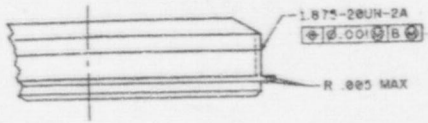
2 MATERIAL: FREE-MACHINING STAINLESS STEEL, TYPE 416 OR 416Se, COND A, ASTM A582.

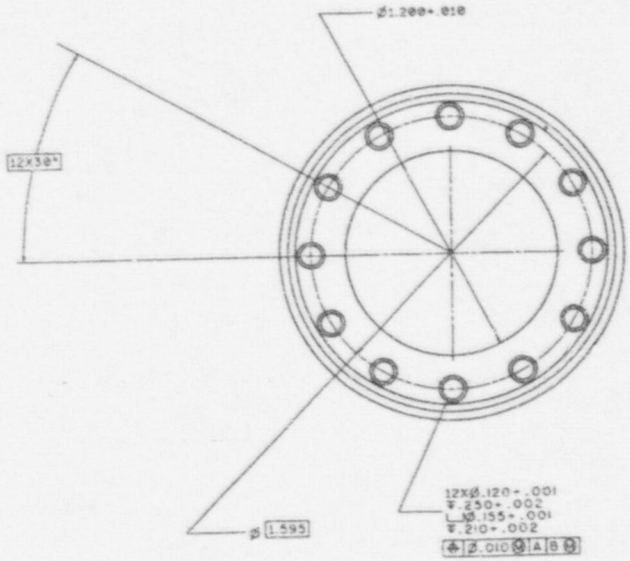
3 125 ALL SURFACES EXCEPT AS NOTED.

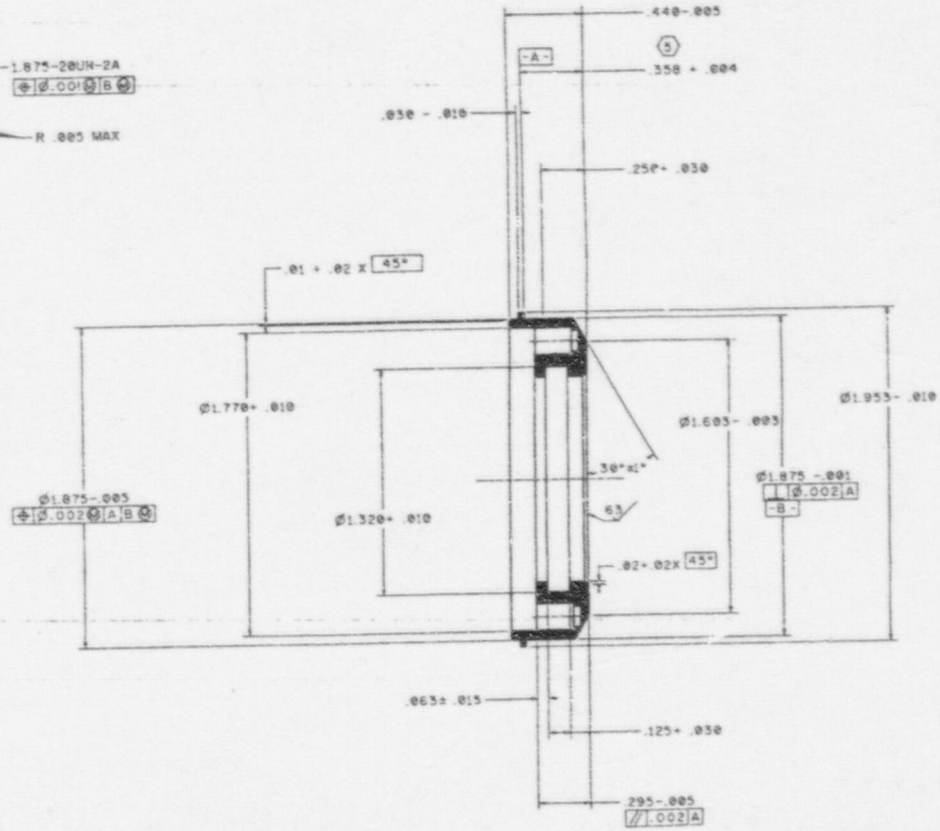
4 PROTECTIVE FINISH: FINISH 5.4.1 OF MIL-STD-171.

(5) ALLOWANCE MADE FOR FINAL MACHINING.

6 GAP 12961193 APPLIES.







SECTION A-A

PART NO. 12961193

RING, RETAINING

F | 19200 | 12961193

DISTRIBUTION STATEMENT A
APPROVED FOR PUBLIC RELEASE.
DISTRIBUTION IS UNLIMITED

FIRE SUPPORT
FSAC
ARMAMENTS CENTER

FAX TRANSMITTAL HEADER SHEET

U.S. ARMY
ARMAMENT RESEARCH
DEVELOPMENT AND
ENGINEERING CENTER
PICATINNY ARSENAL, NJ
07806-5000

US ARMY ARMAMENT MUNITIONS & CHEMICAL COMMAND ARMAMENT RDE CENTER

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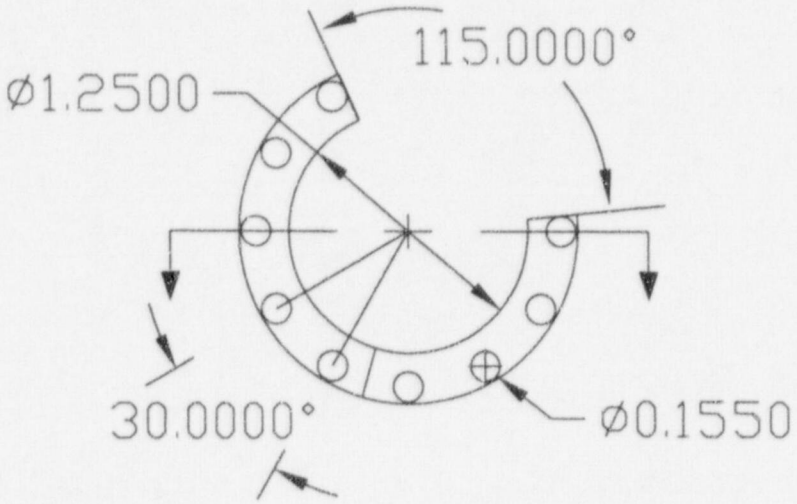
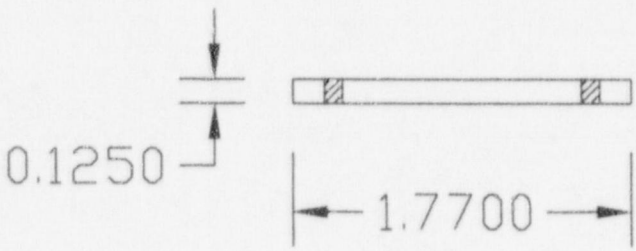
DATE: 4/1/98

TO: Tim Mohs
OFFICE SYMBOL: AMSTA-AC-SF
TELEPHONE NUMBER: DSN 793-6228
FAX TELEPHONE NUMBER: DSN 793-6858

FROM: Wai Luk
OFFICE SYMBOL: AMSTA-AR-FSF-I
TELEPHONE NUMBER: DSN 724-6925
FAX TELEPHONE NUMBER:
NUMBER OF PAGES (INCLUDING HEADER) 3 **CLASSIFICATION:** U
REMARKS: Tim: attached are the latest drawing for the spacer ring and dowel pin.

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED





ARDEC

SPACER RING

	SIZE	FSCM NO.	DWG NO.	REV
	A			
	SCALE		SHEET	

23 March 1998

Michele Burgess,

attached are the pictures for the M67 modification package I FAX'd to you on the 10th of March. These are the pictures I recieved from the poeple who hope to make the subject change to the M67.

Give me a call if you have any questions or problems with the material. My phone number is (309) 782-6228 and my e-mail is tmohs@ria-emh2.army.mil.

Tim Mohs, RSO
ACALA Safety Office

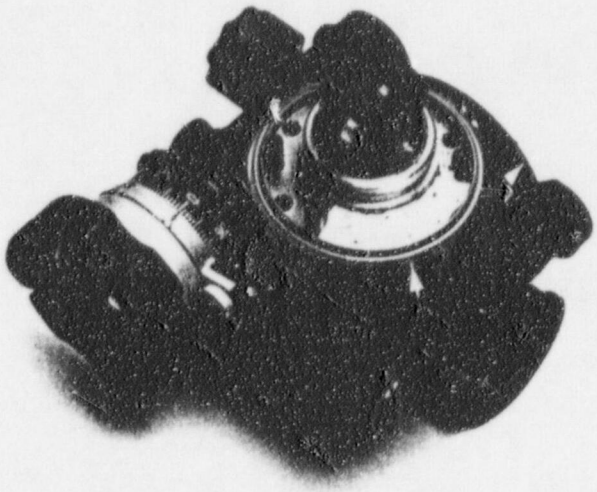


Fig. 1

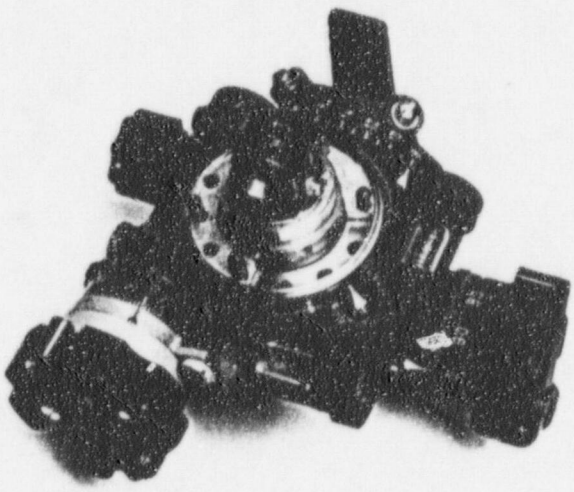


Fig. 2

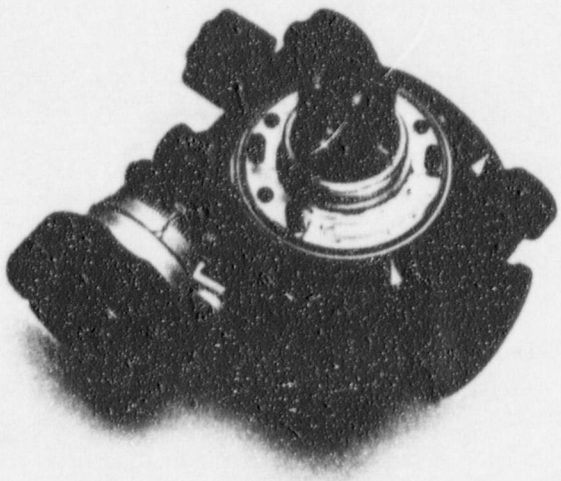


Fig. 3

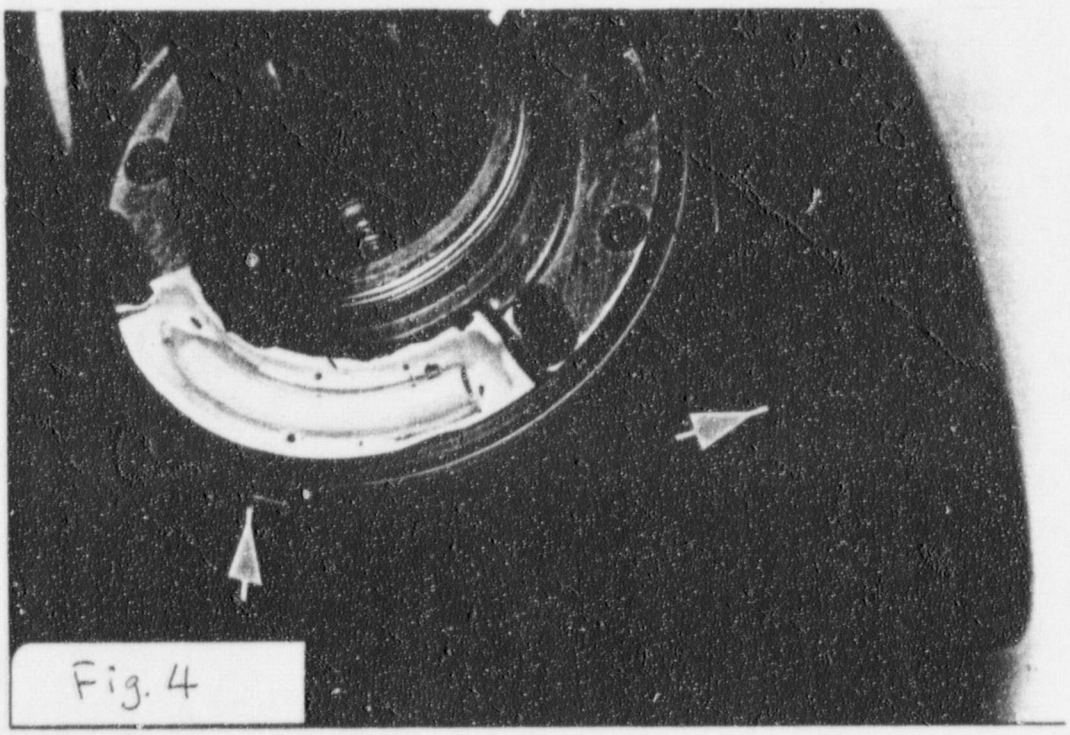


Fig. 4

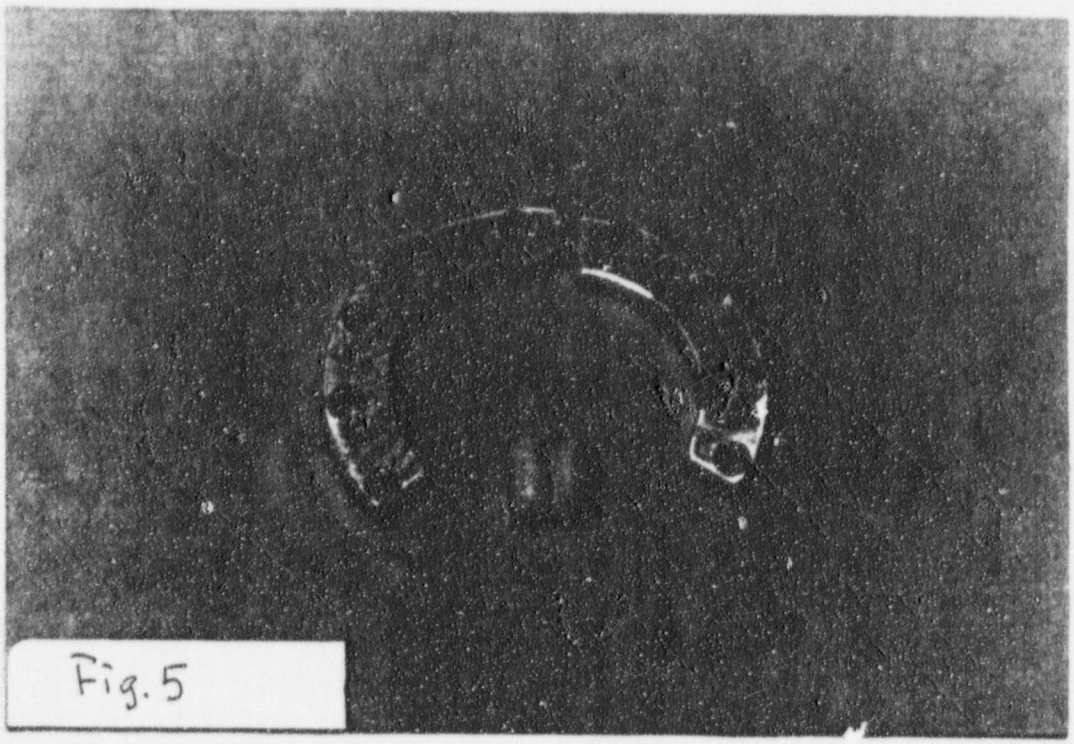
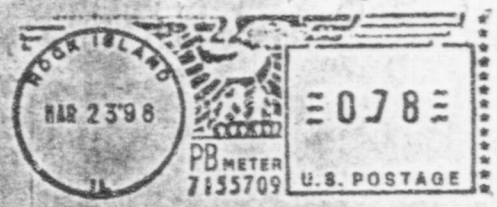


Fig. 5

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TANK — AUTOMOTIVE AND ARMAMENTS COMMAND
ARMAMENT AND CHEMICAL ACQUISITION AND LOGISTICS ACTIVITY
ROCK ISLAND ILLINOIS 61299-7630

OFFICIAL BUSINESS

AMSTA-AC-SF



USNRC
ATTN: MICHELE BURGESS
MAIL STOP T8F5
WASHINGTON DC 20555

FIRST CLASS

Tim Rors
called 3/20 4:30 pm

Wed – Friday
gone

Rock Island arsenal
e mail pictures
~~David~~ Ziegler 309-782-2995

could send color pictures
one e mail was access denied
others no denial, assumed OK

3/20 Mona is going to send hard copy

TACOM

Mobility and Firepower for America's Army

ARMAMENT AND CHEMICAL ACQUISITION AND
LOGISTICS ACTIVITY
AMSTA-AC-SF
(309) 782- OR DSN 793-
FAX (309) 782-6758/DSN 793-6758
Rock Island, IL 61299-7630

can't see anything on pix, they are sending hard copies 3/13/98 faxed to Jeff H Tim M author's office

TO: John Jamkovich DATE: 3/10/98

OF PAGES: HEADER + 1 FAX # 301 415 5369

FROM:

_____Vernon Vondera, Chief, Safety Office, X1690, vvondera@ria-emh2.army.mil

_____Jeff Havenner, Health Physicist, x2965 jhavenne@ria-emh2.army.mil

__X__Tim Mohs, Health Physicist, x6228, tmohs@ria-emh2.army.mil

_____Gavin Ziegler, Health Physicist, x2995, gziegler@ria-emh2.army.mil

_____Judy Windham, Safety Engineer, X6367, jwindha1@ria-emh2.army.mil

_____Juan Fernandez, Safety Engineer, X6820, jfernand@ria-emh2.army.mil

_____Wayne Cook, Training Instructor, X2429,wcook@ria-emh2.army.mil

_____Carl Otte, Jr., Training Instructor, x1542, cotte@ria-emh2.army.mil

_____Jack Wilhoit, Training, X3666, jwilhoit@ria-emh2.army.mil

_____Lawrence Doerr, Contractor, x6020, doerr1@ria-emh2.army.mil

_____Ken Baugh, Contractor, x5979, baughk@ria-emh2.army.mil

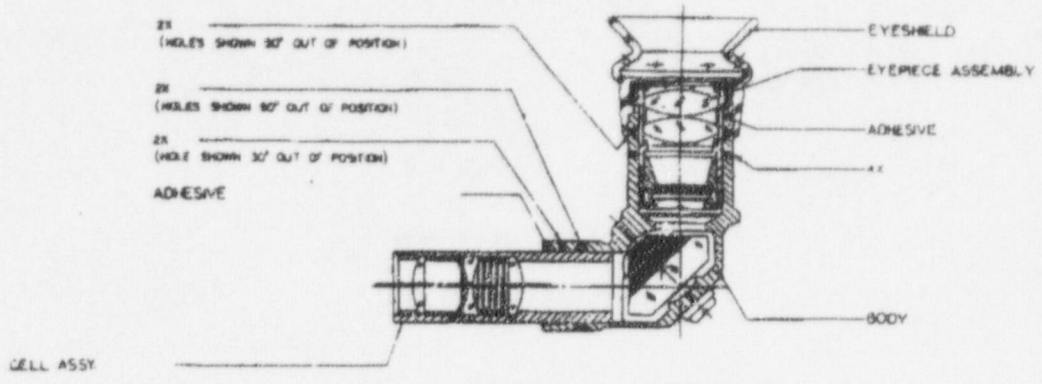
_____Lois Farson, Secretary, x6499, AMSTA-AC-SF@ria-emh2.army.mil

COMMENTS The following sheet was one of the "1st three" sheet from the first fax. It didn't make it so here it is separately. Please add to the first fax as one of the "1st three sheets"! Tim Mohs

Original Drawing

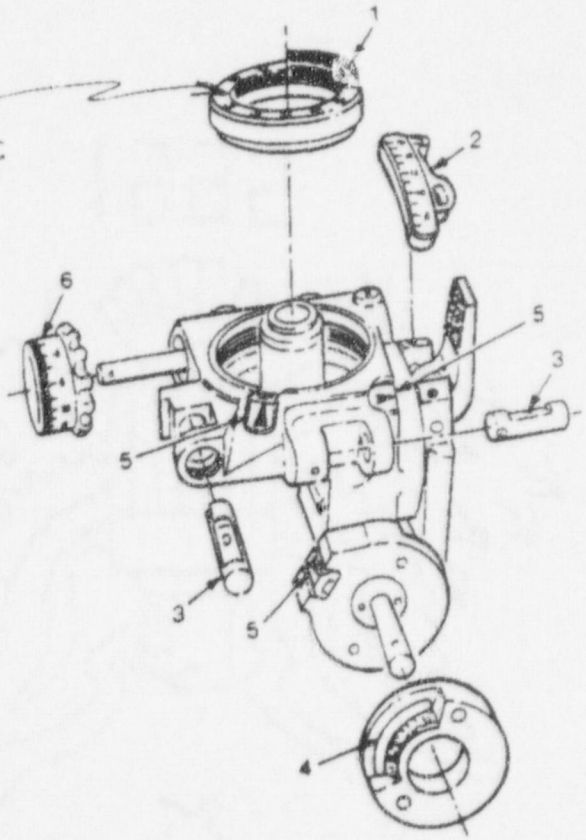
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-0155-D-126-S DATE: August 20, 1997 ATTACHMENT 2



Telescope Assembly Components

Add spacer in this area ... NOT to impact source placement.



1. Course Azimuth
2. Course Scale
3. Level vials (2)
4. Fine Scale
5. Scale (3)
6. **Fine Azimuth**

Mount Assembly components

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ARMAMENT AND CHEMICAL ACQUISITION AND
LOGISTICS ACTIVITY
AMSTA-AC-SF
(309) 782- OR DSN 793-
FAX (309) 782-6758/DSN 793-6758
Rock Island, IL 61299-7630

TO: John Jankovich DATE: 3/10/98

OF PAGES: HEADER + 14 FAX # 301-415-5369

FROM:

_____Vernon Vondera, Chief, Safety Office, X1690,
vvondera@ria-emh2.army.mil

_____Jeff Havenner, Health Physicist, x2965
jhavenne@ria-emh2.army.mil

X Tim Mohs, Health Physicist, x6228, tmohs@ria-emh2.army.mil
Per our Phone Conversation 3/10/98 x 1245 CST

_____Gavin Ziegler, Health Physicist, x2995,
gziegler@ria-emh2.army.mil

_____Judy Windham, Safety Engineer, X6367, jwindha1@ria-emh2.army.mil

_____Juan Fernandez, Safety Engineer, X6820, jfernand@ria-emh2.army.mil

_____Wayne Cook, Training Instructor, X2429,wcook@ria-emh2.army.mil

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_____Lawrence Doerr, Contractor, x6020, doerrl@ria-emh2.army.mil

_____Ken Baugh, Contractor, x5979, baughk@ria-emh2.army.mil

_____Lois Farson, Secretary, x6499, AMSTA-AC-SF@ria-emh2.army.mil

COMMENTS Mr. Jankovich, the 1st three attached sheets are extracted from the corrected registration of 22 August 1997. Following these two sheets are eleven (11) sheets with information regarding the proposed changes. Thanks for reviewing these. I await your read as to what needs to be provided/done to incorporate this change. TM Mohs ACALA SAFETY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 22, 1997

Department of the Army
Director, ACALA
Rock Island, IL 61299-7630
ATTN: AMSTA-AC-SF, Mrs. Betty Peterson

Dear Mrs. Peterson:

It has come to our attention that the registration certificate for the Model M67 tritium illuminated mortar sight issued January 1996 and amended March 22, 1996, was incorrectly assigned number NR-0155-D-121-S. The correct number is NR-0155-D-126-S. The certificate has been reissued with the correct number and is included as an enclosure to this letter. In addition, a copy of the reissued certificate has been forwarded to our Region III office.

Please be advised that you must ensure the product is manufactured, distributed, and used in accordance with the statements and representations contained in your application, with enclosures thereto, and the information set out in your registration certificate. As a general rule, you must request and obtain an amendment to the certificate before you make changes or modifications to the information submitted to obtain the certificate.

Please read over the registration certificate in its entirety and notify us immediately of any errors or omissions. You are obligated to notify us promptly in writing should you decide to no longer distribute or use the product.

Please be aware that, as a holder of an NRC registration, you may be subject to the NRC's licensing and inspection fees in accordance with 10 CFR Part 170, and annual fees in accordance with 10 CFR Part 171. If you have any questions concerning the fee requirements, please contact the License Fee and Debt Collection Branch at (301) 415-7544.

If you have any questions, please contact me at (301) 415-5847 or Mr. Steven Baggett at (301) 415-7273.

Sincerely,

Douglas A. Broaddus, Mechanical Engineer
Sealed Source Safety Section
Medical, Academic, and
Commercial Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

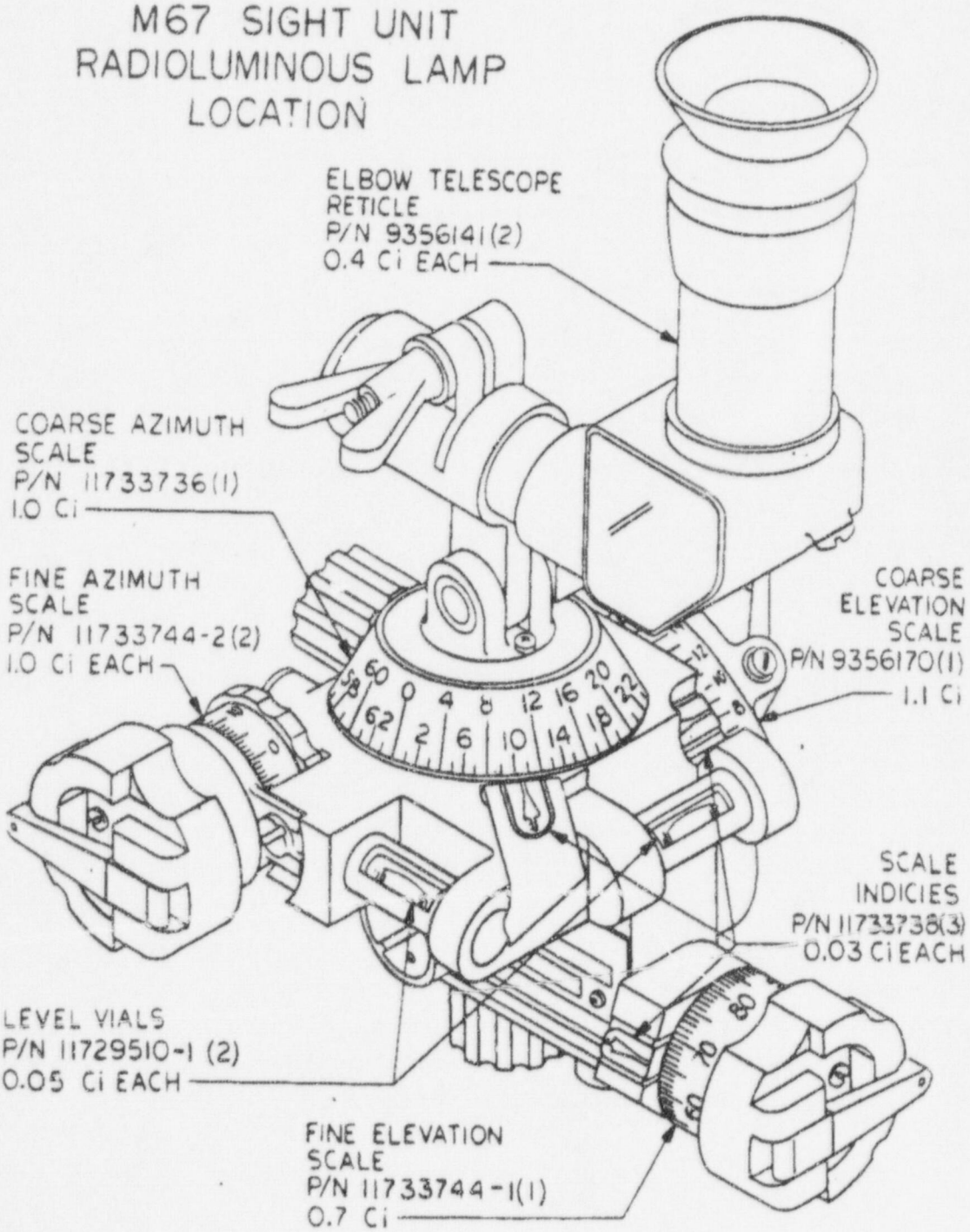
Enclosure: As stated
cc: Sandra Kimberly, LFDCB (w/encl.)

9710100125

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE
(AMENDED IN ITS ENTIRETY)

NO.: NR-0155-D-126-S DATE: **August 20, 1997** ATTACHMENT 1

M67 SIGHT UNIT RADIOLUMINOUS LAMP LOCATION



TOTAL TRITIUM PER SIGHT UNIT 5.79 CURIES

AMSTA-AR-QAW-R

20 Feb. 1998

MEMORANDUM FOR Commander, U.S. Army Armament and Chemical Acquisition and Logistic Activity, ATTN: AMSTA-AC-SF (Mr. Tim Mohs), Rock Island, IL 61299-6000

SUBJECT: Proposed Design Modification to the M67 Mortar Sight Unit

1. Reference MFR, AMSTA-AR-FSF-I, 20 Feb. 1998, Course Azimuth Scale (CAS) Design Change Proposal, encl.

2. Problems presently exist in maintaining proper operation of the course azimuth scale on the M67 mortar sight unit. An engineering design change has been proposed to correct this deficiency. The referenced enclosure documents the safety assessment of the proposed change, which entails the incorporation of a metal spacer ring to that scale assembly. Based on that assessment it does not a appear to this office that the proposed change will have a negative impact on maintaining the structural integrity of the tritium vial that is part of that scale. Also enclosed with the referenced MFR are appropriate drawings, as well as photos, both of the present configuration and of the proposed change, to aid you in your assessment of this matter.

3. It does not appear to this office that further ANSI N540 testing, nor additional live fire testing, will be necessary in regards to this proposed change. It is understood that the final decision in that regard is with your office. Request a decision regarding this matter be received by Mr. Wai's office NLT 10 March 1998. Should you deem it necessary to require further testing, please be specific as to what that testing would need to be, and / or if you feel it necessary to further coordinate this proposal with the NRC. This office is not sure whether the proposed modification will require a change to the registration, even if no further testing is required. Therefore, please provide that guidance also.

4. POC's, should you have any questions regarding this proposed engineering change, are Messrs. Wai Luk, DSN: 880-6925, and Richard Fliszar, DSN: 880-3126.

Richard W. Fliszar

Richard W. Fliszar
Health Physics Manager
Radiation Protection Group
Quality Engineering & Safety Team
Quality Engineering Directorate

CF (w/encl):
AMSTA-AR-FSF-I (Mr. Wai Luk)
AMSTA-AR-QAW (Mr. Geza Pap)

AMSTA-AR-FSF-I

MEMORANDUM FOR RECORD

Subject: Coarse Azimuth Scale (CAS) design change proposal

Objective: To improve the tightness of the CAS on the M67 Sight Unit

Background: During a regular maintenance inspection of M67 Sight Unit, couples of CAS were found loose at Ft. Benning. ARDEC quickly replaced the defected sight units. Since then, the tightness of the CAS has become a concern to the users. PM Mortar was determined to resolve the issue and M67 IPT team was tasked to improve the tightness of the CAS.

Description: After some research and studies, it was found the tightness of the CAS was affected by a few factors. M67 IPT team came up with couple of recommendations to improve the CAS. One of the suggestions requires an addition of a spacer ring on to the retaining ring (12961193). The spacer ring is needed to prevent the plungers from moving side ways. The spacer ring will be secured with a dowel pin and sealing compound. The spacer will sit next to a tritium lamp assembly (11733741) with a gap of 0.03 inches. The tritium lamp assembly consists of a plastic holder (11733735) and a tritium lamp (11733736). The tritium lamp assembly is the configuration for the M67 previously approved by NRC. There will not be any contact between the spacer and the lamp assembly. Referring to the photos:

Fig. 1 shows the present layout of the tritium lamp assembly and plungers.
Fig. 2 shows the spacer ring on the retaining ring without the tritium lamp assembly.
Fig. 3 shows both a spacer ring and the tritium lamp assembly.
Fig. 4 shows the gap between the spacer ring and the tritium lamp assembly.
Fig. 5 show the spacer ring and the dowel pins (note: the spacer ring was sectioned into two pieces for alignment purpose.)

This design change shall make no impact to the tritium lamp from the perspective of the ANSI N540 requirements, which the present M67 design previously passed. In accordance with the criteria of the ANSI N540, the sight unit is subjected to a series of tests—temperature, thermal shock, reduced pressure, impact, vibration, immersion and soak.

Temperature: The sight unit is required to operate at the temperature range of –30 ^{O}C to 65 ^{O}C. The thermal expansion of the spacer ring and the lamp assembly is estimated about 0.008 inches. Since there is a 0.030 inch opening between the spacer and the lamp assembly, they will not touch. No additional stress will be induced to the lamp assembly by the spacer.

Thermal Shock: Similar to temperature test, the spacer has no effect to the lamp assembly.

Reduced Pressure: The reduced pressure test is to test the internal structure integrity of the lamp. The presence of the spacer does not affect the lamp.

Impact: When dropping the sight unit, the probability of hitting the lamp assembly at the retaining ring is the same whether the spacer is installed or not. As a matter of fact, it has been proved in prior ANSI N540 testing that the tritium lamp is very well protected by other feature of the sight unit. Moreover, the additional mass of the spacer does not increase the G force, which is exerted on the lamp assembly.

Vibration: Once the spacer is installed, it will be secured with a dowel pin and sealing compound and become stationary. In accordance with ANSI N540, frequency of 10 Hz to 55 Hz is used for the vibration test. Since the majority of the sight unit is made out of steel, the stiffness is estimated about 1x 10 E 6 lb/in. With the addition of the spacer, the natural frequency of the sight unit is estimated about 1717 Hz. This value should not be any cause for concern to the stability of the tritium lamp.

Immersion & Soak: Since the spacer is made out of steel, there is not any water absorption. For the lamp holder, it will absorb 0.15% of water for 24 hr. soak. The increment of the size is very minimal and will not affect the tritium lamp.

Besides the ANSI N540 test, the live firing test is not required. That is because the shock from the live fire is the same. With the additional mass/weight of the spacer, the G force exerting on the sight unit will be decreased.

Wai Luk
Mechanical Engineer
FSAC

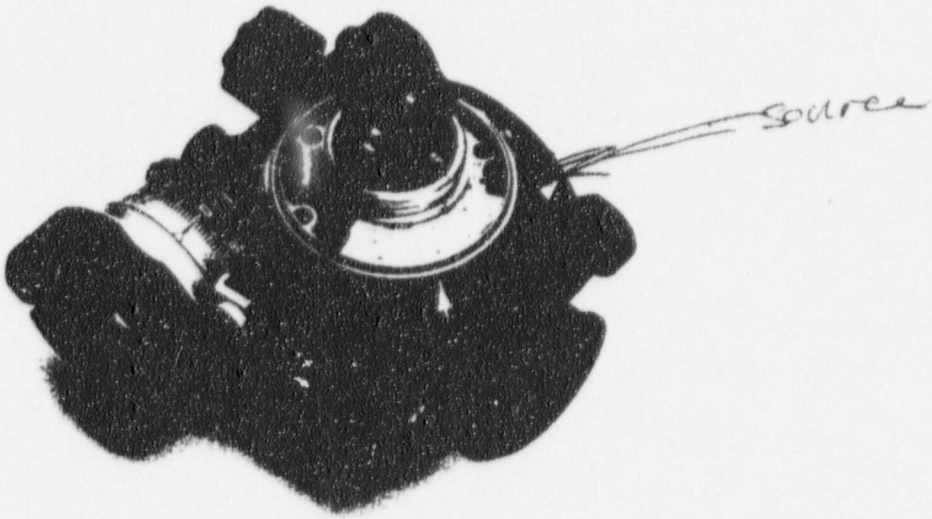


Fig. 1

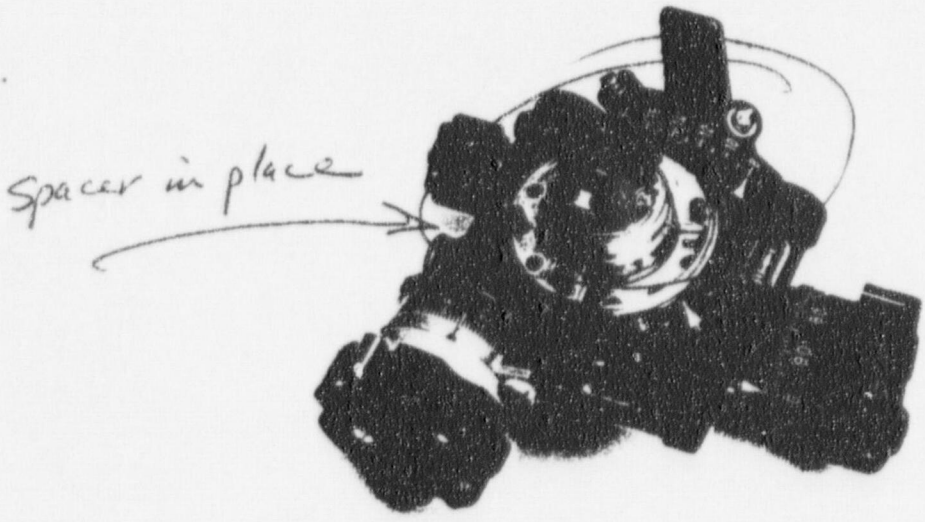


Fig. 2

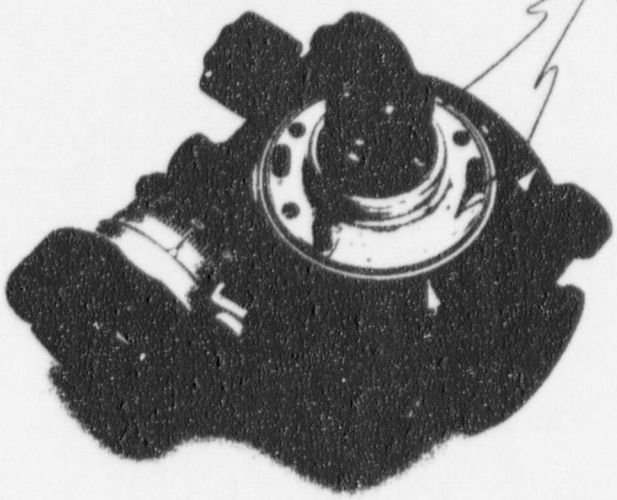


Fig. 3

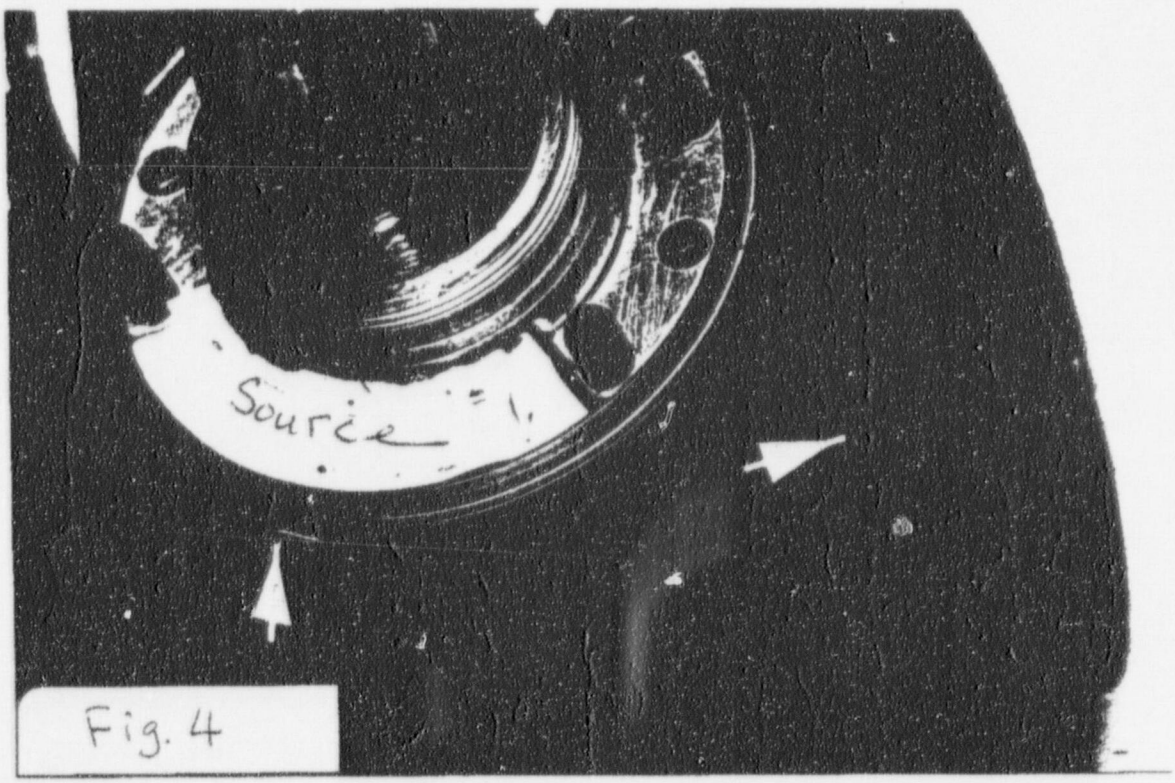


Fig. 4

(New Spacer)

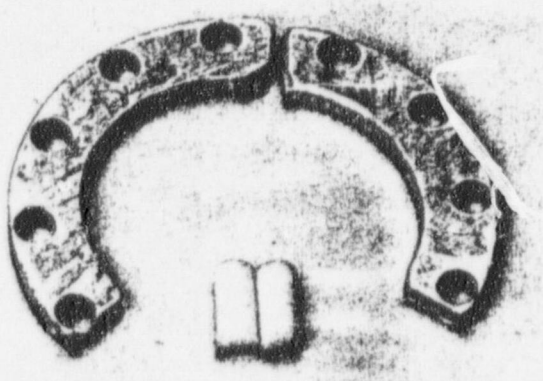
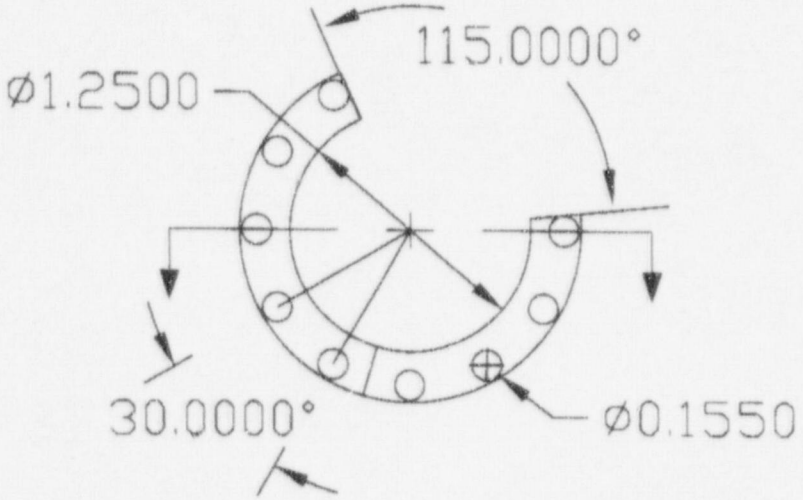
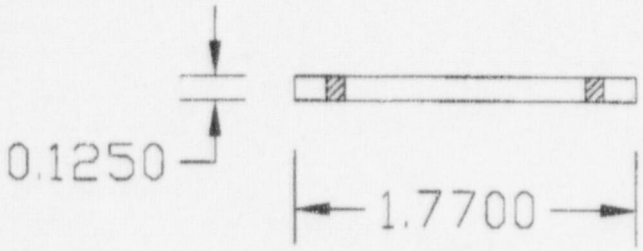


Fig. 5

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED





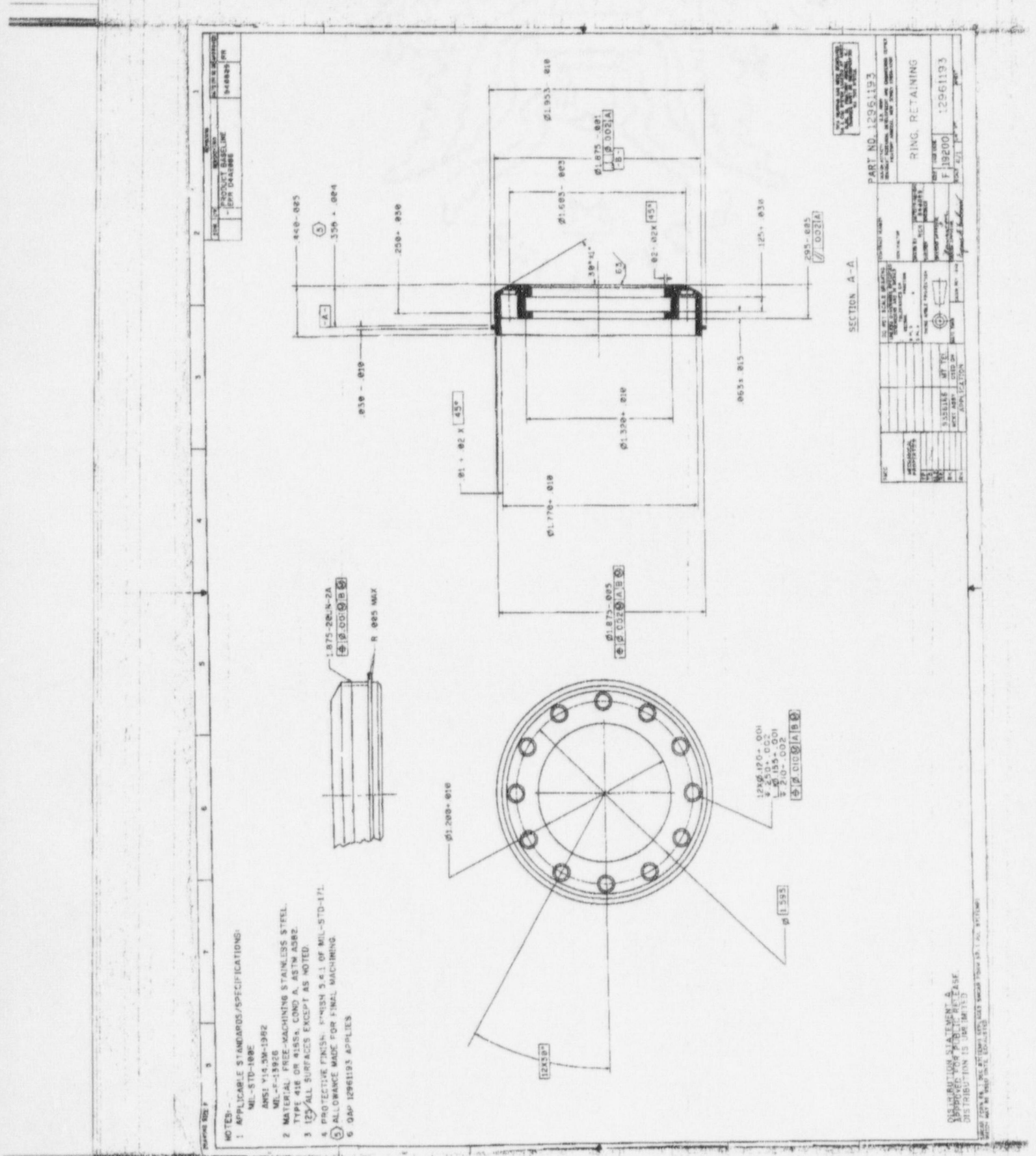
SS Bore Series

ARDEC

SPACER RING

SIZE	FSCM NO.	DWG NO.	REV
A			

SCALE		SHEET


PART NO. 12961193
RING, RETAINING
SECTION A-A
NOTES:-
1 APPLICABLE STANDARDS/SPECIFICATIONS:
MIL-STD-100E
ANSI Y14.5M-1982
MIL-F-13926
2 MATERIAL: FREE-MACHINING STAINLESS STEEL
TYPE 416 OR 416Se, COND A, ASTM A582.
3 125 ALL SURFACES EXCEPT AS NOTED
4 PROTECTIVE FINISH: FINISH 5.4.1 OF MIL-STD-171.
5 ALLOWANCE MADE FOR FINAL MACHINING
6 QAP 12961193 APPLIES
DISTRIBUTION STATEMENT A
APPROVED FOR PUBLIC RELEASE.
DISTRIBUTION IS UNLIMITED.

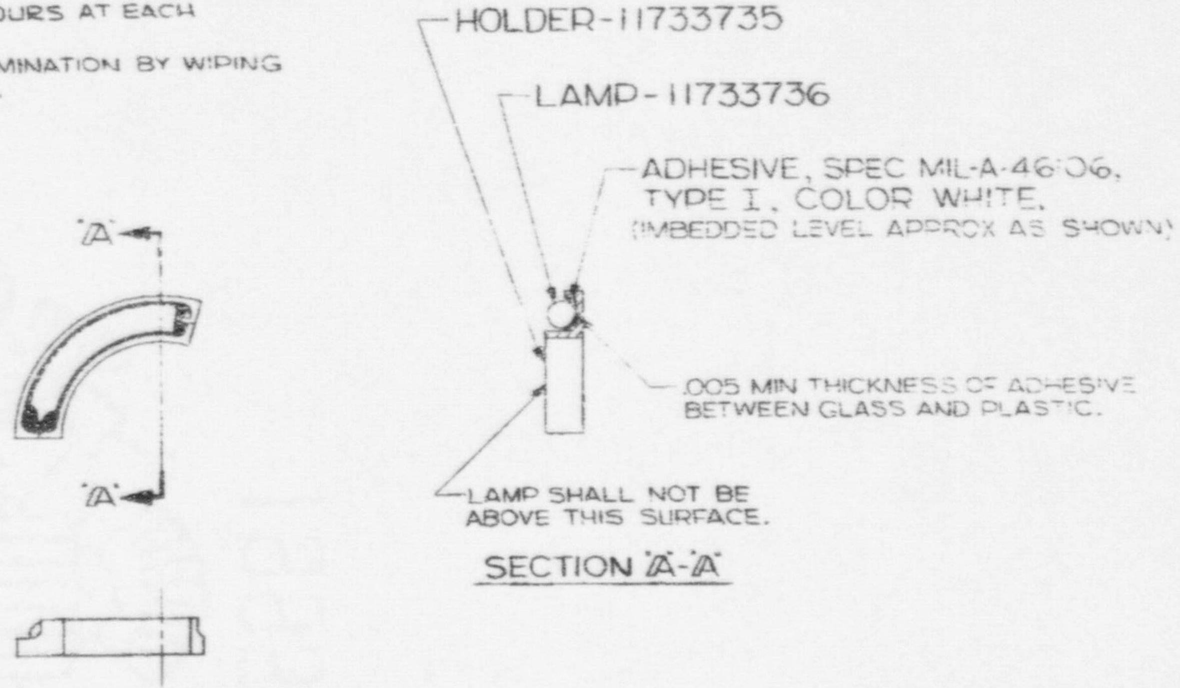
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
X1	REPLACES REV XO WITH CHANGE, ERR FRAF X5030	76-12-30	[illegible]
—	PRODUCTION RELEASE ERR FRAF 60168	77-02-04	[illegible]
A	NOR F4J2001/840320	860711	MR
B	NOR M8J3005/880422	890222	[illegible]

REQUIREMENTS:

1.

2. THERE SHALL BE NO EVIDENCE OF PHYSICAL FAILURE SUCH AS LIGHT LOSS DUE TO EXPOSING THE POTTED LAMP TO -80°F AND +160°F FOR A PERIOD OF 8 HOURS AT EACH TEMPERATURE.

3. REMOVABLE RADIOLOGICAL CONTAMINATION BY WIPING SHALL BE LESS THAN 1000 DPM.



SEE SEPARATE PARTS LIST-11733741

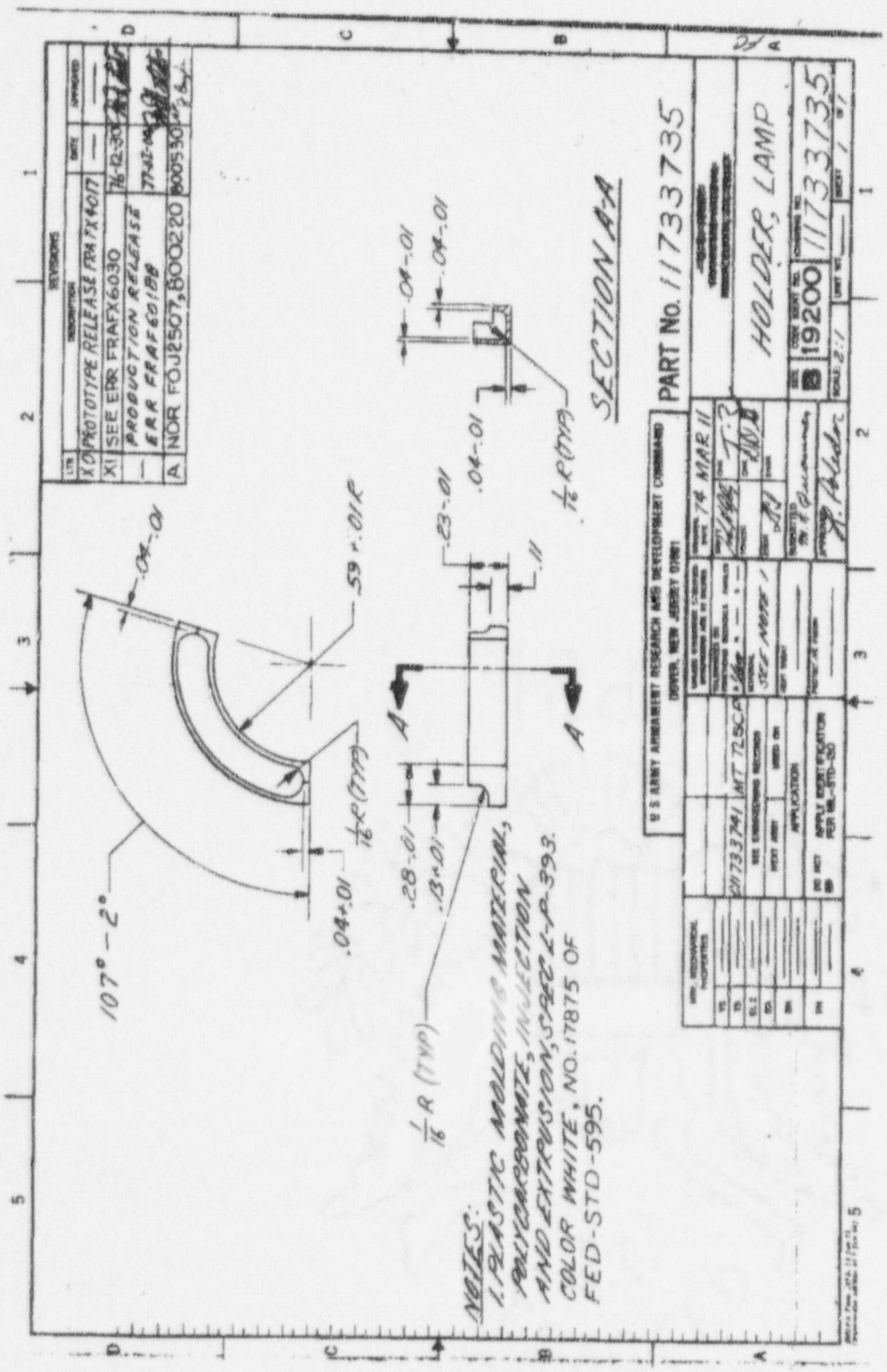
APPLICABLE DOCUMENTS

SQAP 11733741

CURRENT DESIGN ACTIVITY FSCM NO. 19200
U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER
DOVER, NEW JERSEY 07801

PART No. 11733741

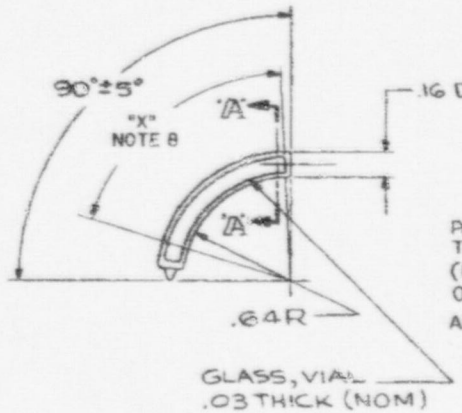
MIL MECHANICAL PROPERTIES	TS, YS, EL 2, RA, BH, BH
F11741796	MT TLSCP
SEE ENGINEERING RECORDS	
NEXT ASSY	USED ON
APPLICATION	
DO NOT SCALE	APPLY IDENTIFICATION PER MIL-STD-130
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCES ON DECIMALS ± ___ FRAC ± ___ ANGLES ± ___
MATERIAL	
HEAT TREAT	
PROTECTIVE FINISH	
ORIGINAL DATE	74 MAR 11
DRAFT	4C
CHK	[illegible]
TRACER	
CHK	[illegible]
DSGN	[illegible]
ENGR	
SUBMITTED	M. L. [illegible]
APPROVED	L. Polidor
U. S. ARMY FRANKFORD ARSENAL PHILADELPHIA, PA. 19137	
TITLE	LAMP RADIOLUMINOUS (POTTED)
SIZE	C
CODE IDENT NO.	19200
DRAWING NO.	11733741
SCALE	2:1
UNIT WT.	
SHEET	1 OF 1


PART No. 11733735
HOLDER, LAMP
SECTION A-A
NOTES:
1. PLASTIC MOLDING AND MATERIAL, POLYCARBONATE, INJECTION AND EXTRUSION, SPEC L-P-393. COLOR WHITE, NO. 17875 OF FED-STD-595.

REQUIREMENTS:

1.
2. THERE SHALL BE NO EVIDENCE OF PHYSICAL FAILURE SUCH AS FRACTURING OR LIGHT LOSS DUE TO EXPOSING THE LAMP TO -80°F AND +160°F FOR A PERIOD OF 8 HOURS AT EACH TEMPERATURE.
3. AFTER SUBMERGING THE LAMP IN ROOM TEMPERATURE WATER FOR 4 HOURS, RADIOACTIVE CONTENT OF THE WATER SHALL NOT EXCEED .005 MICROCURIE.
4. VIAL TO BE FILLED WITH TRITIUM (H_3) OF 94-96% PURITY, LESS THEN 1% TRITIUM OXIDE. TOTAL 1.0 CURIES MAXIMUM.
5. PRIOR TO MAKING BRIGHTNESS MEASUREMENTS, LAMPS SHALL BE ALLOWED TO STABILIZE FOR A PERIOD OF 25 DAYS FROM MANUFACTURE.
6. FOLLOWING THE STABILIZATION PERIOD AND UP TO 120 DAYS FROM DATE OF MANUFACTURE, BRIGHTNESS MEASUREMENTS SHALL NOT SHOW A DECAY IN EXCESS OF 2.5% WHEN MEASURED OVER ANY CONSECUTIVE 30 DAY PERIOD. FURTHER, THE FINAL BRIGHTNESS MEASUREMENT AT TIME OF ACCEPTANCE SHALL BE 600 MICROLAMBERTS MINIMUM.
7. INTERNAL PRESSURE 2.50 ATMOSPHERES (NOMINAL) AT +70°F.
8. PHOSPHOR COATED ARC LENGTH "X" SHALL BE 65° MINIMUM. COLOR OF PHOSPHOR: GREEN SPECTRAL PEAK 5250 Å ± 50 Å 1/2 PEAK WIDTH 700 Å ± 50 Å.
9. THE MANUFACTURER MUST HAVE THE LAMP REGISTERED WITH THE US NUCLEAR REGULATION COMMISSION (NRC) AND HAVE OBTAINED THE LAMP NRC REGISTRATION NUMBER.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
X1	REPLACES REV X0 WITH CHANGE, ERR FRAFX6030	76-12-30	
—	PRODUCTION RELEASE ERR FRAF60188	77-02-04	
A	NOR F8A5041, 790109	800530	
B	NOR F9J2515, 79-11-06 (ECP F0J2501, 80-02-20)	80-08-08	
C	NOR F4J2001/840320 (ECP F4J2002/840321)	860711	
D	NOR M8J3005/880422	890222	
E	NOR D2J2007/920901	921016	
F	NOR D4A2031 / 950127 (ECP D5J2005 / 950918) (ECP D5J2007 / 951122)	960119	FET



PAINT, EPOXY, MIL-C-22750, TYPE I, COLOR 17875 OF FED-STD-595, (180 DEGREES ARC FOR FULL LENGTH OF VIAL), APPLY TWO COATS (MIN).
ALTERNATIVE COATING: DWG C11785530.

SECTION A-A

SUGGESTED SOURCE(S) OF SUPPLY	
VENDOR	VENDOR PART NO.
M.B. MICROTEC AG FREIBURGSTRASSE 624 CH-3172-NIEDERWANGEN SWITZERLAND	NOT AVAILABLE

DISTRIBUTION STATEMENT A
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

APPLICABLE DOCUMENTS
SQAP 11733736

SPECIFICATION CONTROL DRAWING

CURRENT DESIGN ACTIVITY CAGE CODE 19200
U.S. ARMY
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

PART No. 11733736

MIN. MECHANICAL PROPERTIES: TS / TS / EL 2 / DIA / BH / RH

C11735741, MT, TL=CD

APPLICATION

DO NOT APPLY IDENTIFICATION PER MIL-STD-130

UNLESS OTHERWISE SPECIFIED DIMENSION ARE IN INCHES
TOLERANCES ON: FRAC. ± — DECIMALS ± .01 ANGLES ± —
MATERIAL
HEAT TREAT
PROTECTIVE FINISH

ORIGINAL DATE 74 MAR 11
DRAW LHC CHK T.J
TRACER CHK DDJ
ENGR LAS CHIEF
SUBMITTED M. L. Quarnieri
APPROVED A. Polidor

U.S. ARMY
FRANKFORD ARSENAL
PHILADELPHIA, PA. 19137

LAMP, RADIOLUMINOUS

SIZE C | FSCM NO. 19200 | DRAWING NO. 11733736
SCALE 2:1 | UNIT WT. — | SHEET 1 OF 1