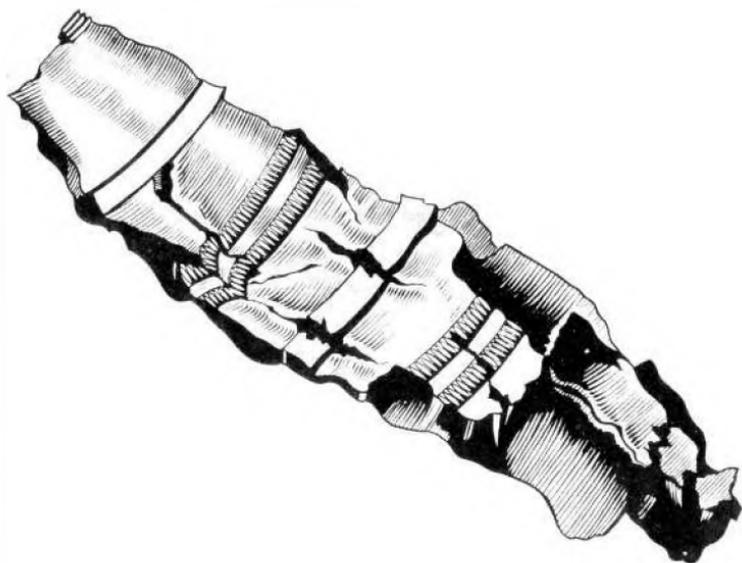


IDENTIFICATION  
OF  
ARTILLERY PROJECTILES  
(WITH ADDENDA)  
SECOND EDITION



RESTRICTED

Published by VI Corps June 1944.  
Republished with Addenda as Second Edition by Seventh Army Aug 1944

MANUAL  
OF  
ARTILLERY PROJECTILES  
(WITH APPENDIX)  
SECOND EDITION

FIRST EDITION DRAFTED & LITHOGRAPHED BY 661 ENGR. CO(TOP) JUNE 1944.  
SECOND EDITION REPRODUCED BY 13 CORPS FD. SVY COY. RE. AUG 1944.

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Inch and Centimeter scale inside back cover.	

## PREFACE

Information included in this booklet has been compiled from all available intelligence sources, including many original drawings submitted by Arty S-2s. No effort has been made to indicate the sources of this information. The measurements on the drawings and in the charts are believed to be reasonably accurate; however, minor variations may exist.

Enemy artillery activity in ITALY reached new heights on the ANZIO Beachhead. Not only have the forward units been shelled continuously, but rear areas including Army, Corps, Air Corps, and Naval installations have been shelled intermittently with heavy caliber guns. Due to the semi-circular front of approx 30 miles we have encountered shelling from every direction, and from weapons ranging from the light 75-mm Recoilless gun to 28-cm super-heavy railway gun. Also, the enemy has used many different types of arty captured from the Russians, Italians and French.

The importance of rendering enemy shelling reports cannot be overestimated and it is a very important means in the neutralization of enemy arty. The counterbattery office received as many as 964 shell reps within 24-hr period, and over a seven week period received an average of 500 per day. To be of maximum value, shelling reports must be submitted promptly and they must contain all the information available. It is hoped that this booklet will stimulate and improve the accuracy of shelling reports to such an extent that enemy arty will be hesitant to open fire, even on very profitable targets.

The information that is most neglected in shelling reports is the caliber of the enemy guns. To report that light, medium or heavy guns are shelling an area is not sufficiently accurate. However, upon proper examination of shell fragments the caliber of the gun can be determined. There are many ways to identify enemy shell fragments, but the most accurate and most practical method is by studying the full portion of the rotating band or the groove of the shell that engages the band. Every type of shell has a "trade mark" and it is usually embedded in the serration of the rotating band.

Drawings and charts of American and British rotating bands have been added so that a comparison can be made with those of the enemy.

*Don W. Dixon*  
DON W. DIXON  
Major, Field Arty  
Asst A. C. of S, G-2  
Headquarters VI Corps

## HOSTILE SHELLING REPORT FORM

DATE 23-APRIL

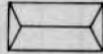
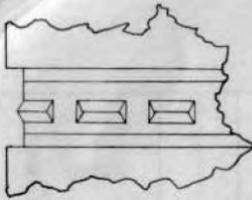
1	2	3	4	5	6	7	8	9	10
Reported By	Location Of Observer	Grid Azimuth (F S & G)	Time From	Time To	Area Shelled	Damage	No/Rds. & Type of Fire (Regt, Int, Hor, Etc.)	No., Type, & Cal. of Guns Firing	Remarks (flash bang, airburst, est location)
45 DIV	8234-1974	504(F)	0210	0218	84-18	—	8 (HAR)	2/MED <sup>3</sup>	F.B. 11 SEC
2 Fd	8916-2041	360(S)	0211	0213	89-189	—	3 (Regt)	1/88	AIRBURST
36 FA	920-186	1600(G)	0150	0151	92-18	1 CAS.	20	1/HV <sup>6</sup>	LITTORIA

- 1- F.S & G - Flash Sound & Groove. Column 3 must always include F.S or G including grid bearing.  
(ie: F 2580 = Flash observed from grid azimuth 2580)
- 2- Column 6 should always be sent in clear
- 3- Column 7 should NEVER be sent in clear
- 4- Remarks - (flash bang is the time interval, in seconds, between seeing the flash and hearing the report of the initial explosion)

# ROTATING BANDS

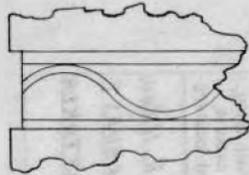
(Keying)

AMERICAN



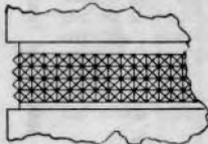
Horizontal Pyramid with Gaps

BRITISH



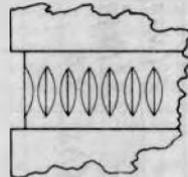
Wavy Ripple

ITALIAN



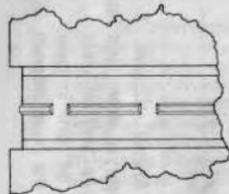
Rows of Raised Pyramids

GERMAN



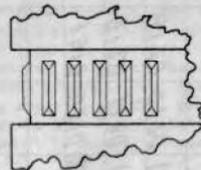
Vertical Serration/Curved Projection

ITALIAN



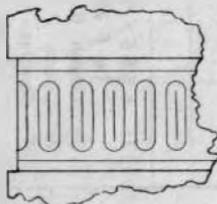
Horizontal Linear with Gaps

GERMAN



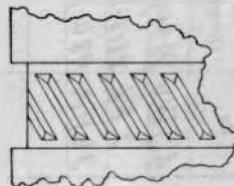
Vertical Serration/Pyramidal Projection

RUSSIAN



Vertical Indentation

FRENCH

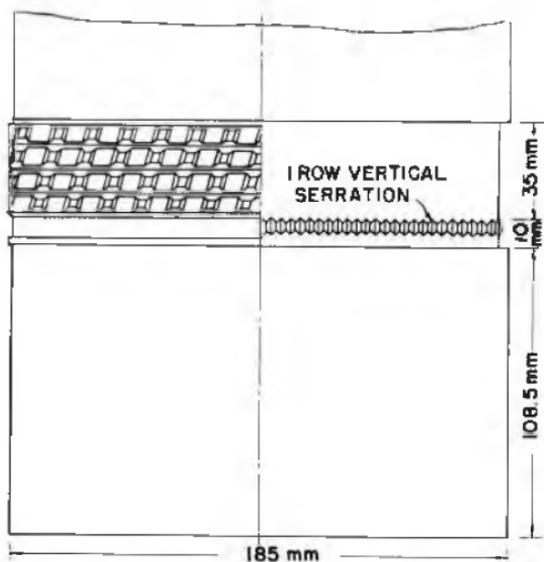


Oblique Indentation

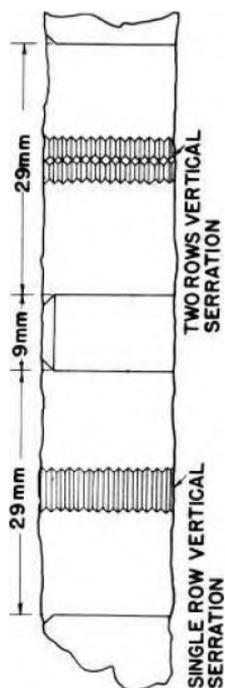


Interpretation of German Gun and Ammunition Nomenclatures

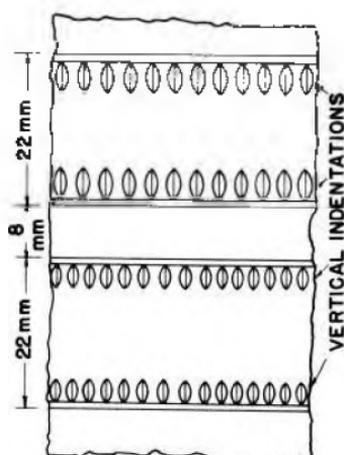
s. Ps. Bu.	schwere Panzerbüchse	heavy anti-tank rifle (28/20 tapering bore gun)
Pak	Panzerabwehrkanone	anti-tank gun
Flak	Flugabwehrkanone	A.A. gun
KwK	Kampfwagenkanone	Tank Gun
K.	Kanone	gun
Pak K.u.T.	Panzerabwehrkanone Kasematte und Turm	anti-tank gun casemate and turret
Lg.L.	langer Lauf	long barrel
Ks.L.	kurzer Lauf	short barrel
Stu.G.	Sturmgeschütz	assault gun (how type)
Stu.K.	Sturmkanone	assault gun
l.F.K.	leichte Feldkanone	light field gun
F.K.	Feldkanone	field gun
Geb.G.	Gebirgsgeschütz	mountain gun
l.I.G.	leichtes Infanterie Geschütz	light infantry gun
l.Geb. I.G.	leichtes Gebirgeinfanteriegeschütz	light infantry mountain gun
Geb. K.	Gebirgskanone	mountain gun
l.F.H.	leichte Feldhaubitze	light field howitzer
K.K.	Kanone Kasematte	casemate gun
K.T.	Kanone Turm	turret gun
m.	mittel	medium
lg.	lang	long
s.F.H.	schwere Feldhaubitze	heavy field howitzer
s.H.T.	schwere Haubitzenurm	heavy turret howitzer
s.I.G.	schweres Infanteriegeschütz	heavy Inf gun (how type)
ins Mrs Laf (E)	ins Mörsers Lafette Eisenbahn	on howitzer mounting railway
Mrs	Mörser	heavy howitzer
Th.Br.Kan	'Theodor Bruno' Kanone	'Theodor Bruno' gun
Th. Kan.	Theodor Kanone	'Theodor' gun
Br. Kan.	Bruno Kanone	'Bruno' gun
Ks.	kurs	short
lg.	lang	long
s.	schwer	heavy
H.	Haubitze	howitzer
L.G.	leichtes Geschütz	light gun (parachutists' recoilless gun)
Patr.	Patrone	ammo for fixed equip
	rot	projectiles used in guns
Sprgr. patr	Sprenggranat Patrone	HE fixed ammo
Gr.	Granat	HE separate
AZ	Anschlagszunder	Percussion fuse
Kpf.Z., K.Z.	Kopfsunder	Percussion fuse
	Rachentwickler	Smoke boxes
Hb.	haube	
m. Haube	Haube mit	HE fitted with
Hbgr.	haubgranat	ballistic cap
Ks.	Kopfsunder	
Nb.	Nebel	HE fitted with nose fuse
hl	höhl ladung	fog or smoke
psgr. patr.	Panzergranatpatrone	hollow charge
psgr.	Panzergranat	AF fixed ammo
Spr. br	Spreng Brand	AF separate ammo
	demtblau	incendiary projectile
	stielgranat	indicator projectile
EPB	Kupferpanzerstahl	rodged projectile
FEK	Weicheisenführung	Rimetallic rotating band
FEW	Walzeisenführung	sintered iron rotating band
tp		rolled iron band
Ub		tropical ammunition
A or L3		practice ammunition
		base ejection with flash producing charge
Stg		cast steel shell
Bo	Zündschraube	pressed steel
	Kartuschvorlagen	primer
		flash reducer



**210 HOW. GERMAN**  
ANZIO SECTOR



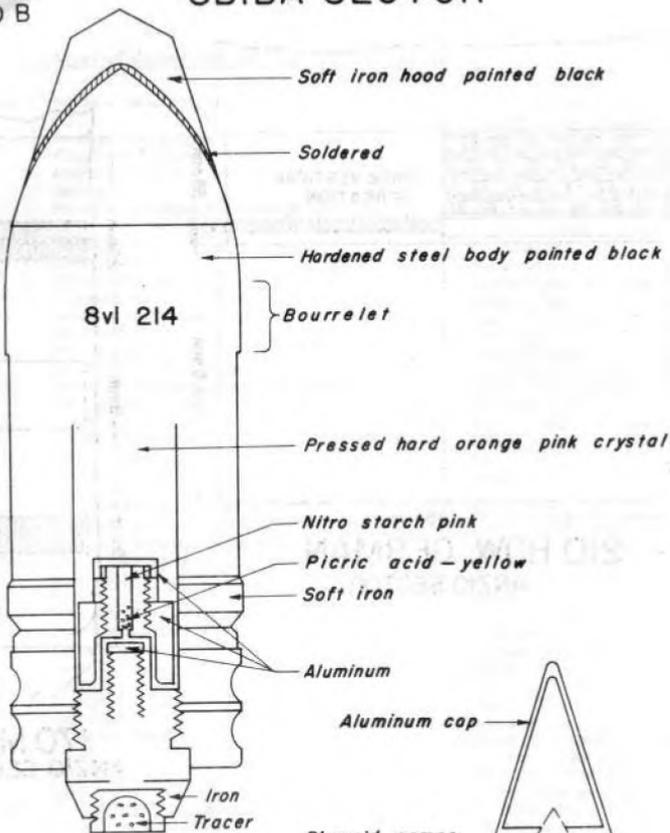
**170 MM**  
ANZIO SECTOR



**128 MM**  
ANZIO SECTOR

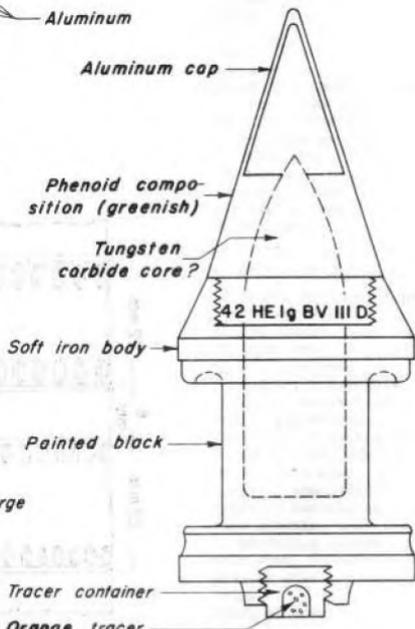
# 50mm FROM MK III TANK (GR) SBIBA SECTOR

50 B



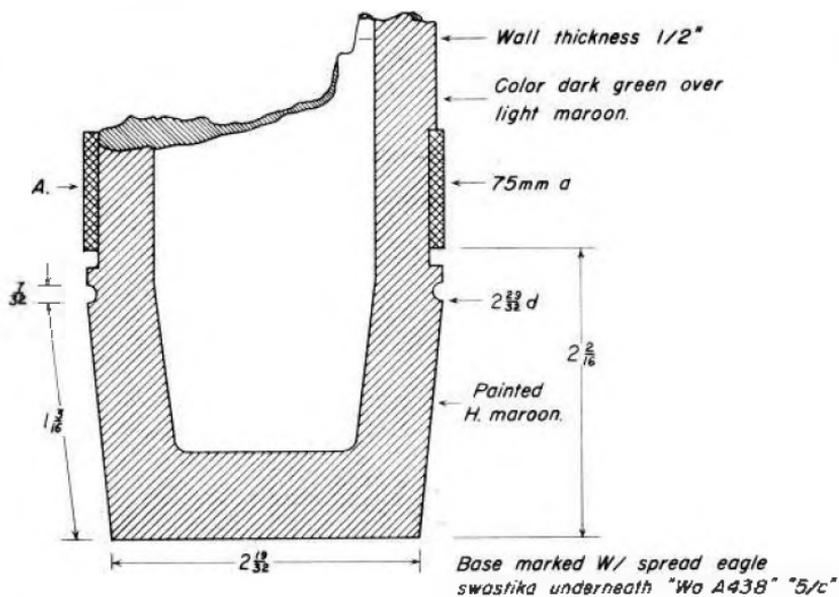
50mm Solid Shot  
(hooded)

Spaghetti sticks propelling charge  
Same cartridge as HE

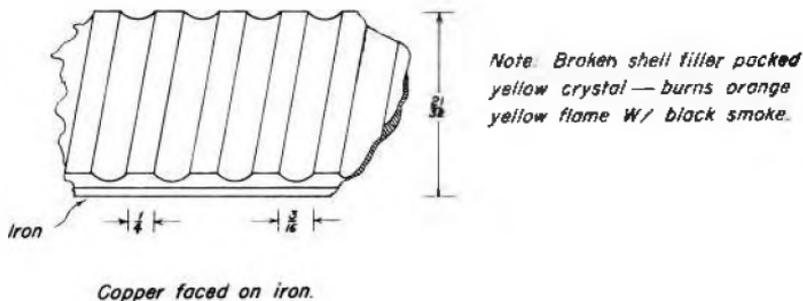


50mm AP Solid Shot

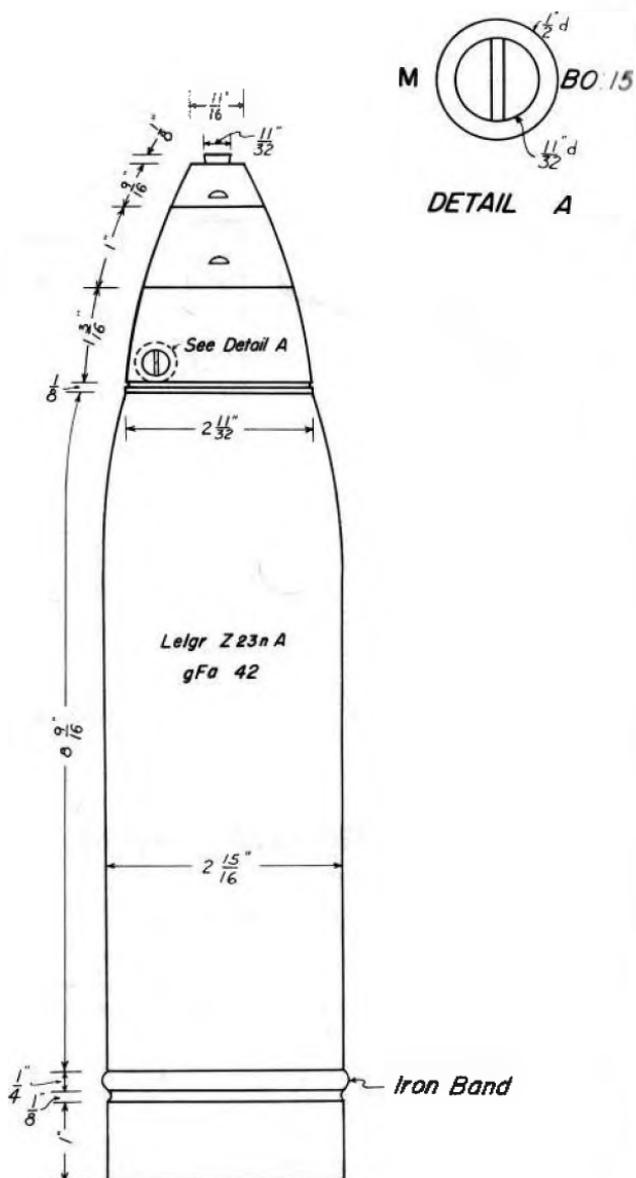
# GERMAN 75mm



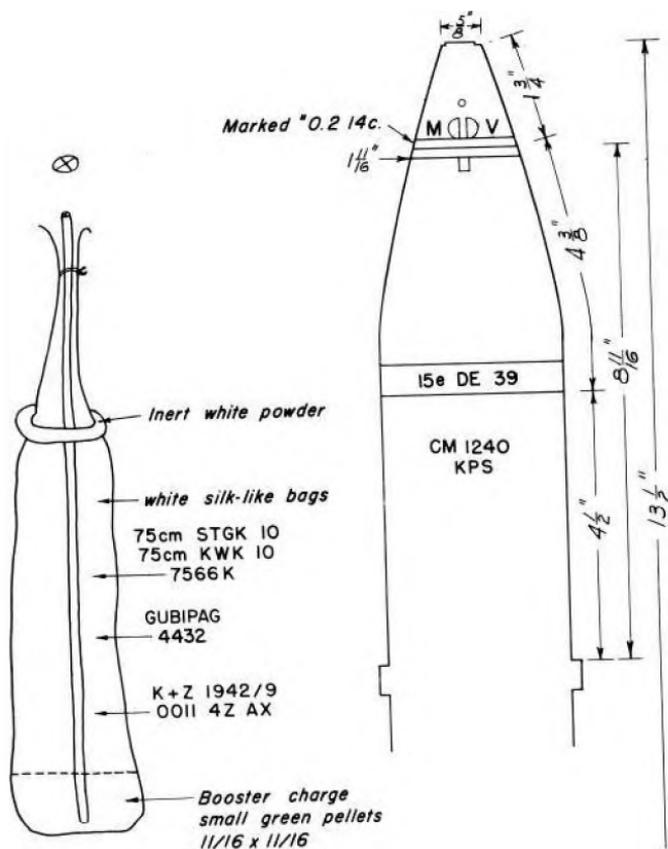
## A. ROTATING BAND



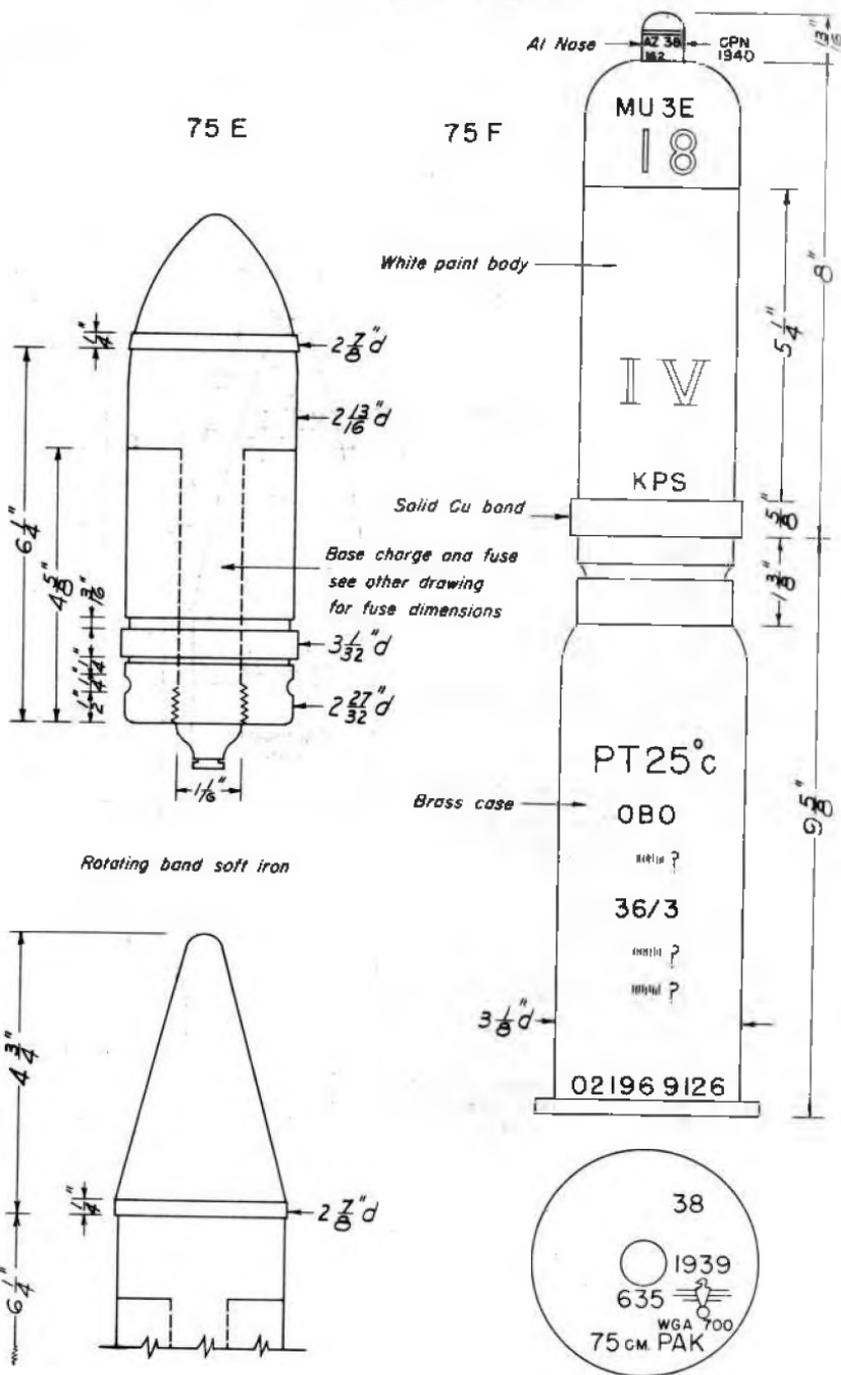
# 75mm FOUND IN EBOLI SECTOR



# 75mm FROM MK IV GERMAN TANK SBIBA SECTOR

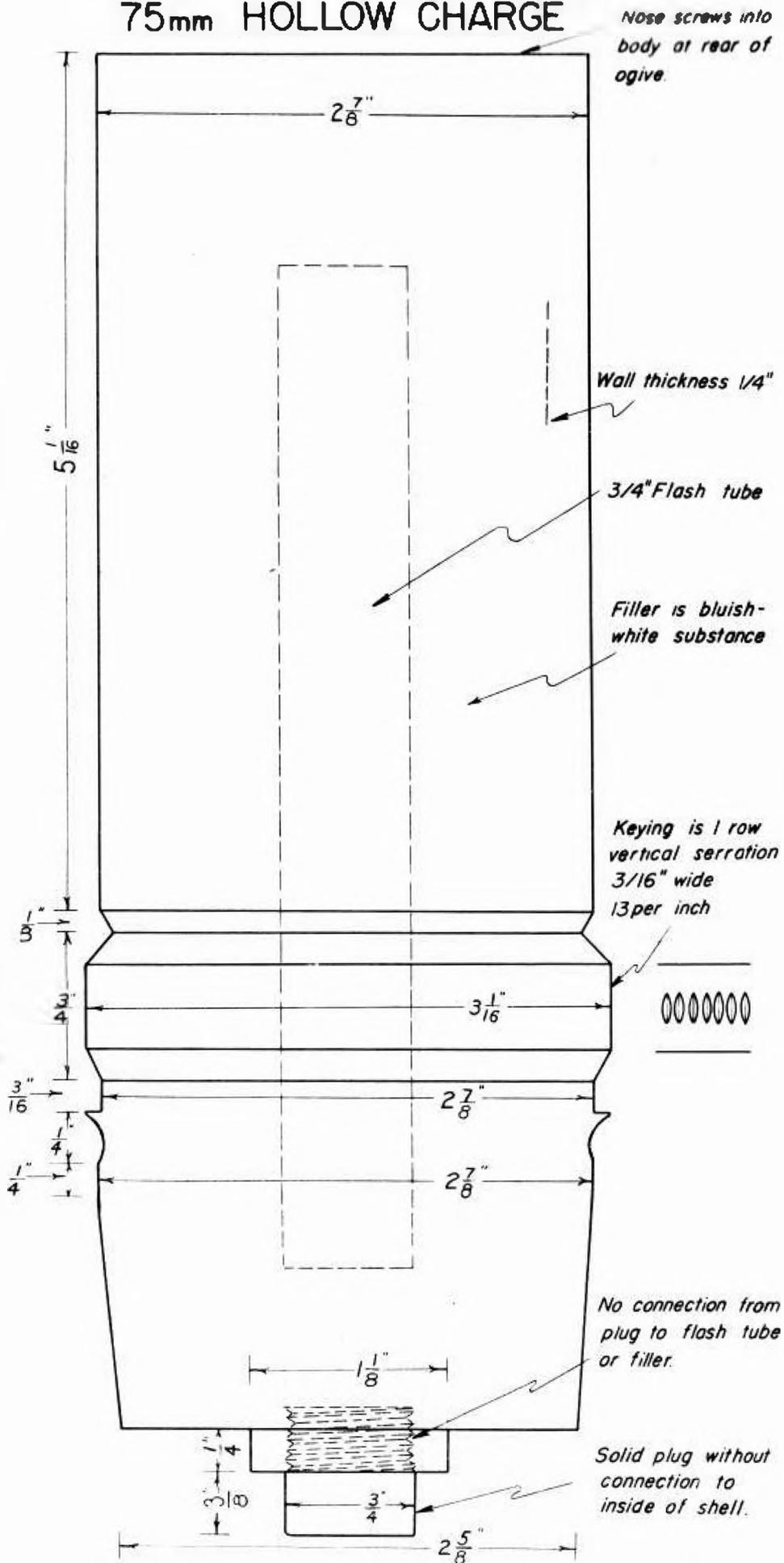


# 75mm FROM MK IV TANK — SBIBA SECTOR



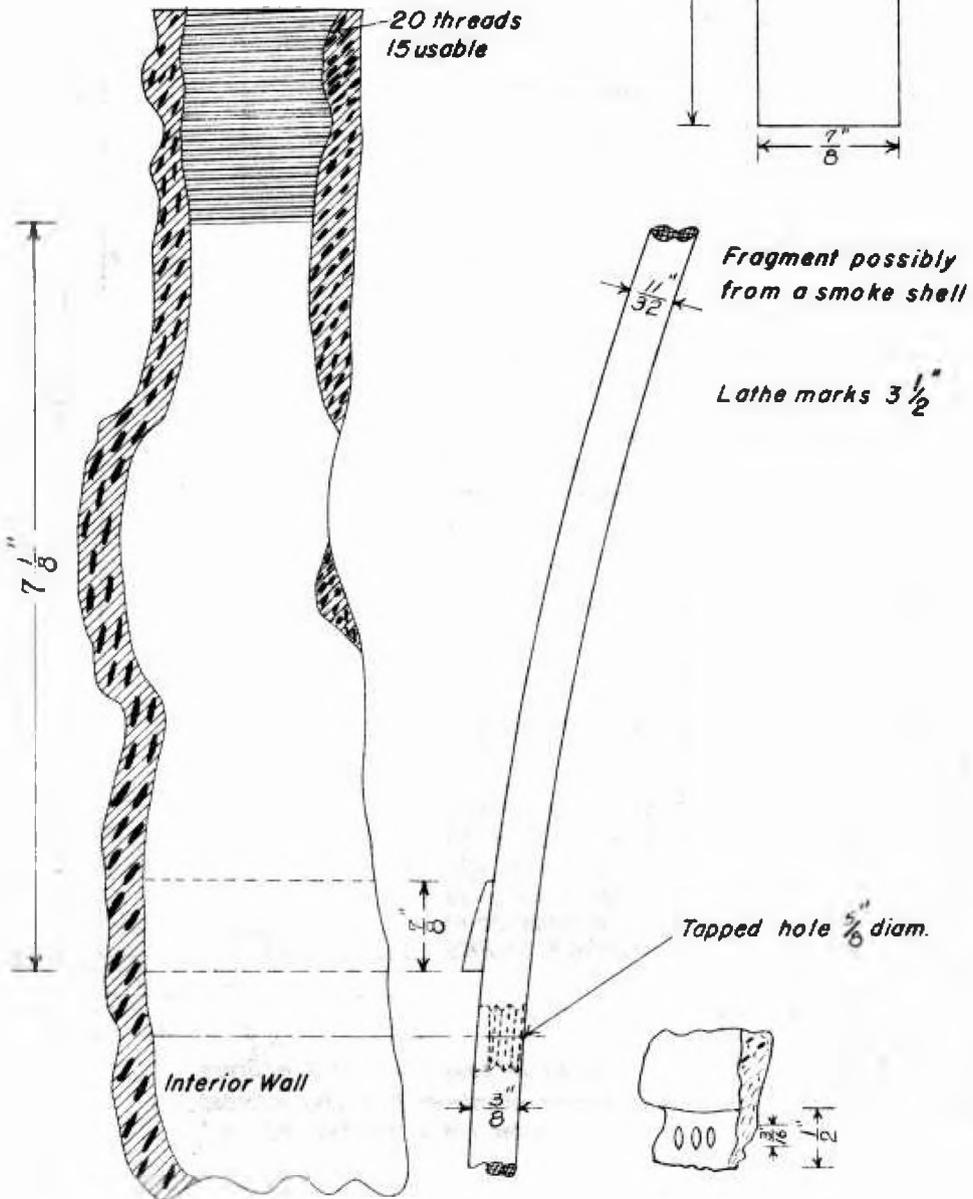
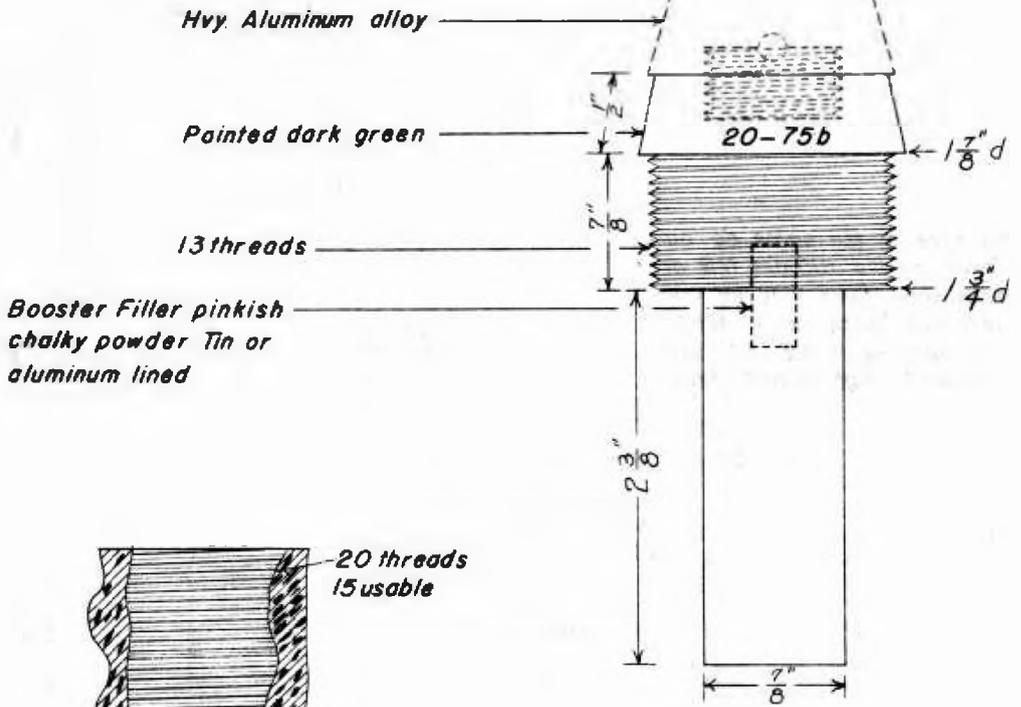


# 75mm HOLLOW CHARGE



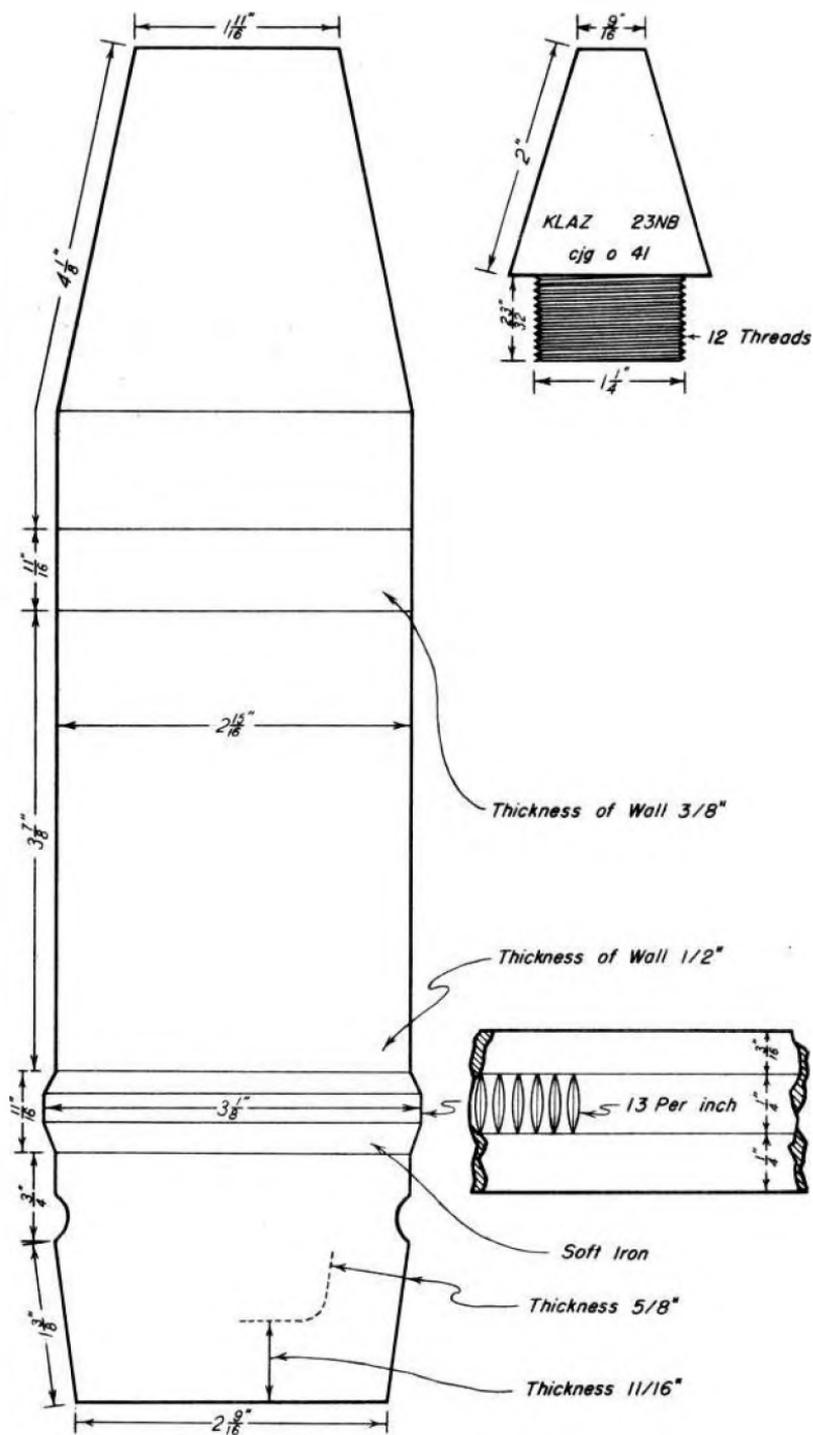
# 75 G

Reconstruction of unexploded fuze

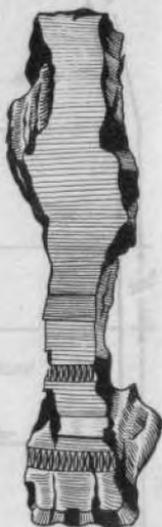
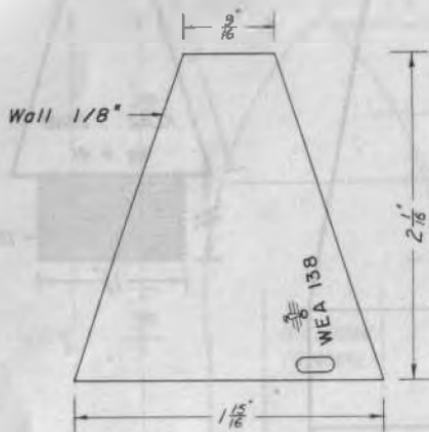




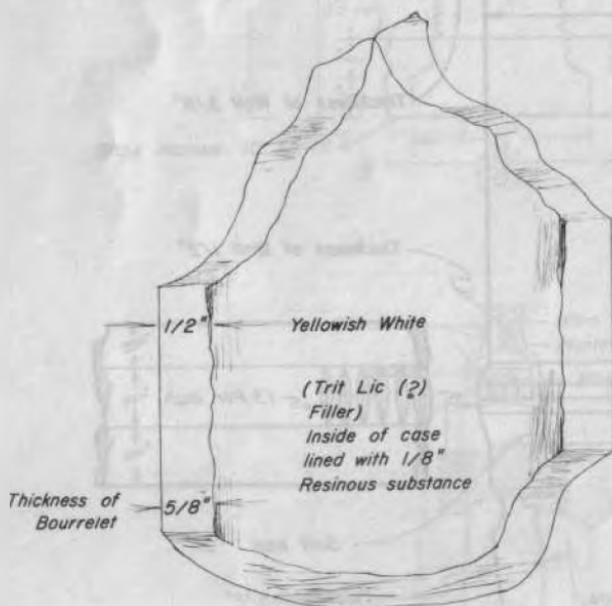
# 75mm GUN (GR) PERSANO SECTOR



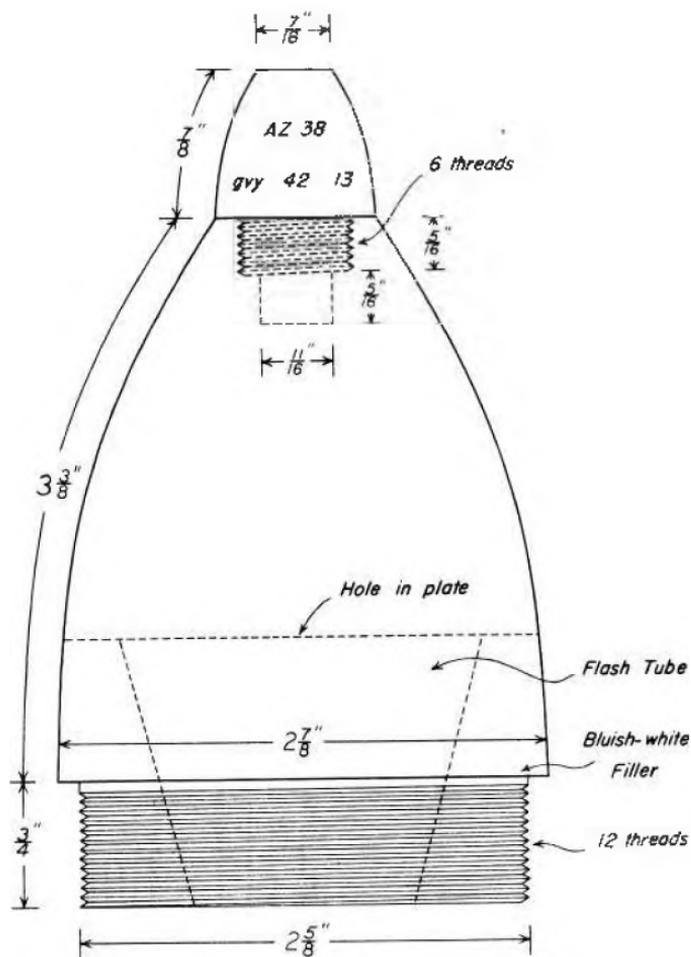
Aluminum Ballistic Cap  
 either 88 or 7.56 Russian  
 Persano sector



88mm.



Fragment of German 105mm HE  
 believed How. picked up in  
 Persano sector.

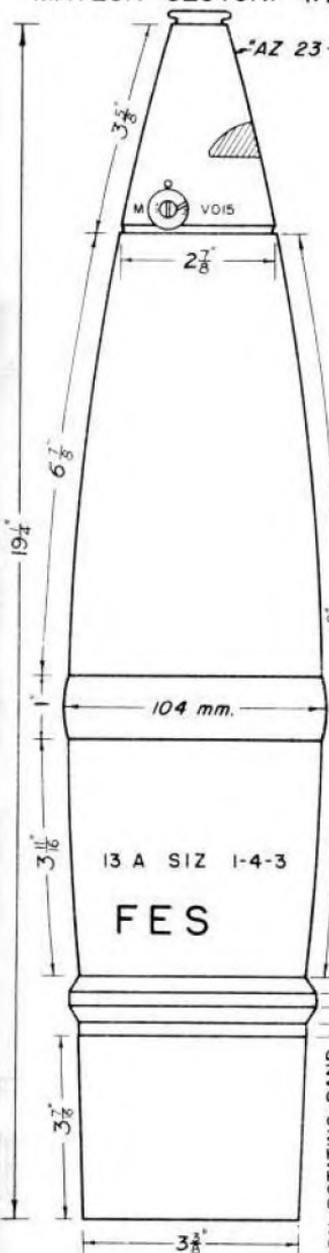


Fuze & screw in ogive to 75mm tank shells. This type was found in Mk IV tank equipped with high velocity 75mm gun. Hollow charge shell. EBOLI sector.



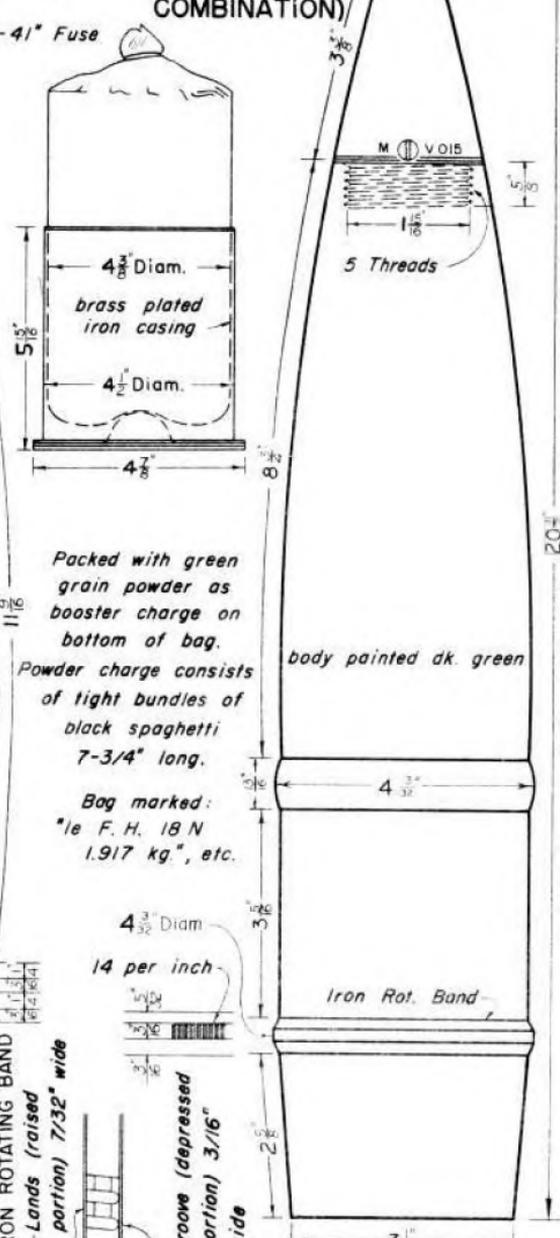
105 A

GERMAN 105mm. FROM GUN-HOW. POSITION. MUNCHAR-MATEUR SECTOR. 4/26/42



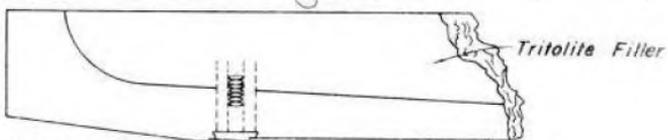
105 B

GERMAN 105mm. (ASSUMED SUPERCHARGED COMBINATION)



Packed with green grain powder as booster charge on bottom of bag.  
 Powder charge consists of tight bundles of black spaghetti 7-3/4" long.  
 Bag marked:  
 "le F. H. 18 N  
 1.917 kg.", etc.

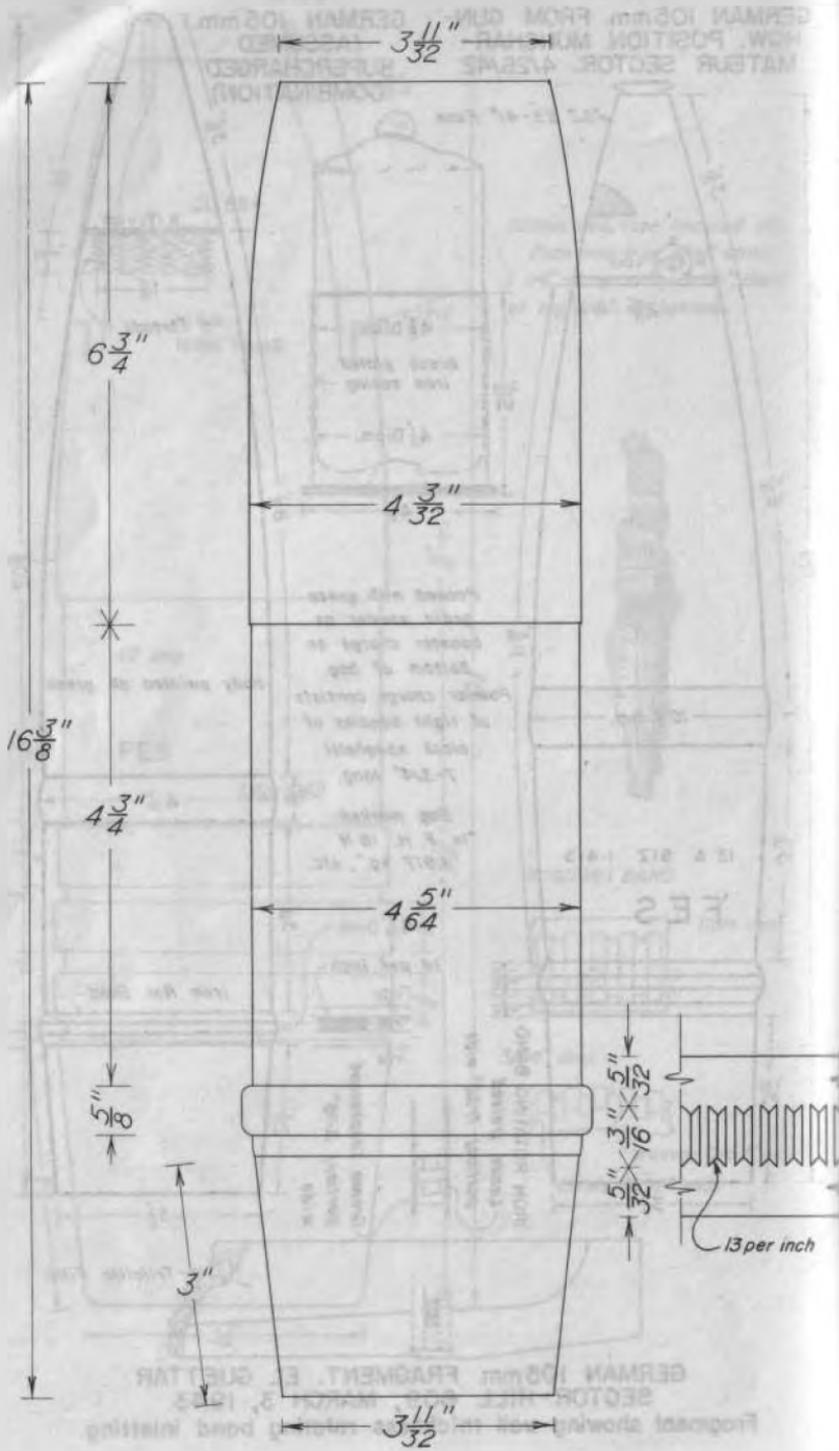
body painted dk. green



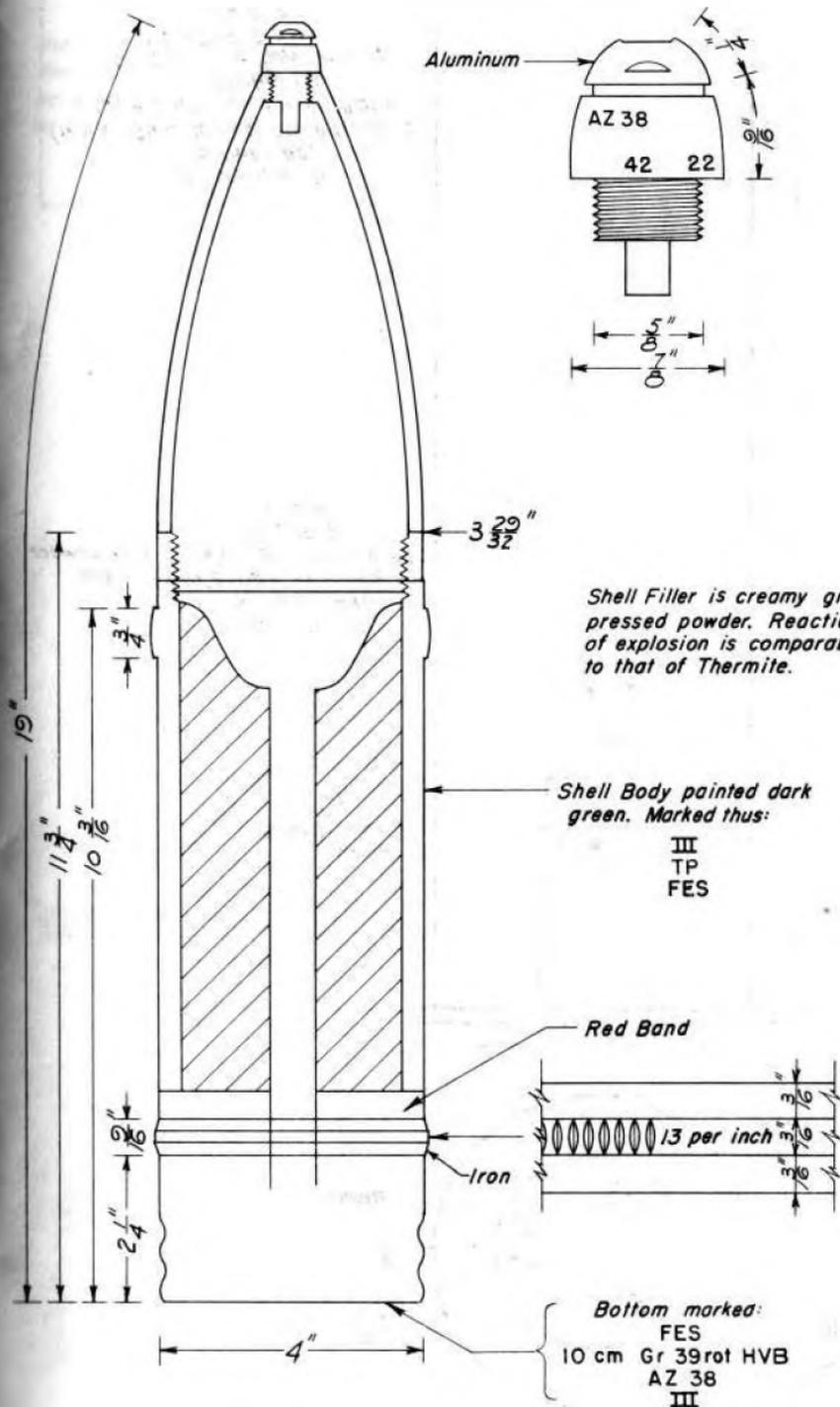
GERMAN 105mm. FRAGMENT. EL GUETTAR SECTOR-HILL 609, MARCH 3, 1943.

Fragment showing wall thickness rotating band inletting.

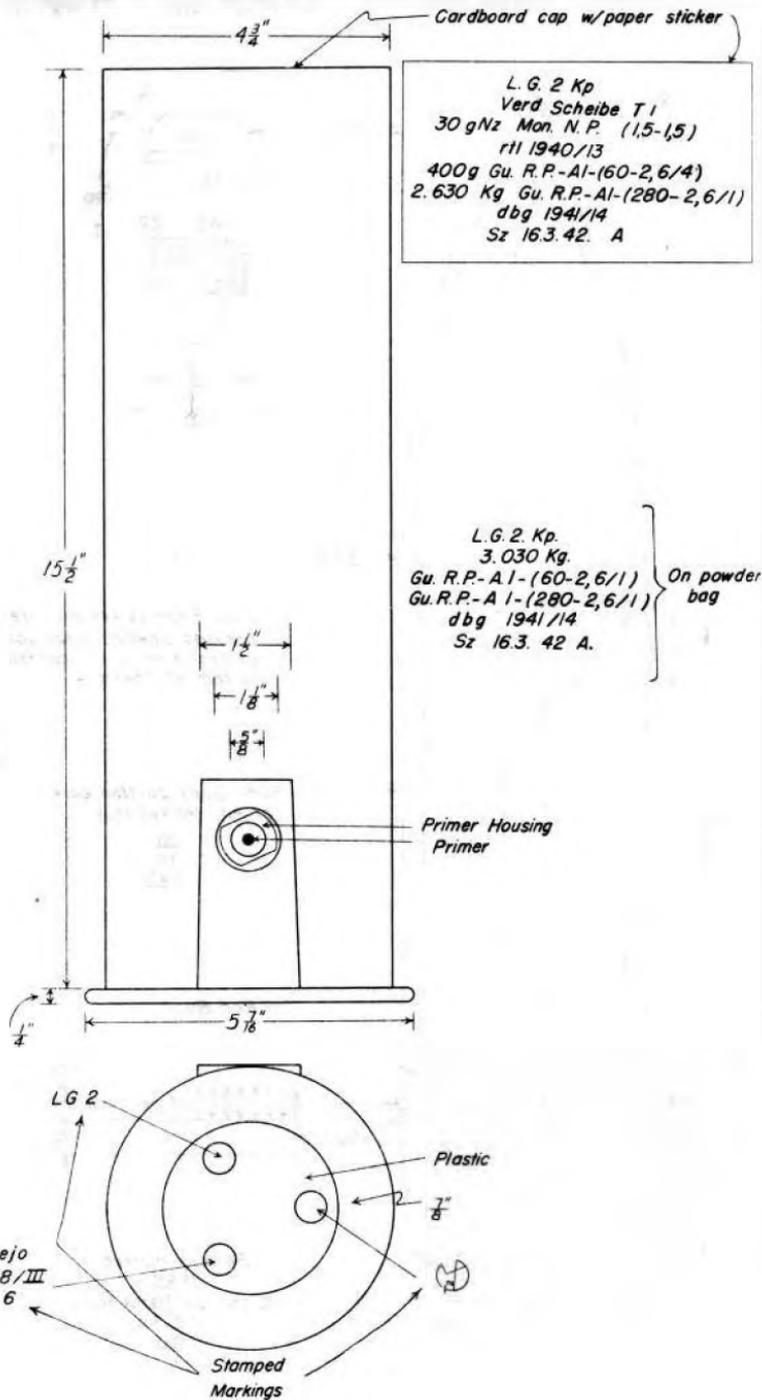
# GERMAN 105mm CAPO DI ORLANDO SECTOR



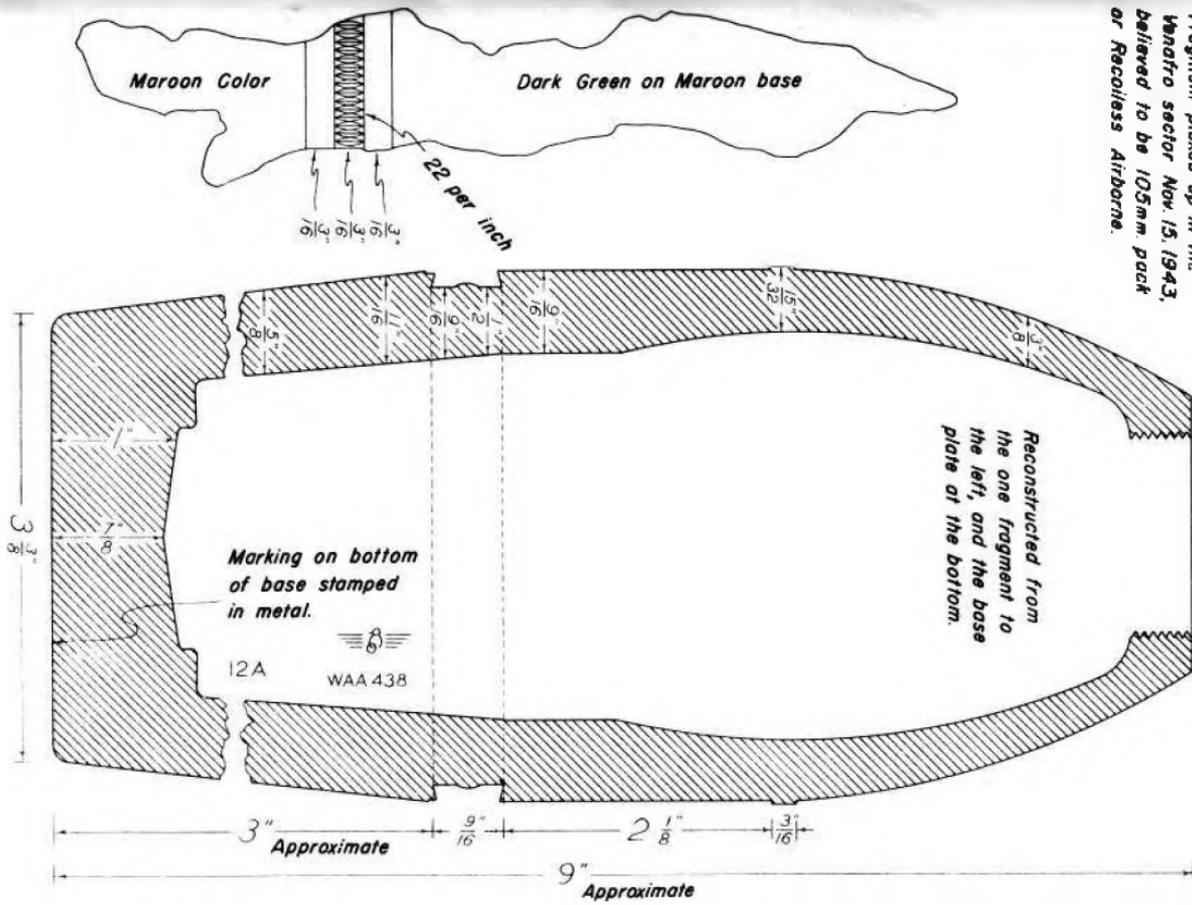
# GERMAN 105mm HOLLOW CHARGE



# 10.5 CM AIRBORNE RECOILLESS HOW.

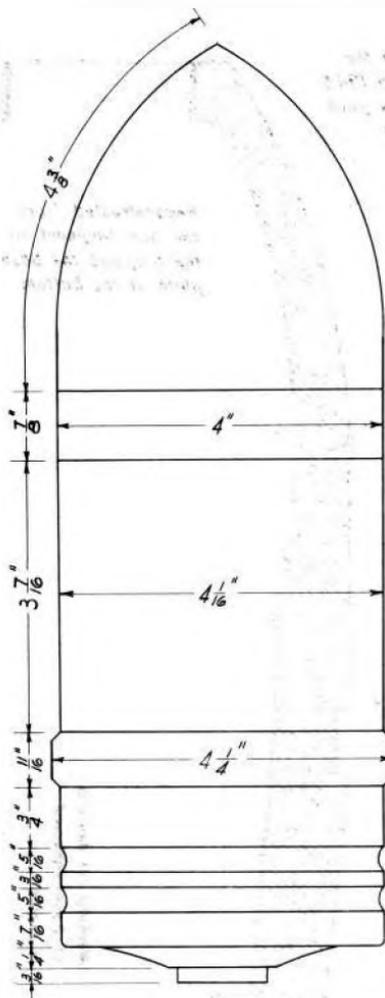


Fragment picked up in the  
 Wundt sector Nov 15, 1943,  
 believed to be 105mm pack  
 or Recoiless Airborne.



# 10.5cm. ARMOR PIERCING

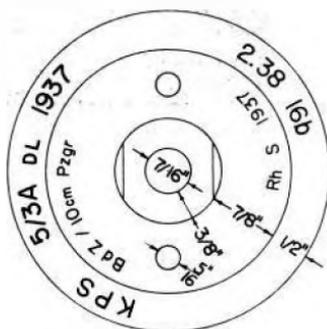
*Base percussion fuse*



Used by the  
10.5cm. Gun How  
10.5cm. I.F.H. 18  
10.5cm. Gun  
10cm. K18

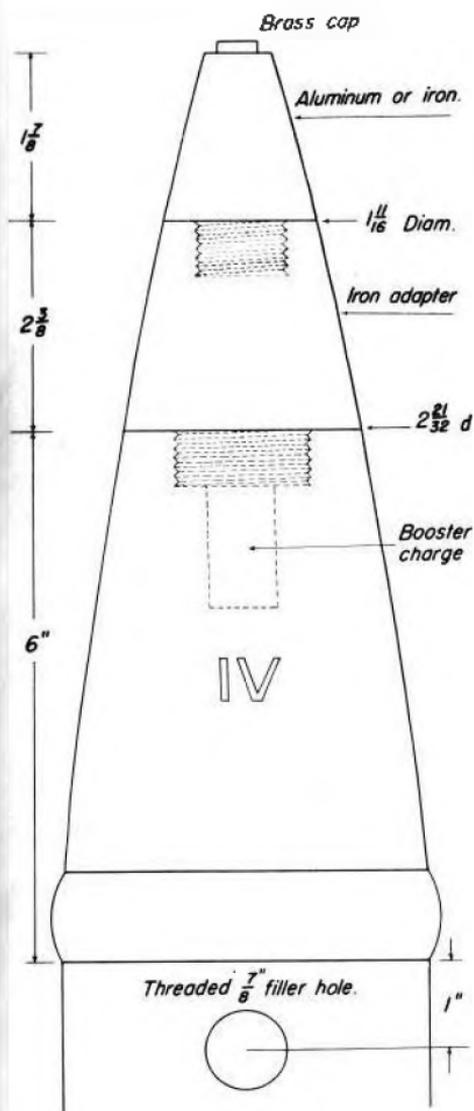
Bi-metallic  
Copper on iron

Weight of Shell  
31.25 pounds



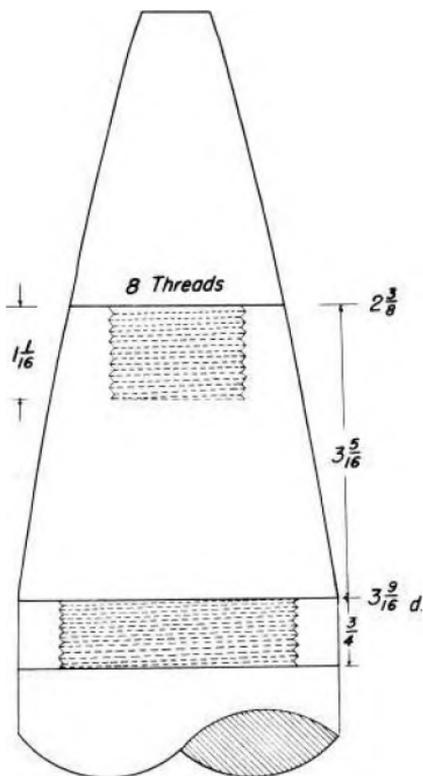
# 105 C

# 105 D

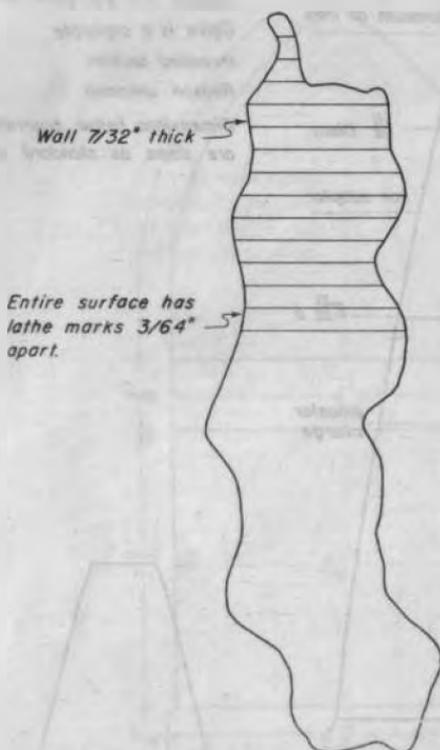


GR 105 mm Smoke  
 Cu band  
 May have aluminum fuze (1937)  
 or iron (1940).

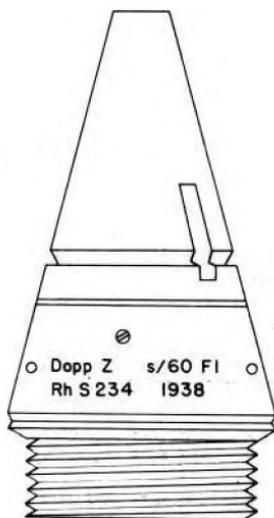
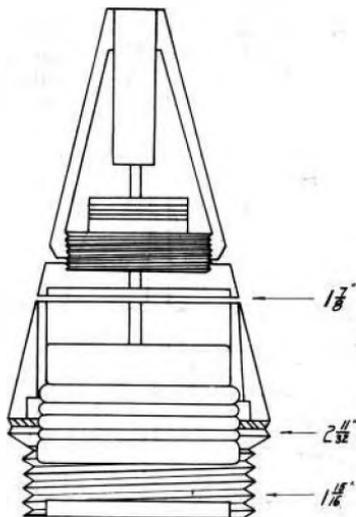
GR 105 mm  
 Normal AZ-23 quick-delay fuze  
 Ogive is a separate  
 threaded section.  
 Reason unknown.  
 Dimensions below bourrelet  
 are same as standard shell.



GERMAN IO5mm.



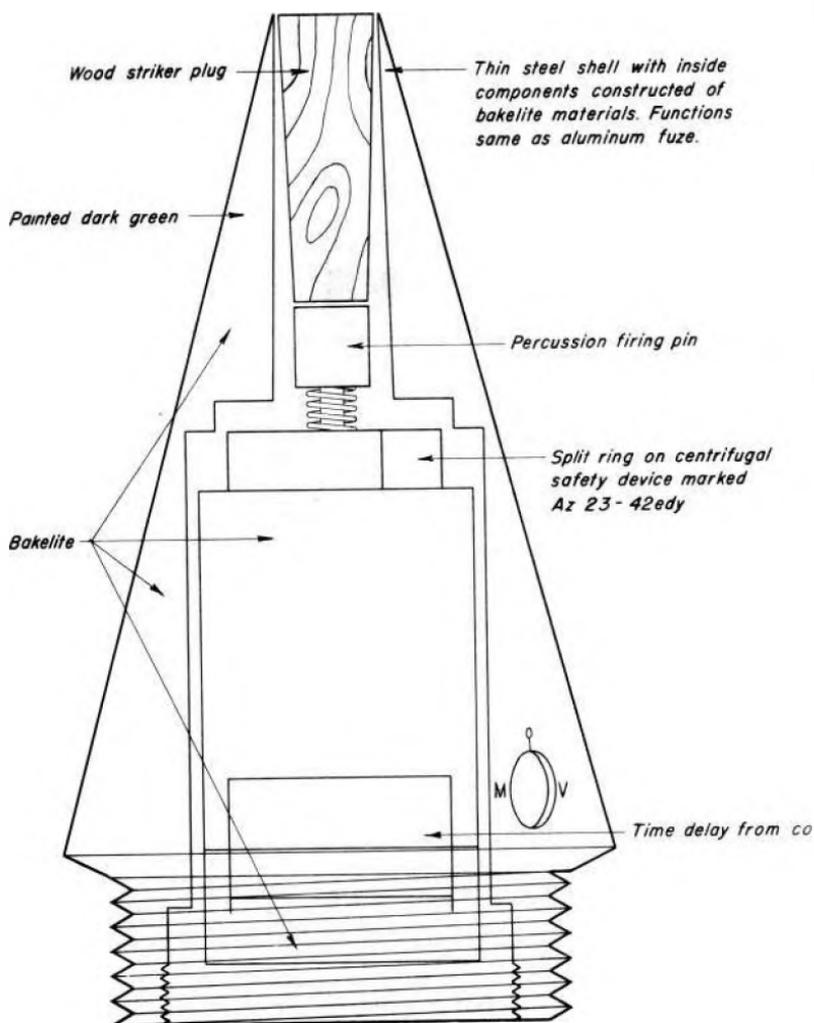
GERMAN 105mm FUSE D  
(Dopp Z s/60 FI) CLOCKWORK TIME FUZE  
Rh B 234 MAX: 35 sec (7)



# GERMAN 105mm. (88mm. ?)

AZ 23-42EDY FUZE

FUZE B<sub>1</sub>

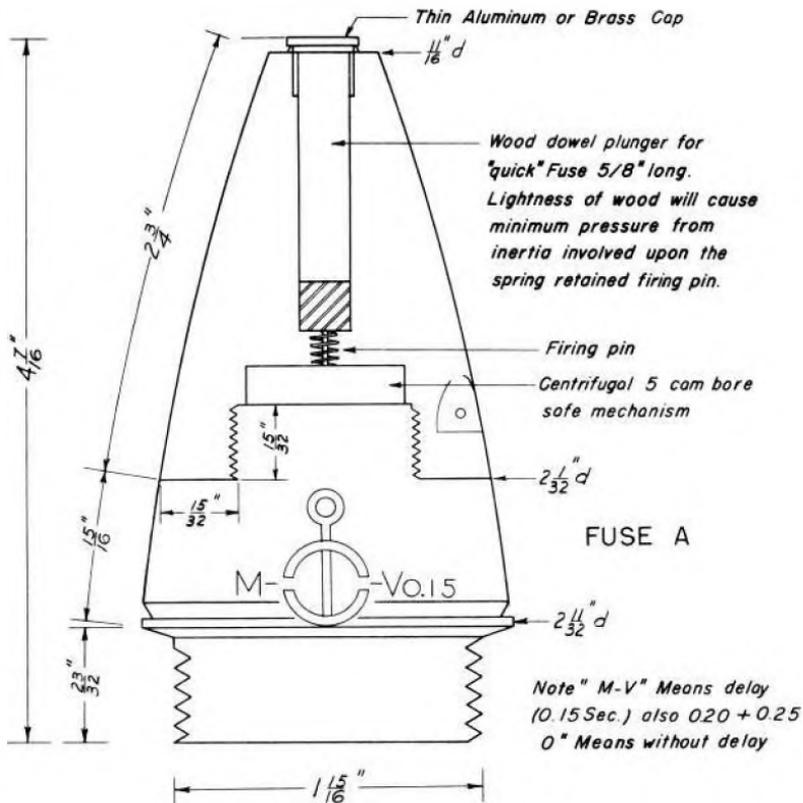


*This fuze is not in wide use. Shows simplification and speed of construction combined with employment of non-strategic materials.*

*The Az 23 aluminum fuze has also been constructed of a heavier, harder, non-ferrous metal (resembles zinc in color). Machining operations are identical.*

# FUSE "AZ 23"

Adapted to German 105mm & 88mm



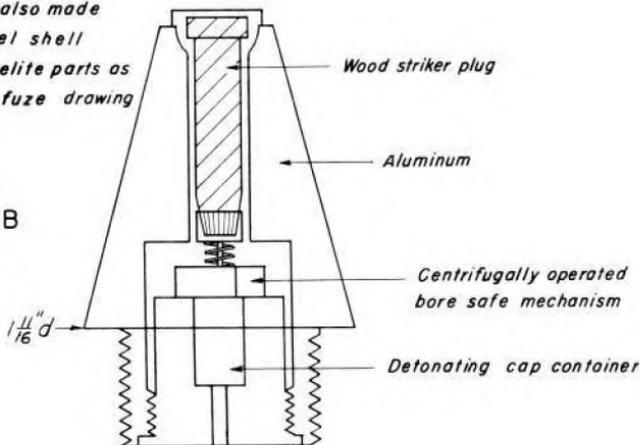
German 105 and 88-mm (and other calibres?)

fuze for smoke shells KLAZ 23 NB

RHS 350 1937

This fuze is also made of a thin steel shell with cast bakelite parts as shown in 105 fuze drawing

FUSE B

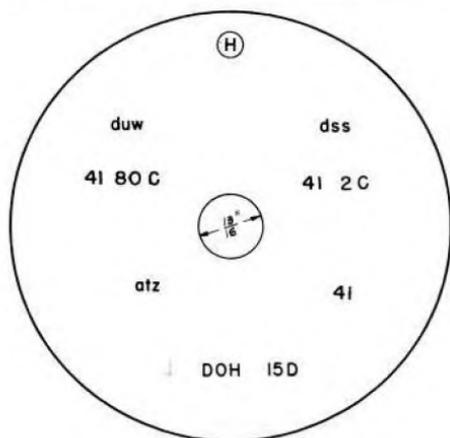
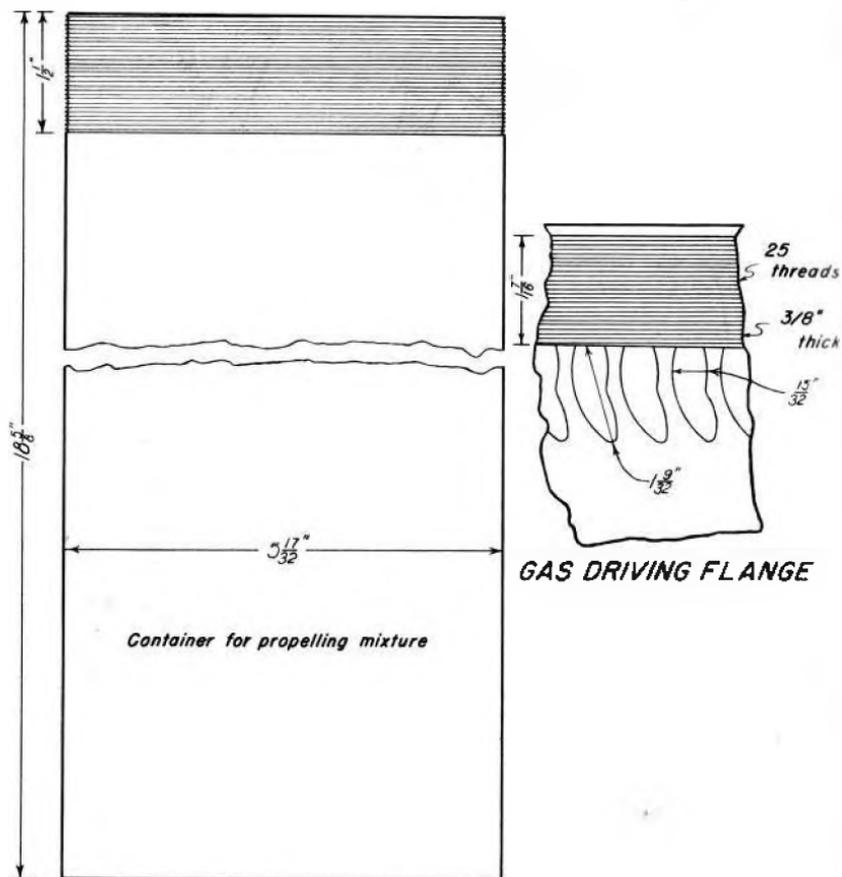






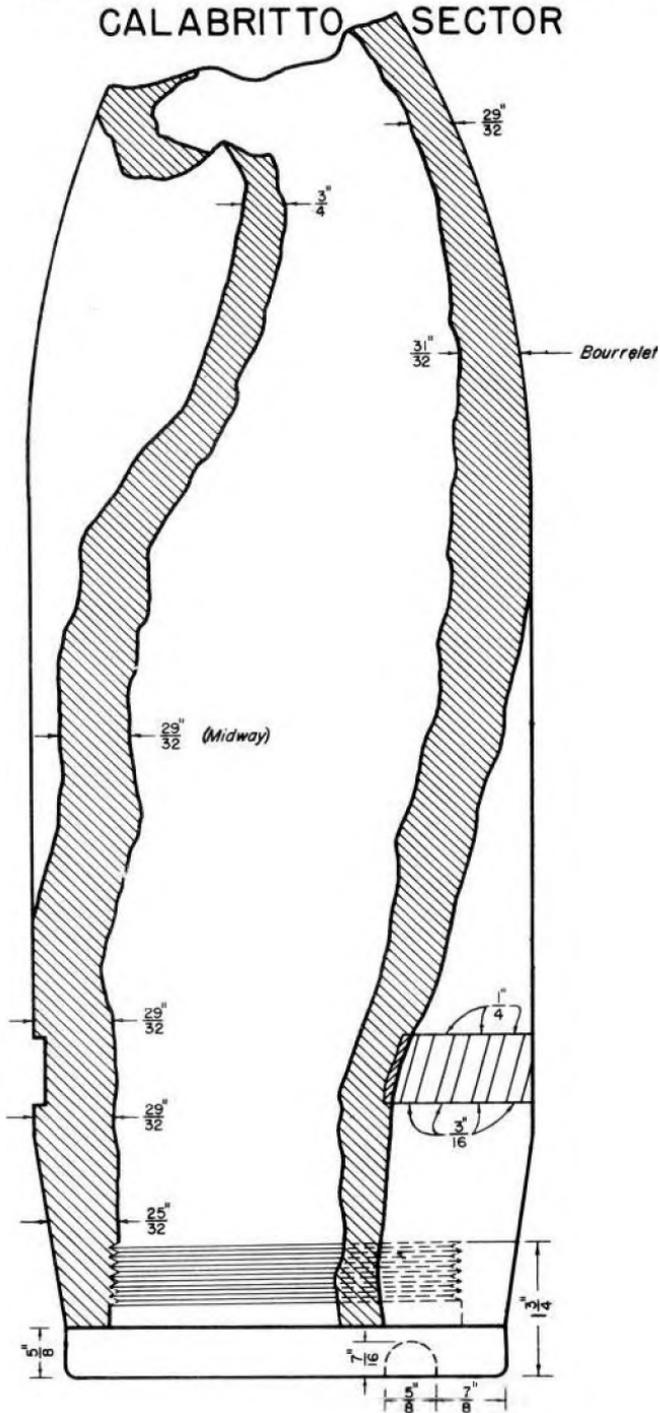
# 15cm. ROCKET PROJECTILE. TELESE AREA

## OCT. 1943

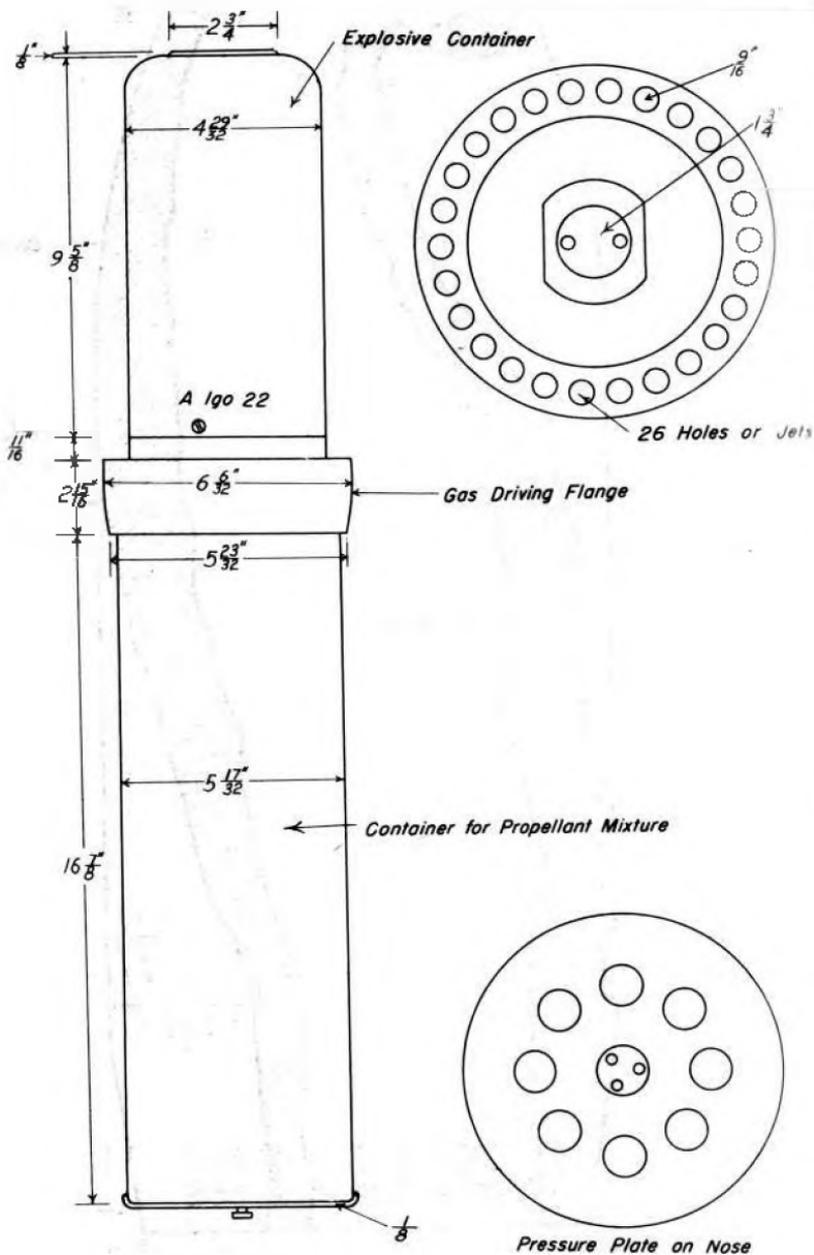


Markings on end of container.

# LOW ORDER 150mm. SHELL FROM CALABRITTO SECTOR



# 15 cm ROCKET PROJECTILE SAN SALVATORE SECTOR



# PERCUSSION FUSE 23 CONVERTED TO 2 SEC. DELAY

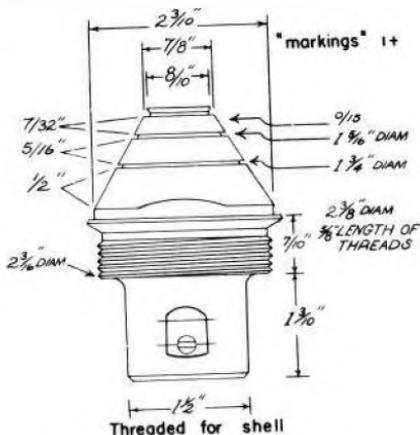
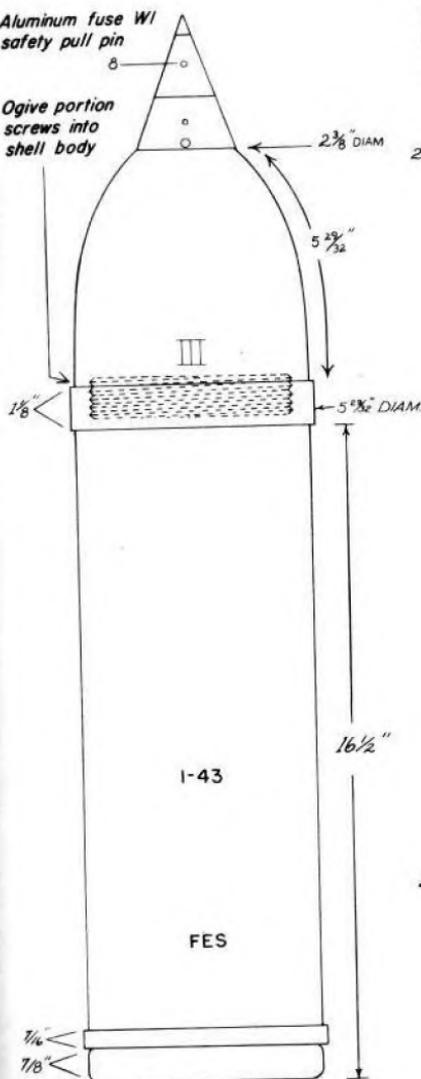
From Medjez sector

Feb. 10, 1943 1943

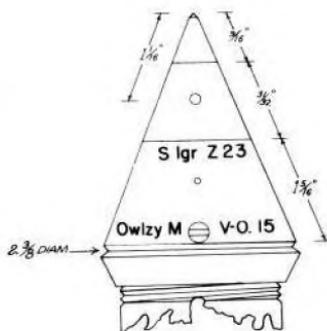
## GERMAN 150mm HOW.

Aluminum fuse w/ safety pull pin

Ogive portion screws into shell body



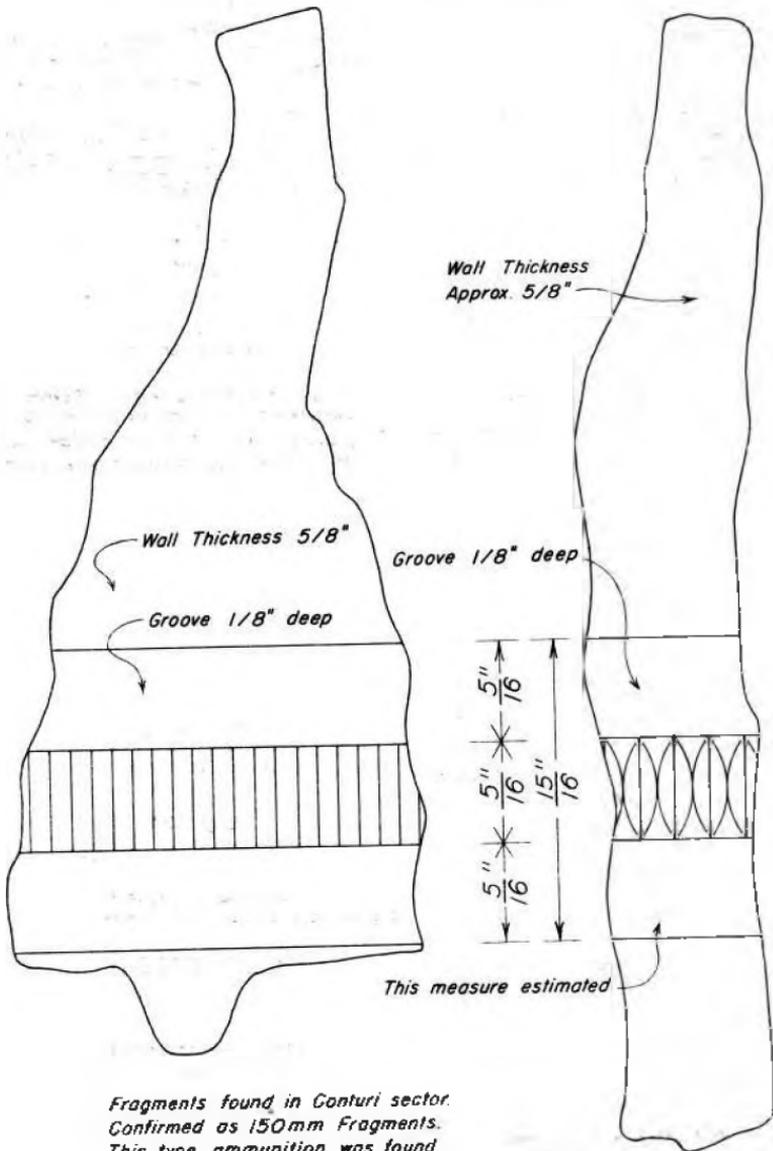
Fuse is assumed to be from 150mm shell  
Adjustment for "quick" as well as 15/100  
seconds delay. This fuze may be capped  
by a conical cast aluminum streamlined hood.



Delay — instantaneous  
safety pull pin

Color — dark green base marked  
Fes 15cm Jgr 38 Fess Jgr z 23

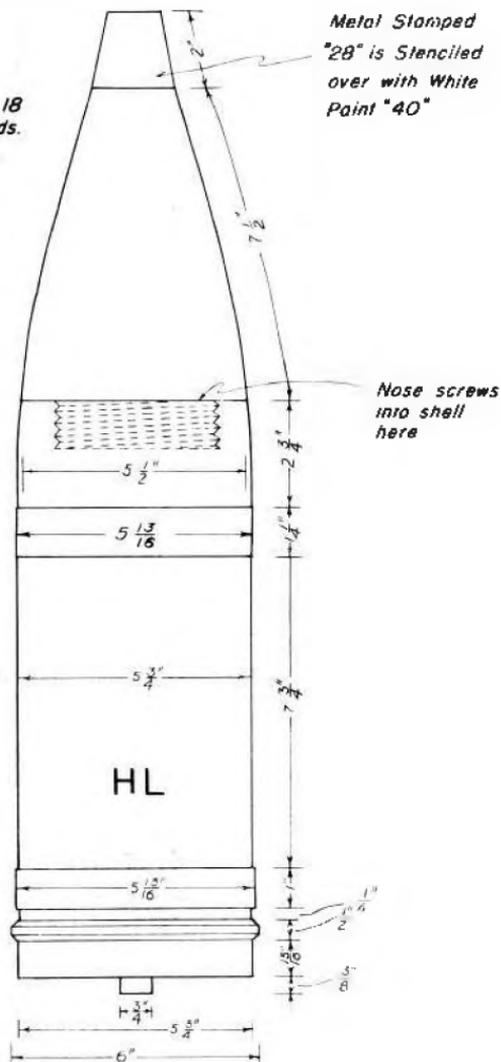
150mm

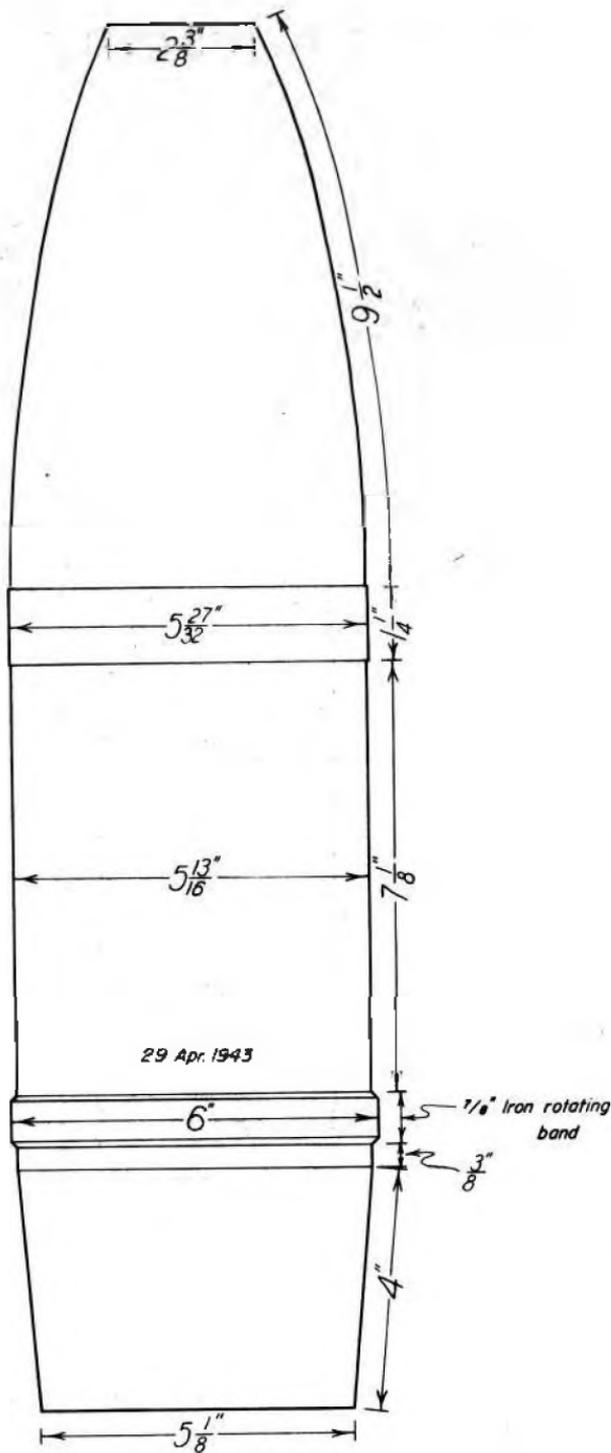


Fragments found in Conturi sector.  
Confirmed as 150mm Fragments.  
This type ammunition was found  
at a position which had been  
occupied by a battery of 150mm  
guns 24 calibres long.

# 15.0cm. PROJECTILE

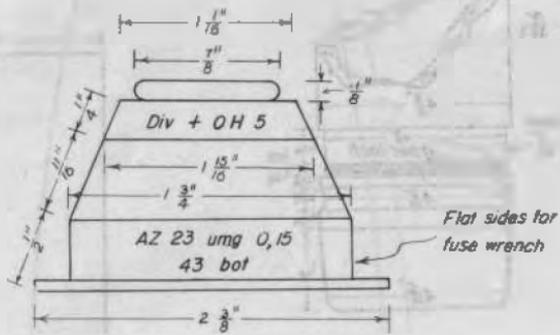
Found in a position  
which had been  
occupied by the  
standard 15CM. s F.H. 18  
Max. Range 14,570 yds.



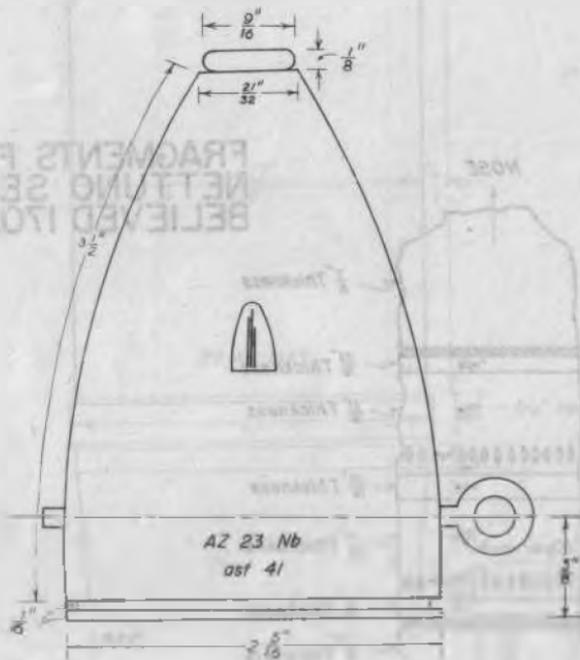




TIME FUSE 15.0cm.W/IRB



FUSE 15.0cm.W/2GRB



# GERMAN 17.5cm. SHELL-H.E. STREAMLINED

(from large fragments)

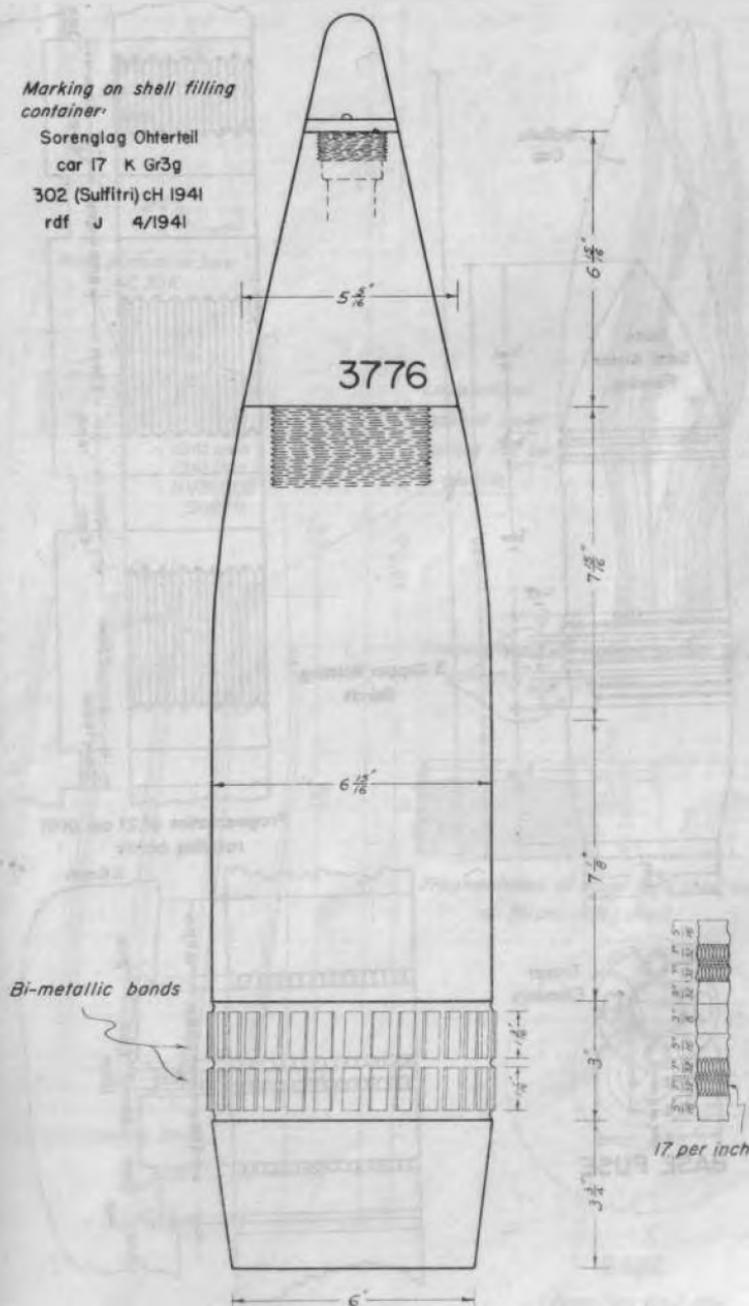
Marking on shell filling container:

Sorenglag Ohterteil

car 17 K Gr3g

302 (Sulfitri)ch 1941

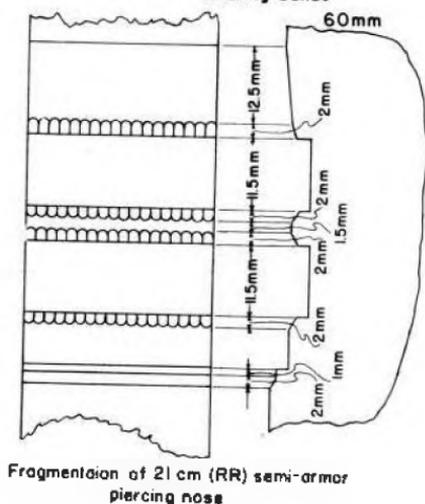
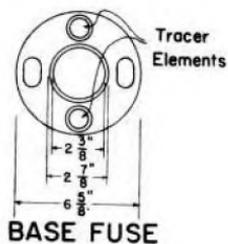
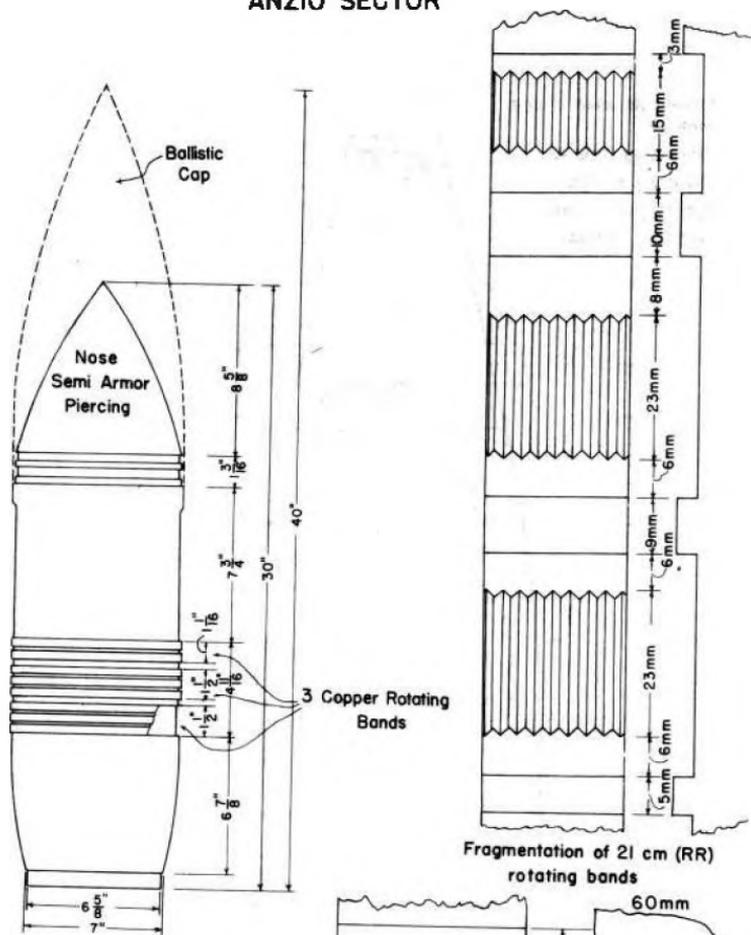
rdf J 4/1941



# 21 CM DUD

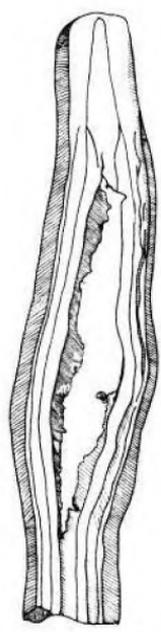
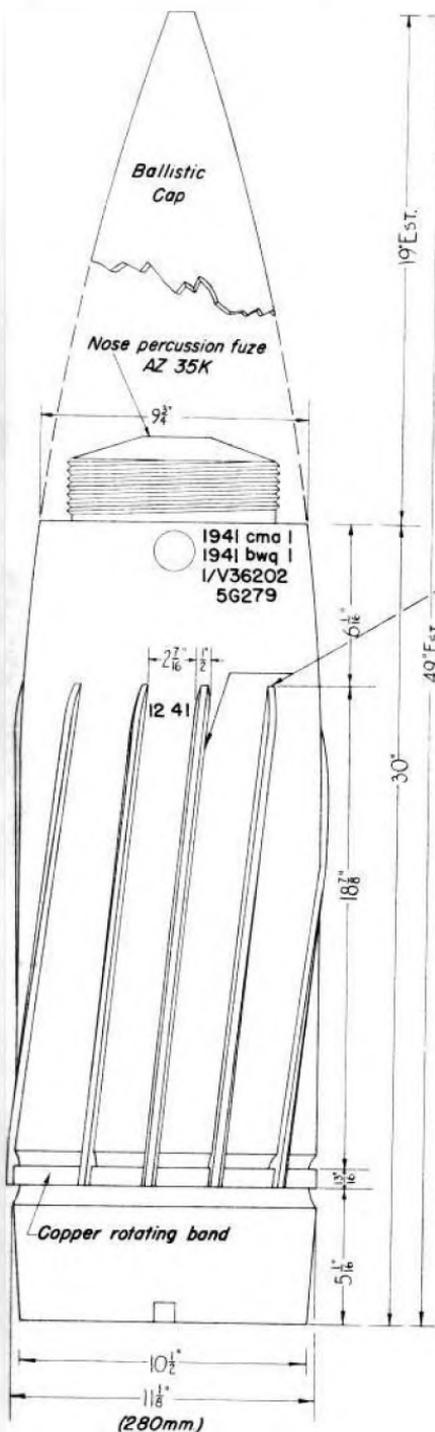
APPROX. WEIGHT 285 LBS.

ANZIO SECTOR



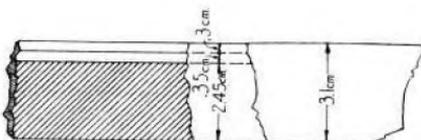
28 cm DUD - ANZIO SECTOR

Approx. wt. 520 lbs.

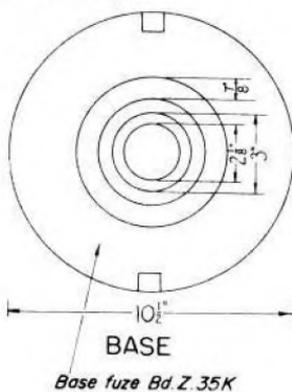


Longitudinal inclined steel splines - 12 on projectile.

Fragmentation of inclined splines of 28 cm. (R.R.) projectile.



Fragmentation of cased hard steel walls of 28 cm. (R.R.) shell.



DETAILS OF GERMAN ROTATING BAND

ALL MEASUREMENTS IN MILLIMETRES

WEAPONS	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space be- tween bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
28 cm. Kz. Br. K (E)	HE	Copper	1	23			128	Probably pressed on hot- no keying for single copper band which acts as a gas seal. Also special naval design (rifled) with 12 longitudinal inclined steel splines approx 480 mm long.	Shell weighs approx 520 lbs, streamlined base with ballistic cap, and nose and/or base fuse.
21 cm. K 12 (E)	HE	Copper	3	35	35	10	175	Upper band (third band) approx 24 mm wide. Long vertical serration on two lower bands approx 23 mm wide. Serration on upper band approx 15 mm wide (also 21 cm shell may be same construction of 28 cm.)	Semi-armour nose with ballistic cap and base fuse. Approx 285 lbs.
20.3 cm K (E)	HE	Copper	3						
21 cm Mrs. 18	HE	Bimetallic	2	15	15	10	117	1 row vertical serration es.	Streamlined-base per- cussion or T. and P. fuse.
	HE	Bimetallic	2	15	15	10	117	2 rows vertical serration es.	
	HE	Bimetallic	1	45	-	-	109	1 row vertical serration near bottom of groove.	1944 ammunition.

DETAILS OF GERMAN ROTATING BAND

ALL MEASUREMENTS IN MILLIMETRES

WEAPONS	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space be- tween bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
17 cm. K 39	HE	Bimetallic	2	26	26	10	100	2 rows vertical serration es.	Streamlined base with tracer element.
	HE	Bimetallic	2	29	29	9	108	2 rows vertical serration es.	
	HE	Bimetallic	2	32	32	9	108	1 row vertical serration near bottom of each groove.	1944 ammunition.
17 cm. K 38	HE	Bimetallic	2	26	26	10	125	2 rows vertical serration es.	
	HE	Bimetallic	2	29	29	9	125	2 rows vertical serration es.	
15 cm. SIG 33	HE	FE	1	11	-	-	24	1 row vertical serration	Unstreamlined.
* 15 cm. SF 18	HE	FE	2	12	12	5	82	1 row vertical serration es.	Streamlined.
	HE	FE	2	12	12	8	-	1 row vertical serration es.	
	HE	FE	2	11	11	5	80	1 row vertical serration es.	
	HE	FE	1	22	-	-	112	1 row vertical serration	
	HE	FE	1	22	-	-	82	1 row vertical serration	
15.2 cm. Russina 37	HE	Copper	1	21	-	-	92		
15.5 cm. How.	HE	Copper	1	15	-	-	86	1 row oblique indentation	French manufacture

DETAILS OF GERMAN ROTATING BAND

ALL MEASUREMENTS IN MILLIMETRES

WEAPONS	SHELL	NATURE OF ROTATING BAND	No of bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
15.5 cm. gun	HE	Copper	2	15	15	13	83	1 row oblique indentation ca.	French manufacture.
12.8 cm. Flak 40	HE	Fe	2	22	22	8	30	1 row vertical indentation top and bottom of each groove.	Yellow shell.
12.2 cm.	HE	Copper	2	22	22	8	-	1 row vertical indentation 12 mm wide.	
10 cm. K 18	HE	Bimetallic	2	17	17	6	91	1 row vertical serration ca.	Streamlined.
	AP	Bimetallic	1	23	-	-	38	1 row vertical serration	
*10.5 cm. 1 P 18	HE	Bimetallic	1	15	-	-	86	1 row vertical serration	
	HE	Bimetallic	1	15	-	-	65	1 row vertical serration	
	HC	Bimetallic	1	15	-	-	56	1 row vertical serration	
	HE	Bimetallic	1	15	-	-	76	1 row vertical serration	
	Smoke	Bimetallic	1	16	-	-	84	Narrow serration approx 7 mm of 7 rows pyramids	
10.5 cm. Recoilless LG 40	HE	Bimetallic	1	20	-	-	88	1 row vertical serration	
10.5 cm. Flak 38	HE	Bimetallic	2	17	17	6	63	1 row vertical serration ca.	Unstreamlined-yellow shell.
8.8 cm. Flak 36 and 37	HE	Bimetallic	2	11	11	5	35	1 row vertical serration ca.	Yellow shell.
	AP	Bimetallic	2	11	11	5	35	1 row vertical serration ca.	Black shell.

DETAILS OF GERMAN ROTATING BAND

ALL MEASUREMENTS IN MILLIMETRES

WEAPONS	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
7.62 cm. Pak 36	AP-HE	Bimetallic	1	17	-	-	25	1 row vertical serration	German manufacture
	HE	Bimetallic	1	17	-	-	82	1 row vertical serration	German manufacture
	AP-HE	Copper	1	13	-	-	87	1 row vertical indentation	Russian manufacture
	HE	Copper	1	12	-	-	42	1 row vertical indentation	Russian manufacture
7.5 cm. Pak 40	HE	Bimetallic	1	16	-	-	58	1 row vertical serration	
	AP	Bimetallic	1	16	-	-	25	1 row vertical serration	
7.5 cm. Mtn gun	HE	Bimetallic	1	11	-	-	18	1 row vertical serration	Unstreamlined
7.5 cm. 1 IG 18	HE	Bimetallic	1	16	-	-	28	1 row vertical serration or one row of pyramids	Unstreamlined
* 15 cm. and 10.5 cm. weapons may fire a new streamlined projectile with disintegrating rotating bands.									Projectiles are painted yellow

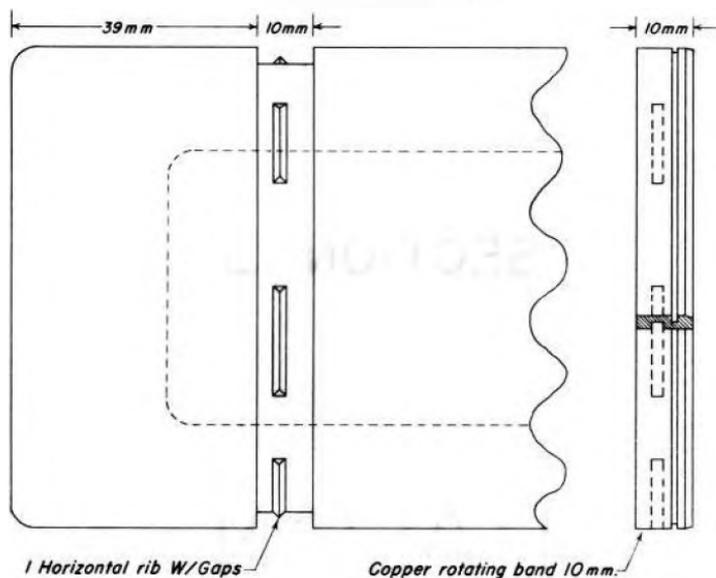
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2	...	...	...	...	...	...	...	...	...
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17	...	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...	...
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23	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...	...
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31	...	...	...	...	...	...	...	...	...
32	...	...	...	...	...	...	...	...	...
33	...	...	...	...	...	...	...	...	...
34	...	...	...	...	...	...	...	...	...
35	...	...	...	...	...	...	...	...	...
36	...	...	...	...	...	...	...	...	...
37	...	...	...	...	...	...	...	...	...
38	...	...	...	...	...	...	...	...	...
39	...	...	...	...	...	...	...	...	...
40	...	...	...	...	...	...	...	...	...
41	...	...	...	...	...	...	...	...	...
42	...	...	...	...	...	...	...	...	...
43	...	...	...	...	...	...	...	...	...
44	...	...	...	...	...	...	...	...	...
45	...	...	...	...	...	...	...	...	...
46	...	...	...	...	...	...	...	...	...
47	...	...	...	...	...	...	...	...	...
48	...	...	...	...	...	...	...	...	...
49	...	...	...	...	...	...	...	...	...
50	...	...	...	...	...	...	...	...	...

SECTION II

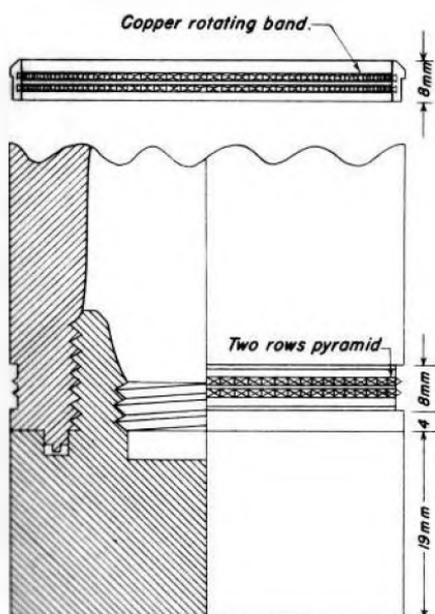
ITALIAN



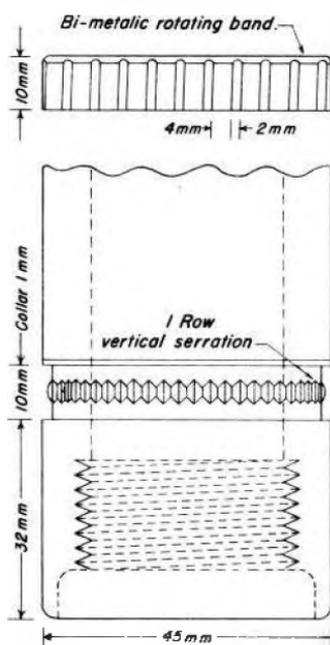
# 75/27 H.E.

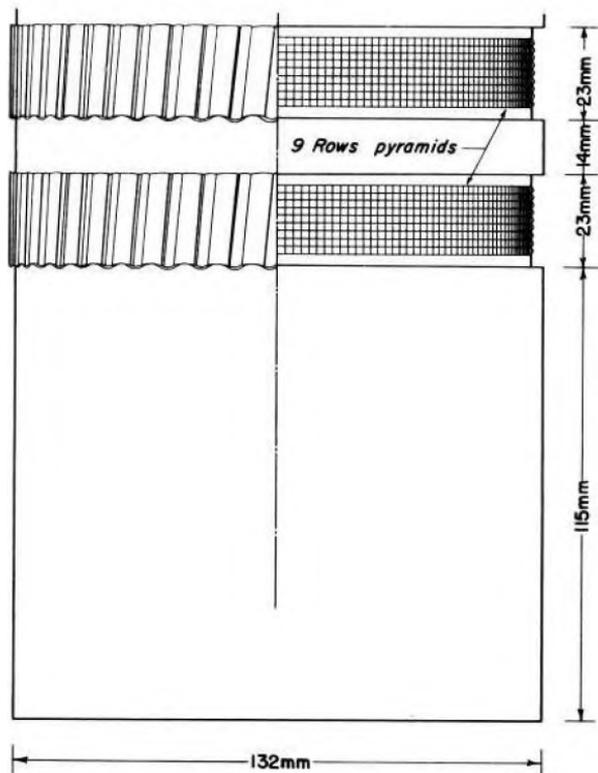


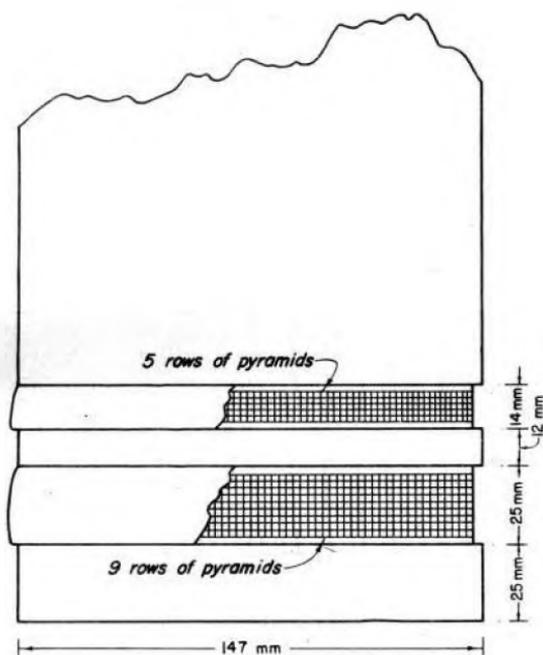
# 65/17 H.E/A.P.



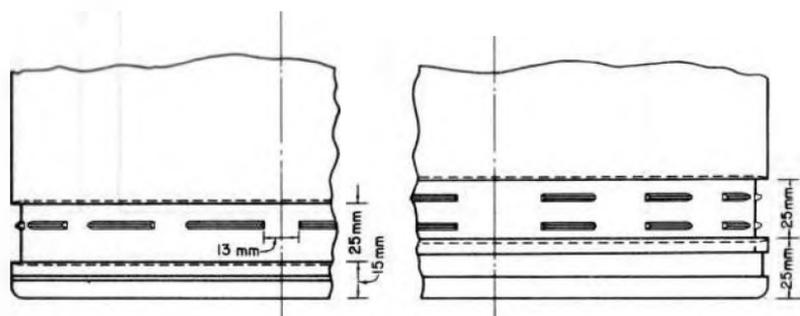
# 47 mm A.P.







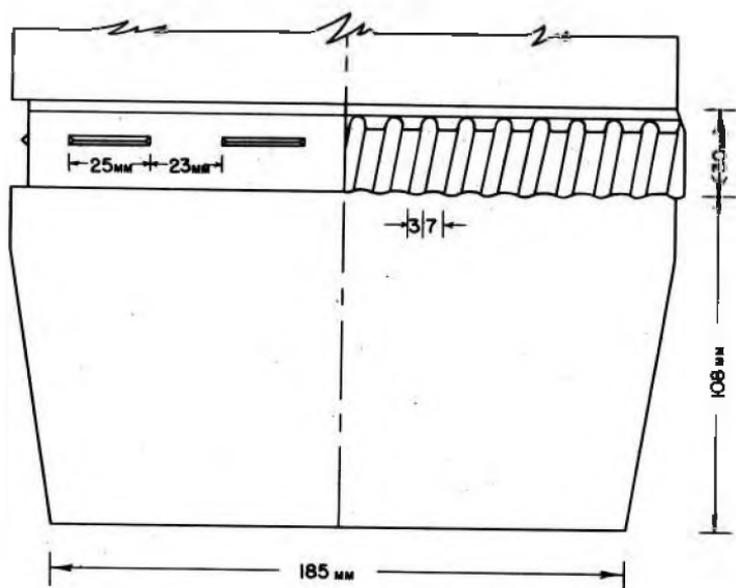
**149/42**



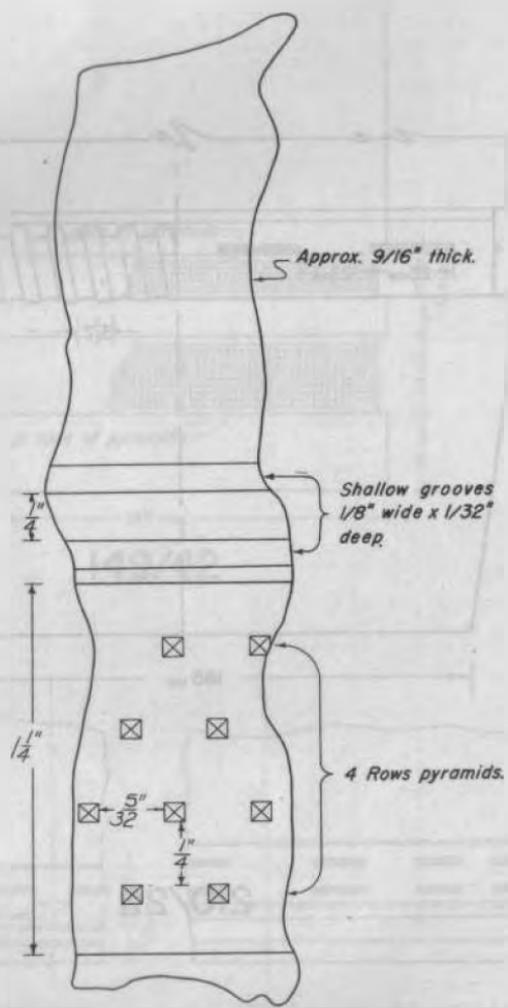
*One horizontal rib with gaps*

*Two horizontal ribs with gaps*

**210/8**



210/22



DETAILS OF ITALIAN ROTATING BAND

ALL MEASUREMENTS IN MILLIMETRES

WEAPON	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space betw bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
420/12 How.	HE	Copper	2	41	25	20	25		Base fuze
305/8 How.	HE	Copper	1	58	-	-	24	14 rows of pyramids	Nose percussion fuze-streamlined
260/9 How.	HK	Copper	1	34	-	-	75	14 rows of pyramids	Nose percussion fuze-streamlined
210/22 How.	HE	Copper	1	30	-	-	108	1 horizontal rib with gaps	Round base with nose percussion fuze
210/8 How.	HE	Copper	1	25	-	-	15	1 horizontal rib with gaps	Nose percussion fuze-unstreamlined
	HK	Copper	1	25	-	-	25	2 horizontal ribs with gaps	Nose percussion fuze-unstreamlined
152/50 gun	AP-HE	Copper	1	17	-	-	31		Screwed in base-unstreamlined
152/45 gun	HE	Copper	2	25	25	15	35	2 rows of pyramids	Screwed in base-unstreamlined
152/37 gun	HK	Copper	2	30	35	9	25	2 rows vertical serration	Screwed in base-unstreamlined
152/32 gun	HE	Copper	1	22	-	-	34	2 horizontal ribs with gaps	Nose percussion fuze-unstreamlined
	HK	Copper	1	36	-	-	22		Nose percussion fuze-unstreamlined
	HE	Copper	1	47	-	-	17		Nose percussion fuze-unstreamlined

DETAILS OF LANTAN ROTATING BAND  
ALL MEASUREMENTS IN MILLIMETERS

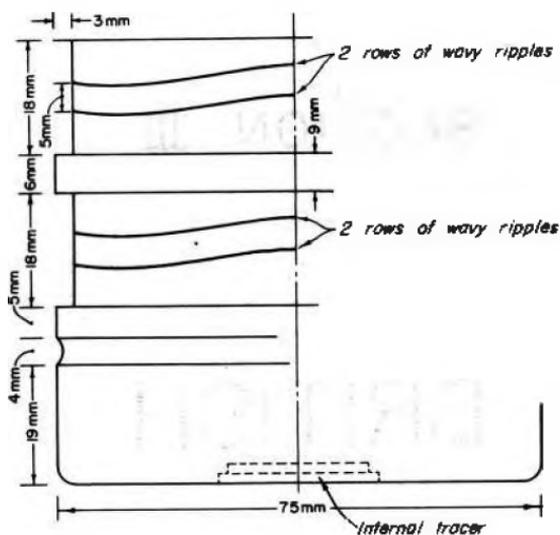
WEAPON	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		SPRING TO LOWER BAND	SETTING	REMARKS
				TOP TO TOP	TOE TO TOE			
152/13 How.	HE	Copper	1	25	-	-	12 rows of pyramids	Base fuse
	HE	Copper	1	27	-	-		Base percussion fuse- underreamed
149/42 gun	HE	Copper	2	14	25	12	Top band 5 rows pyramids lower band 9 rows pyramids	
149/40 gun	HE	Copper	2	23	23	14	9 rows of pyramids	Base percussion fuse- streamlined
	HE	Copper	2	25	25	13	5 rows of pyramids	Base percussion fuse- streamlined
149/35 gun	HE	Copper	1	25	-	-	6 rows of pyramids	Base percussion fuse- streamlined
	HE	Copper	1	25	-	-	6 rows of pyramids	Base percussion fuse- streamlined
149/12 How.	HS	Copper	1	15	-	-	1 horizontal rib with gaps	Base percussion fuse- underreamed
105/28 or 105/14	HR	Copper	1	15	-	-	5 rows of pyramids	Base percussion fuse- streamlined
	HE	Copper	1	16	-	-	8 rows of pyramids	
	HE	Copper	1	15	-	-		Base percussion fuse- underreamed
100/17 How. Model 14	HS	Copper	1	13	-	-	No keying-band pressed on hot	Base percussion fuse- underreamed
	HS	Copper	1	16	-	-	6 rows of pyramids or 1 horizontal rib with gaps; also with 7 rows pyramids	

DETAILS OF ITALIAN ROTATING BAND

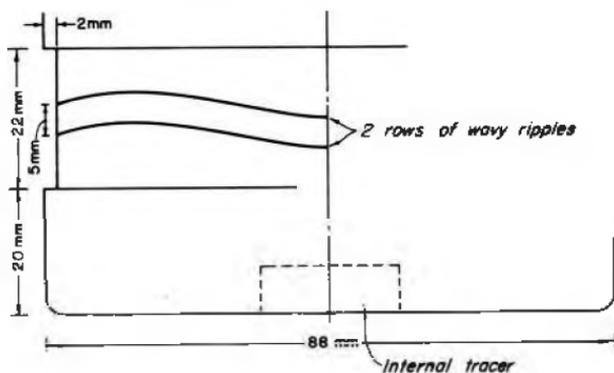
ALL MEASUREMENTS IN MILLIMETERS

WEAPON	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	ROT-TOM				
90/53 A.A. (D.P.)	HE	Copper	2	20	18	8	60	Top band 8 rows of pyramids, lower band 7 rows of pyramids	f. and P. fuze-streamlined
77/28 A.A. gun	HE	Copper	1	10	-	-	41	4 rows of pyramids	Time fuze-unstreamlined
76/40 A.A. gun	HE	Copper	1	17	-	-	48	2 horizontal ribs with gaps	Time fuze-unstreamlined
75/46 A.A. gun	HE	Copper	2	18	16	7	55	7 rows of pyramids	Time fuze-unstreamlined
75/27 A.A. gun	HE	Copper	1	10	-	-	39	1 row horizontal rib with gaps	Time fuze-unstreamlined
75/27 field gun	HE	Copper	1	10	-	-	58	3 rows of pyramids	Nose fuze-streamlined
	HE	Copper	1	10	-	-	58	4 rows of pyramids	
75/13 Mtn gun	HE	Copper	1	10	-	-	46	4 rows of pyramids	Nose percussion fuze-streamlined
	HE	Copper	1	10	-	-	38	1 row horizontal ribs with gaps	Nose fuze-unstreamlined
65/17 How.	HE	Copper	1	8	-	-	23	2 rows of pyramids	
47/34 AT gun	AP	BM	1	10	-	-	32	1 row vertical serration	

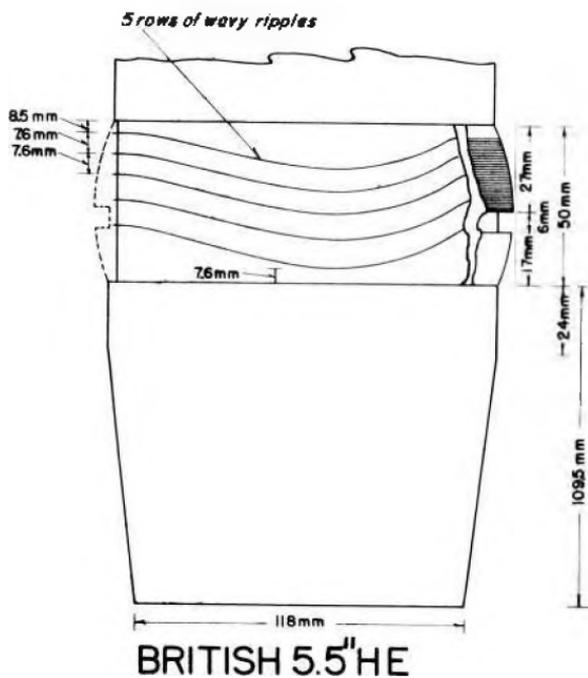
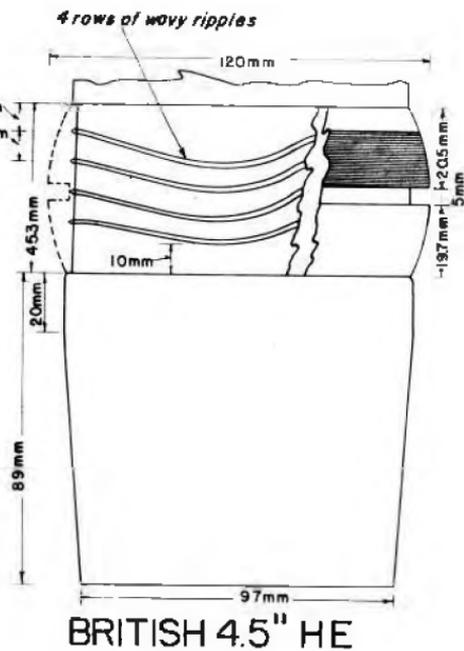
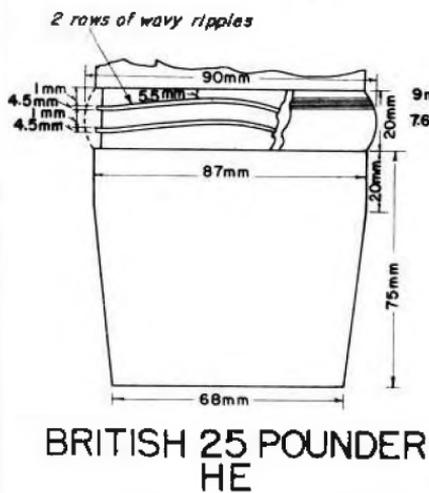


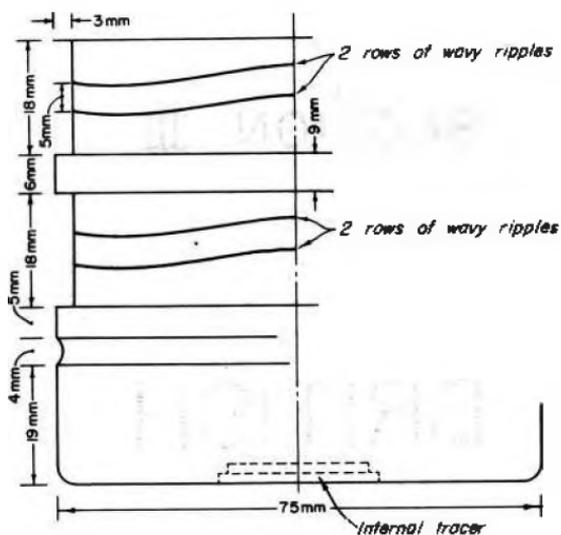


BRITISH 17 POUNDER AP SHOT

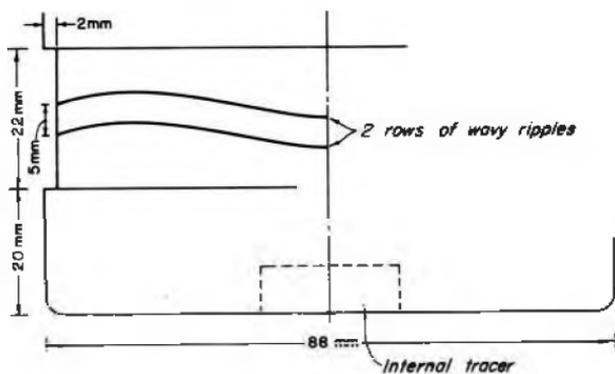


BRITISH 25 POUNDER AP SHOT

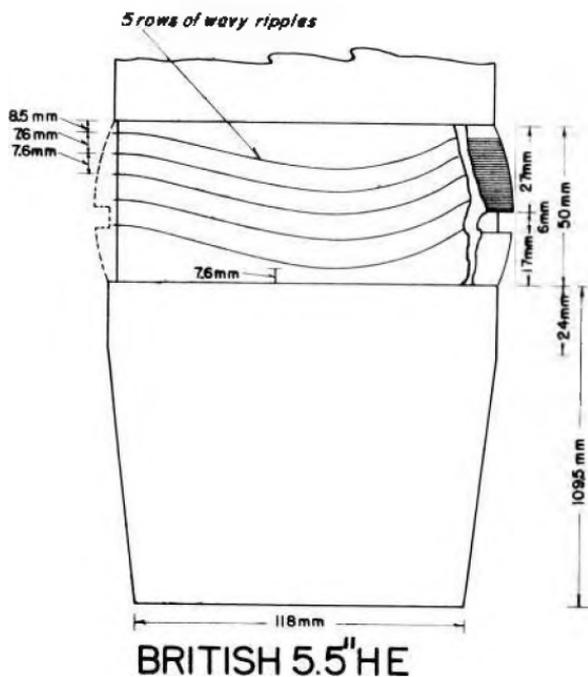
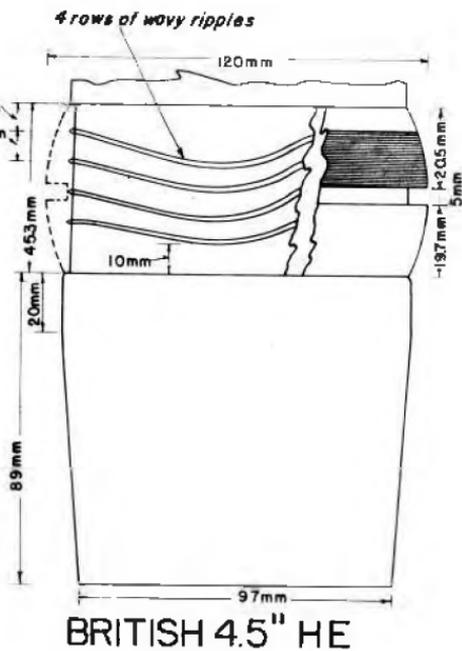
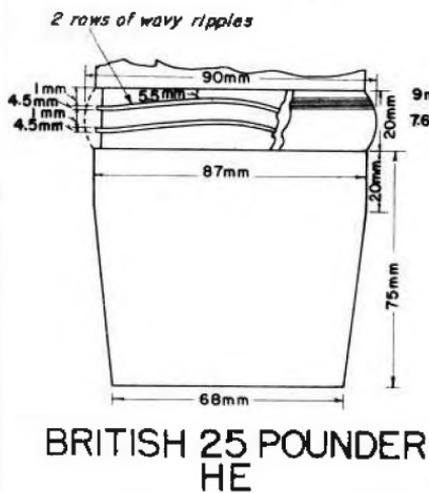




BRITISH 17 POUNDER AP SHOT

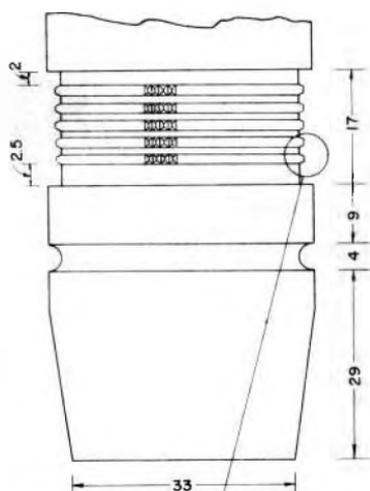


BRITISH 25 POUNDER AP SHOT



### British 40mm. HE A.A.

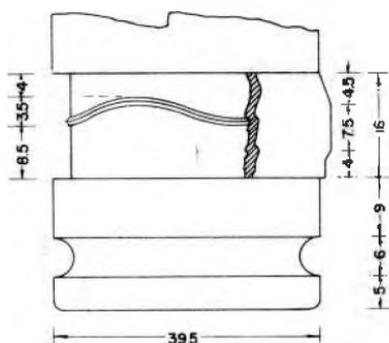
5 rows of vertical pyramid serrations



All dimensions are in millimeters

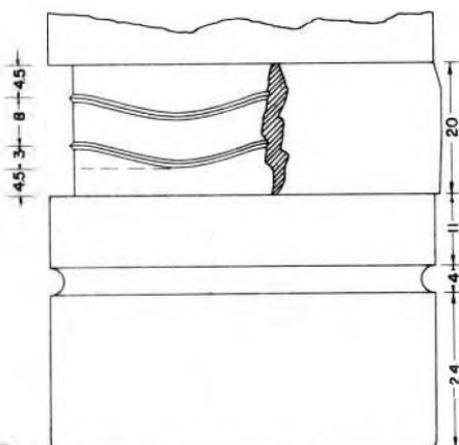
### British 40mm. AP

1 row of wavy ripples



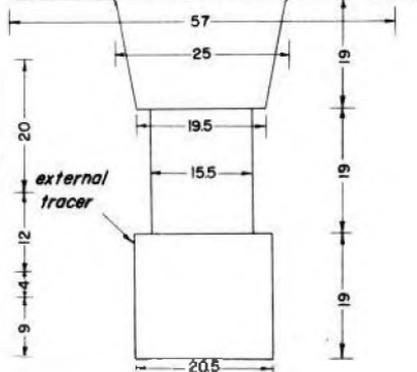
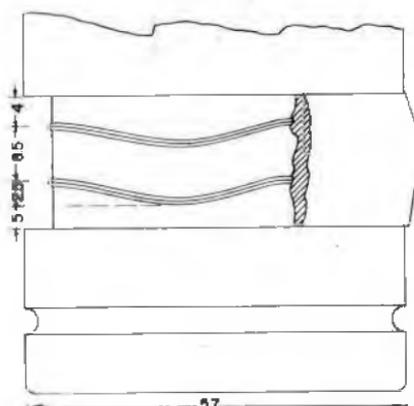
### British 6 pound HE

2 rows of wavy ripples



### British 6 pound AP

2 rows of wavy ripples



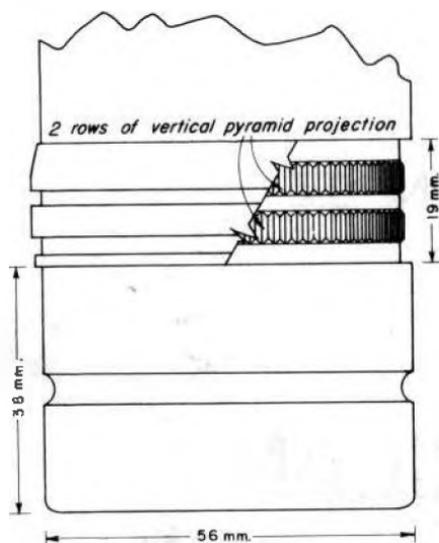
DETAILS OF BRITISH ROTATING BANDS

ALL MEASUREMENTS IN MILLIMETRES

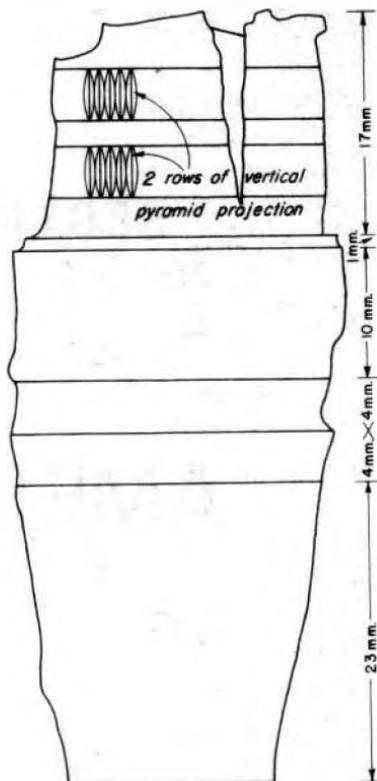
WEAPON	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER HAND	KEYING	REMARKS
				TOP	BOT-TOM				
7.2"	HE	Copper	1	50	-	-	143	5 rows of wavy ripple	Boat tail
	HE	Copper	2	25	25	14	140		Boat tail
5.5"	HE	Copper	1	50	-	-	110	5 rows of wavy ripple	
4.5"	HE	Copper	1	45	-	-	89	4 rows of wavy ripple	Boat tail
25 Pounder (88mm)	AP	Copper	1	22	-	-	20	2 rows of wavy ripple	Internal tracer element
	HE	Copper	1	20	-	-	75	2 rows of wavy ripple	
	Smoke	Copper	1	20	-	-	57	2 rows of wavy ripple	Base ejection
	Smoke	Copper	1	20	-	-	17	2 rows of wavy ripple	Base ejection
17 Pounder (76.2)	AP	Copper	2	18	18	6	28	2 rows of wavy ripple	Internal tracer element
6 Pounder (57mm)	HE	Copper	1	20	-	-	39	2 rows of wavy ripple	External tracer
	AP	Copper	1	20	-	-	25	2 rows of wavy ripple	
40mm AA	HE	Copper	1	17	-	-	42	5 rows of vertical pyramid serration	Boat tail - may be fitted with external tracer
	AP	Copper	1	16	-	-	20	1 row of wavy ripple	Internal tracer
3.7" AA	HE	Copper	1	33	-	-	32	3 rows of wavy ripple	
3"	HE	Copper	1	16	-	-	26	2 rows of wavy ripple	
3.7" How	HE	Copper	1	16	-	-	13	2 or 3 rows of wavy ripple	



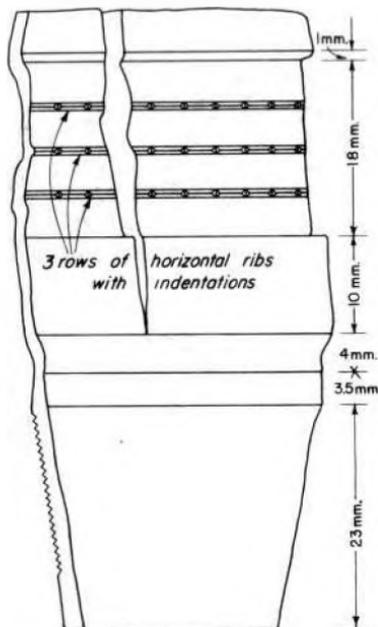
AMERICAN  
57 mm. M70 AP



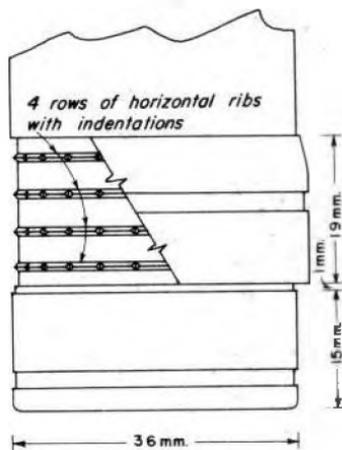
AMERICAN  
40 mm. A. A. HE



AMERICAN  
40 mm. A. A. HE



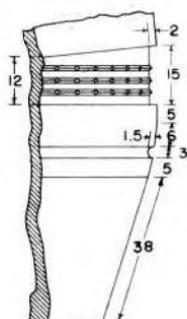
AMERICAN  
37 mm. M59 AP



## AMERICAN 75mm. HOW. HE

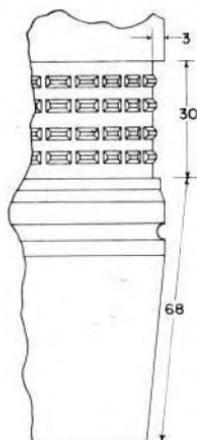
*3 rows of horizontal ribs with indentations*

NOTE:  
ALL DIMENSIONS IN MILLIMETERS



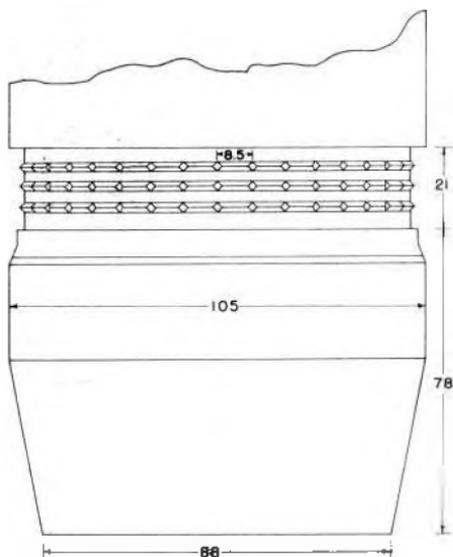
## AMERICAN 90mm. A.A. HE

*4 rows of horizontal ribs with indentations*



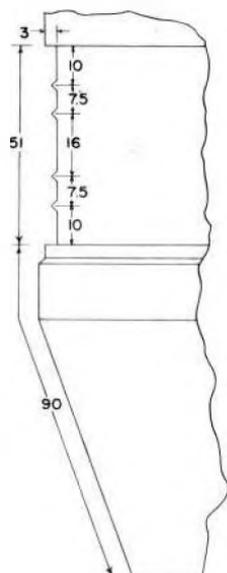
## AMERICAN 105mm. HOW. HE

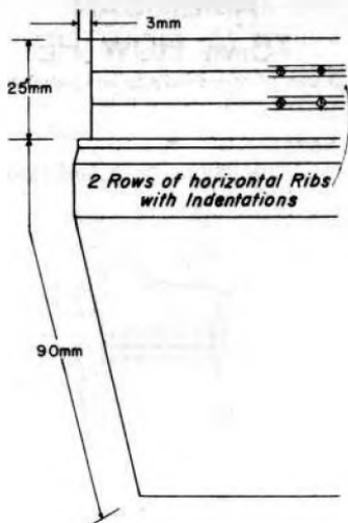
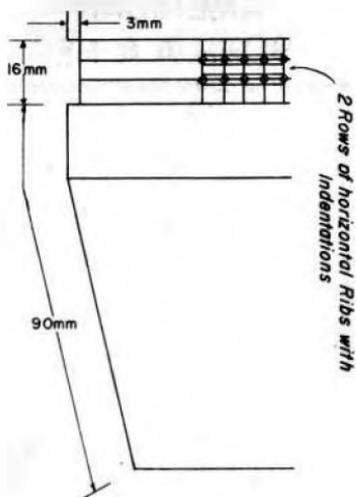
*3 rows of horizontal ribs with indentations*



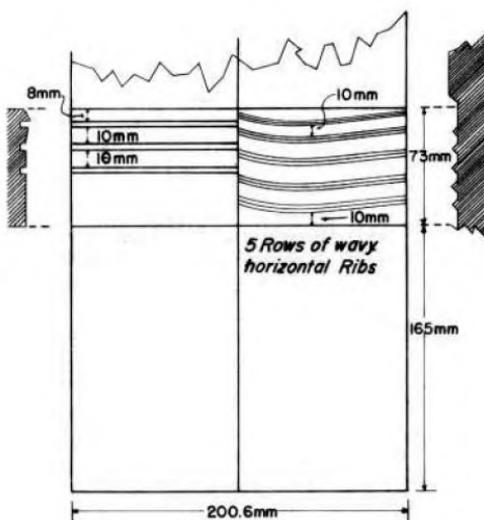
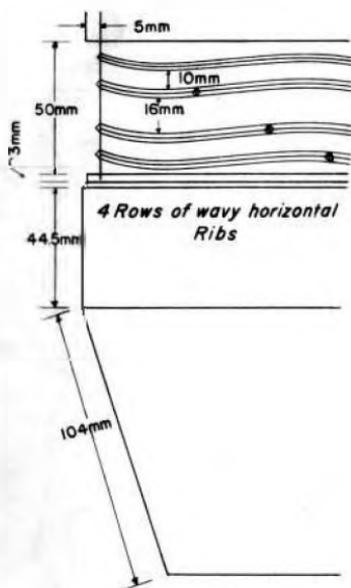
## AMERICAN 155mm. GUN HE

*4 rows of horizontal ribs with indentations*





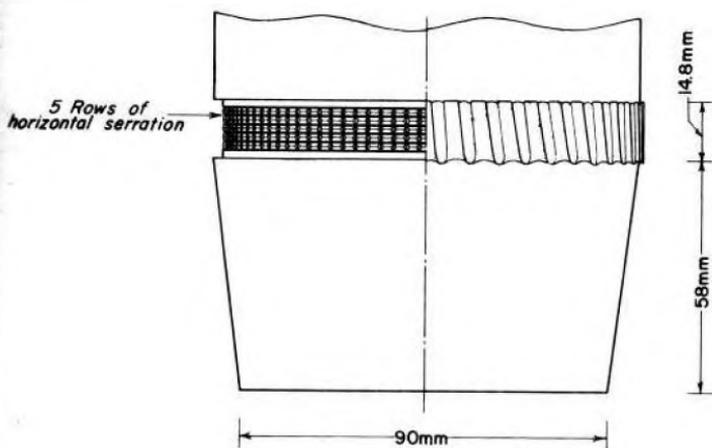
AMERICAN I55  
HOW. HE



AMERICAN 210mm.  
HOW. HE

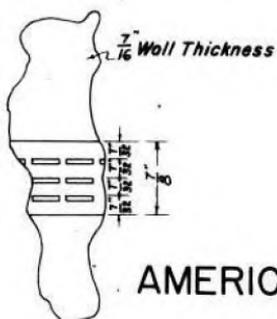
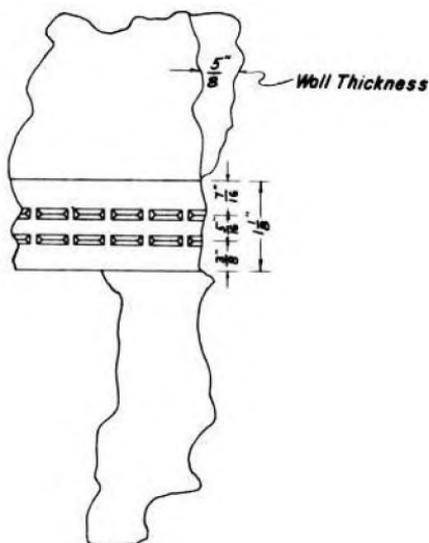
AMERICAN 240mm.  
HOW. HE

8" How



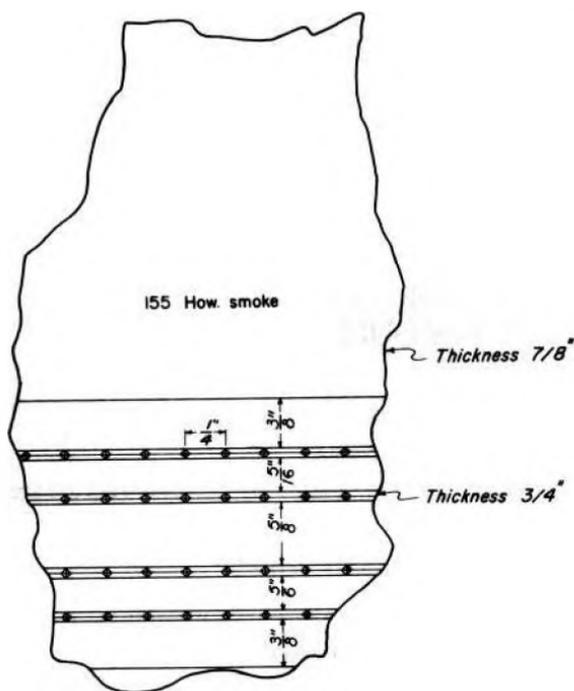
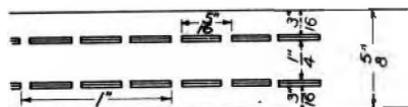
105 mm HE-AT

AMERICAN  
155 mm GUN



AMERICAN 105 mm

# AMERICAN 155mm HOW. SMOKE PROJECTILE



DETAILS OF AMERICAN ROTATING BANDS

ALL MEASUREMENTS IN MILLIMETRES

WEAPON	SHELL	NATURE OF ROTATING BAND	No of Bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	ROT-TOM				
3" T.D. Gun	HE	Copper	1	27	-	-	81	4 rows horizontal ribs with indentations	Cyl. base
	AP	Copper	1	25	-	-	68	4 rows horizontal ribs with indentations	Cyl. base
75 mm How	HE	Copper	1	12	-	-	57	3 rows horizontal ribs with indentations	Tapered base
	AP	Copper	1	12	-	-	57	3 rows horizontal ribs with indentations	Tapered base
	Chem	Copper	1	12	-	-	57	3 rows horizontal ribs with indentations	Tapered base
75 mm Gun	HE	Copper	1	12	-	-	57	3 rows horizontal ribs with indentations	Tapered base
	HE	Copper	1	25	-	-	32	4 rows horizontal ribs with indentations	Cyl. base
	M61	AP	1	12	-	-	19	3 rows horizontal pyramid projection with gaps	
	AP	Copper	1	12	-	-	57	3 rows horizontal ribs with indentations	Tapered base
57 mm Gun	M70	AP	1	19	-	-	38	2 rows vertical pyramid projection	
40 mm AA Gun	HE	Copper	1	18	-	-	41	2 rows vertical pyramid projection, also with 3 rows horizontal ribs with indentations	
37 mm	M59	AP	1	19	-	-	15	4 rows horizontal ribs with indentations	

DETAILS OF AMERICAN ROTATING BANDS

ALL MEASUREMENTS IN MILLIMETRES

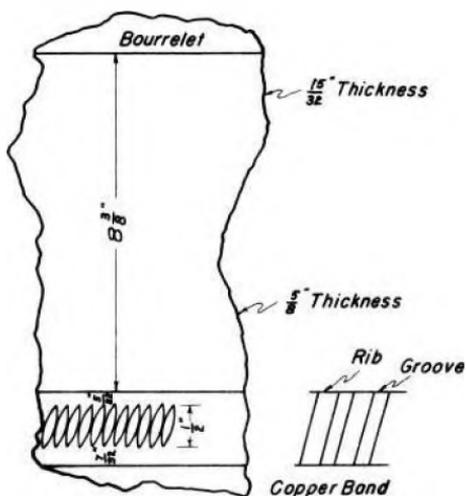
WEAPON	SHELL	NATURE OF ROTATING BAND	No. of Bands	WIDTH OF ROTATING BANDS		Space between bands	BASE TO LOWER BAND	KEYING	REMARKS
				TOP	BOT-TOM				
240 mm How	HE	Copper	1	73	-	-	165	5 rows of wavy horizontal ribs	Tapered base
210 mm How M106	HE	Copper	1	51	-	-	146	4 rows of wavy horizontal ribs	Tapered base
210 mm Gun	HE	Copper	1	64	-	-	152	4 rows of wavy horizontal ribs	Tapered base
155 mm How Model 17-18	HE	Copper	2	15	15	1	83		Tapered base
M107	HE	Copper	1	25	-	-	90	2 rows horizontal ribs with indentations	Tapered base
M102	HE	Copper	1	16	-	-	90	2 rows horizontal ribs with indentations	Tapered base
M1	HE	Copper	1	26	-	-	83	1 row horizontal ribs with indentations	Tapered base
	Chem	Copper	2	15	15	-	83	2 rows horizontal ribs with indentations	Tapered base
155 mm Gun M101	HE	Copper	1	51	-	-	90	4 rows horizontal ribs with indentations	Tapered base
	Chem	Copper	2	15	15	-	83	4 rows horizontal ribs with indentations	Tapered base
4.5" Gun	HE	Copper	1	45	-	-	89	4 rows horizontal ribs	Tapered base
105 mm How M1-M2	HE	Copper	1	21	-	-	78	3 rows horizontal ribs with indentations	Tapered base
	AP	Copper	1	21	-	-	57	3 rows horizontal ribs with indentations	Tapered base
	Chem	Copper	1	21	-	-	78	3 rows horizontal ribs with indentations	Tapered base
90 mm AA Gun	HE	Copper	1	30	-	-	68	4 rows horizontal ribs with indentations	

SECTION V

MISCELLANEOUS

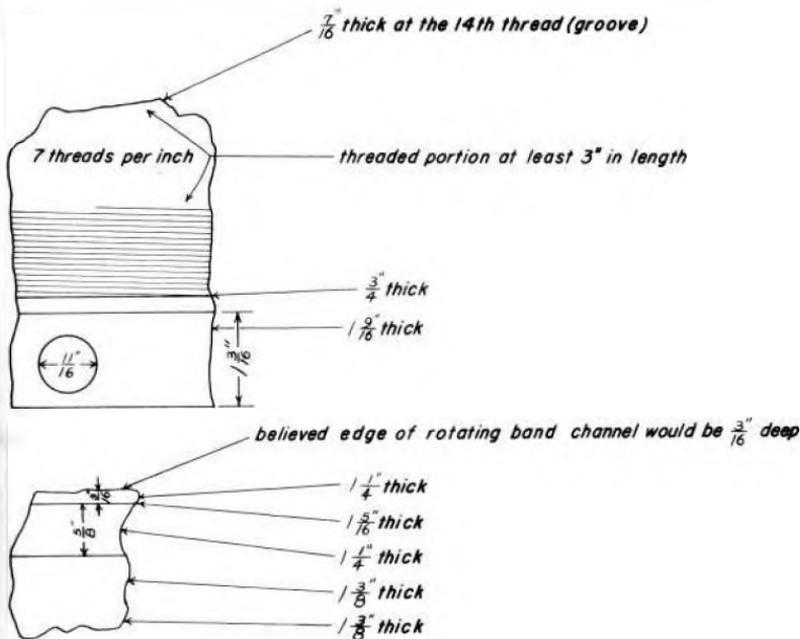


NOT POSITIVELY IDENTIFIED BUT BELIEVED 155mm FRENCH

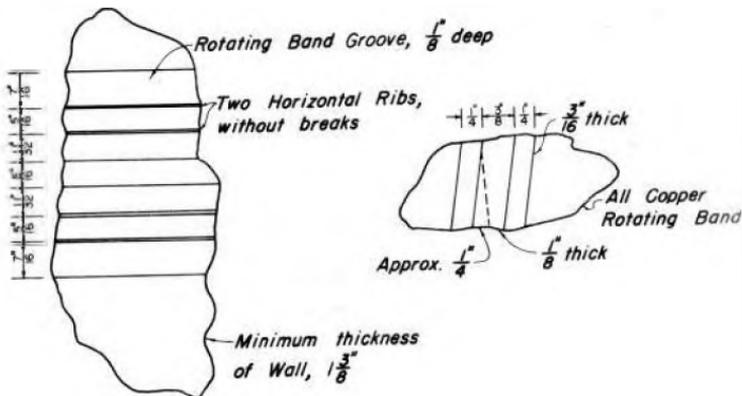
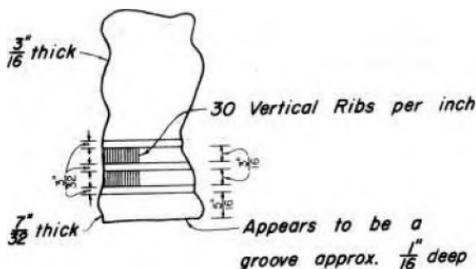
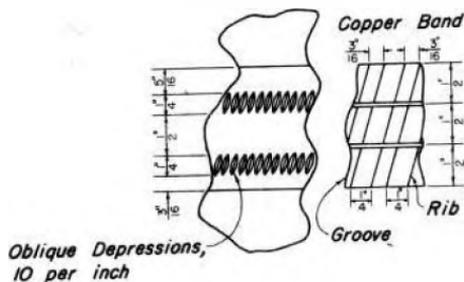
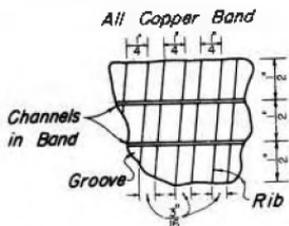
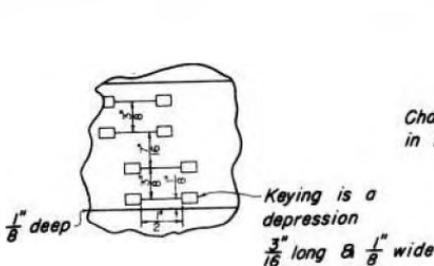


UNKNOWN CALIBRE 210mm OR LARGER

Landed in Nettuno at range of more than 20,000 yds.



# UNIDENTIFIED FRAGMENTS FOUND AT (81-24) ANZIO FEB. 10, 1944.



## ADDENDA

## INDEX TO ADDENDA

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Identification of Enemy Shells & Shell Fragments...	85	Base-band	
Report Form .....	87	Band-bourrelet	
Location of Enemy Batteries by Analysis of Shell Holes .....	88	Bourrelet-nose	
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Diameter fuze hole		thread	
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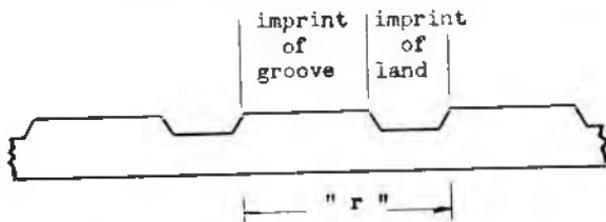


#### DETERMINATION OF CALIBER FROM ROTATING BANDS.

The width of the imprint of the land plus that of the groove is a reliable indication of caliber. The width, groove plus land, is termed "r", and may be found by the following formula:

$$"r" = \frac{3.1416 \times \text{Caliber}}{\text{No. of grooves}}$$

#### CROSS-SECTION OF TYPICAL ROTATING BAND



"r" is constant throughout the life of the weapon. The width of the land decreases through wear. Thus a comparison of the measured width of the imprint of a land on a used rotating band with the corresponding measurement as given in the table "CHARACTERISTICS OF WEAPONS" is an indication of the "age" of the weapon.

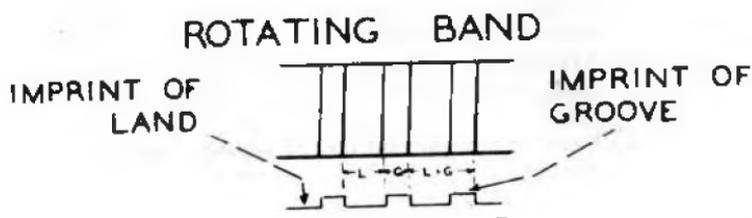
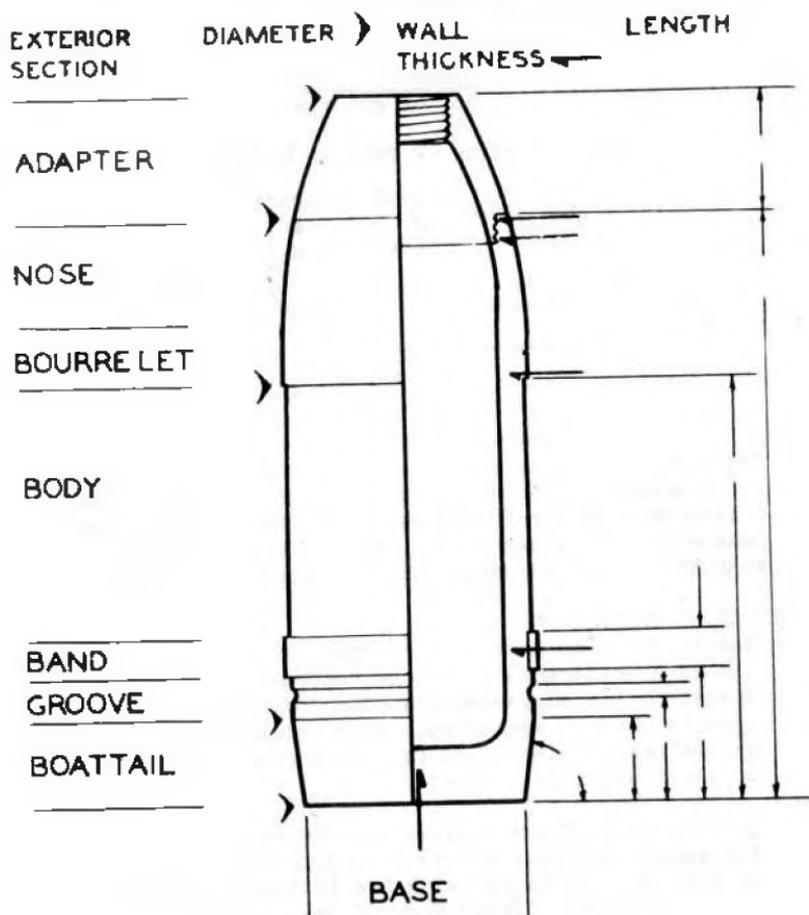
#### REPORTING SHELLS:

Shells found to have characteristics unlike any of those listed in reference should be reported to proper authorities. It is suggested that the form on the following page be used in making such a report if fragments themselves are not sent, and that measurements taken all be in millimeters or inches.

If fragments of projectiles sent to rear for further intelligence analysis are to be completely useful, each of them must be tagged with the following information:

- (1) TIME. Exact time of day and date shell is known to have been fired.
- (2) LOCATION. Place where shell was found (as closely as possible).
- (3) DIRECTION. Direction from which projectile came, and how it was judged (survey of crater, sound, etc.).
- (4) NAME and organization of person making report.

# TYPICAL SHELL SHOWING CRITICAL MEASUREMENTS EXTERIOR SECTIONS



SCHEMATIC READY REFERENCE MANUAL  
IDENTIFICATION OF ENEMY SHELLS  
AND SHELL FRAGMENTS

**PURPOSE:**

To simplify and speed up identification of enemy shells and shell fragments.

**DESCRIPTION:**

Contents are schematic, to show means and method, principally. Consists of tables and drawings. Tables are of critical shell characteristics and other identifying information, arranged alphabetically by subject. Columns are numbered from left to right. Nomenclature of shells is to be found in first vertical column of each table. The most significant characteristic under general subject and further identifying details are listed in vertical columns left to right in order of importance. Last column lists pages on which drawings of shells may be found.

Drawings are arranged by caliber of shell and nationality. Consist of one exterior drawing showing color and marking, one cross-section drawing giving critical dimensions for each shell. All measurements are given in inches. Also listed are weapons and fuzes commonly used with shell.

**METHOD OF USE:**

To identify a shell or shell fragment, turn to table giving details of any critical characteristic noted or dimension measured. Scanning appropriate column, check shells listed as having character similar to that noted on unidentified shell or fragment. By scanning secondary columns and by reference to other tables, possibilities may be eliminated. Reference then may be made to drawings by noting page numbers in right hand column of each table.

**EXAMPLE:**

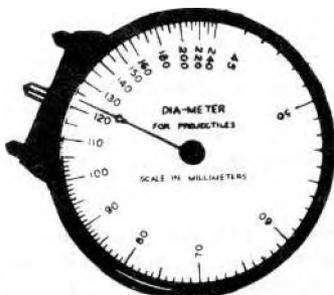
A base fragment has been found. Diameter at base has been determined to be approx. 3.45 inches. Threads number six. Thickness of wall at bottom thread measures .35 inches.

- (1) Turn to DIAMETER table. Run down column headed BASE. 88 mm HE and 88 mm APC have base diameters of 3.46 inches.
- (2) Turn to THREAD COUNT table. Run down column headed BASE. 88 mm HE is listed as having 10 base threads, 88 mm APC as having six base threads. 88 mm HE is thus eliminated.

(3) Note in right column of table that drawing of 88 mm APC is to be found on page 131. Turn to drawing. 88 mm APC is shown to have wall thickness at base of .35 inches. Identification is confirmed and may be further confirmed by relating other items found on other fragments in same crater.

EQUIPMENT:

- (1) Rule, steel, flex. 12 in. (grad. in mm and in. - 3 fold type).
- (2) Calipers, firm-joint, outside, 10 in.  
(a) Alternative: Calipers, micrometer, outside, set
- (3) Protractor, semi-circ. 6 in.  
(a) Alternative: Protractor, bevel  
Protractor, head with combination square
- (4) Dia-Meter



METHOD OF DETERMINING ANGLE OF BOATTAIL using folding rule and protractor:  
Placing edge of first section of rule firmly against base, close adjoining section until it fits against boattail. Remove and measure with protractor, or if protractor is not immediately available, record angle in notebook by tracing along edges of rule.

SPECIAL NOTE: Most plates of shells are in skeleton form and more or less incomplete (or omitted) except for the following to which special attention is invited:

88 mm HE German.....pages 128 & 129  
88 mm APC German.....pages 130 & 131

SUGGESTED FORM:

REPORT OF NEW TYPE ENEMY SHELL

The following information should be filled in and this completed form promptly forwarded:

- X Caliber.....
- Type of shell.....
- Nature of charge.....
- Hour and date fired.....
- Place found.....
- Direction of fire and how determined.....
- Color.....
- Stenciling.....
- Stamping.....
- Number of threads in fuze hole.....  
in base plug hole.....
- Length without fuze.....
- Base:-
  - Angle of boattail.....
  - Thickness.....
  - Diameter.....
  - Other data.....
- Rotating bands:-
  - Height to rotating band(s) from base...
  - Number and width of bands.....
  - Distance between bands.....
  - "r".....
  - Material.....
- Fuze:-
  - Base of nose.....
  - Markings.....
  - Material.....
  - Other data.....

Remarks:-

If possible, make sketch of shell on reverse side and showing any additional details and dimensions definitely ascertained.

(Name)

(Date)

(Org.)

## LOCATION OF ENEMY BATTERIES BY ANALYSIS OF SHELL HOLES

The direction of flight of a projectile frequently can be determined accurately from its ricochet furrow or crater. A gun position can be located by the intersection of the average directions of flights of two or more groups of ricochet furrows or craters fired from that position.

### (1) RICOCHET FURROWS

The direction from which a shell came can be determined from marks on trees, shrubs, cleanly clipped off grass and the furrow on the ground. Since the furrow frequently changes direction, only the first part of the furrow plus marks on grass, etc. can be used.

#### (a) Method

Carefully remove loose dirt in furrow with hands leaving smooth hard channel intact. Put two small stakes or survey pins at either end of the usable part of the furrow. Make sure to get the stakes straight and in the center of the channel. Place an aiming circle 5-15 feet from the furrow and in line with it. Sighting thru the A. C. move it until the stakes appear directly in line. This is the direction of the fire.

The angle of fall can be determined by laying an M2 compass in the furrow or by sighting along the bottom of the furrow.

### (2) CRATERS

Data from craters is less accurate than that from ricochet furrows but with judgment can be used to advantage.

#### (a) Method

Use of CHANNEL in ground where shell has entered: Place a stake in center of channel. Place a second stake on opposite side of crater. Sighting along these get direction as for ricochet furrows.

Use of SIDE SPRAY shown by dirt and cut grass: Place a stake in the center of each side spray equally distant from the crater. Putting A. C. in exact center of the crater measure angle between stakes. One half the angle is the direction of fire.

Position of fuze in crater may give excellent indication of direction of fire.

# METHODS OF OBTAINING DIRECTION OF FIRE

## TYPICAL RICOCHET MARKINGS

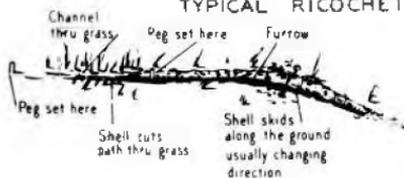
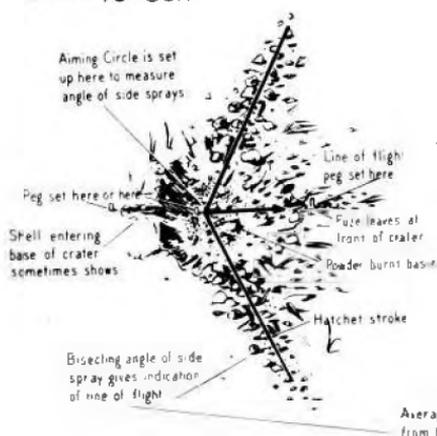


FIG 1

Aiming Circle set up in line with the 2 pegs then measured the back azimuth of the line of fire

Effect of air burst

← TO GUN



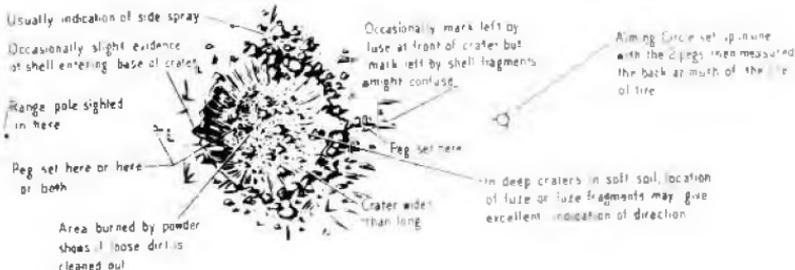
## TYPICAL SHELL CRATER, FQ (small angle of fall)

FIG 2

The Aiming Circle set up in line with the 2 pegs then measured the back azimuth of the line of fire

## TYPICAL SHELL CRATER, FQ (larger angle of fall)

FIG 3



## GERMAN

## ABBREVIATIONS

A	Artillery
Ap	Ricochet
Az	Percussion fuze
Az m V	Percussion fuze w/delay
Bd.G.	Incendiary shell
Bhr. Ptr.	Explosive cartridge
BLP	Flashed gunpowder
Bris.	HE
Bz	Time fuze
Dopp. Z.	Combination fuze
Felda	Field Arty
Fernf	Long range fire
F.H.	Field howitzer
P.H. Gr.	Field howitzer shell
P.K.	Field gun
F. K. Gr.	Field pc. shell
Flak	A.A. gun
Fla.M.G.	A.A.M.G.
GebGesch	Gebirgs Geschutz (mnt. gun)
Geb. Haub	Mountain how
Geb K	Gebirgs Kanone (mnt. gun)
Gesch	Projectile-shell
Gew	Rifle
G.Gr	Chem. shell
G.K.W.	S.P. gun mount
Gr.	Shell
Grf	Bursting chg.
Gr.m.P.	AP shell
Gr.Z.	Shell fuze
G.Z.	Shell fuze
Hinh. Gef.	Delaying Action
H.Z.	Howitzer fuze
I.G.	Inf. howitzer
Iz.	Interval fuze
K.	Gun Cannon
KwK	Kampfwagen Kanone (tank gun)
LPH	Leichte Feldhaubitze (light field how)
LG	(air-born breach blow back)
LGeb	Leichte Gebirgs Infanterie Geschutz (light infantry mtn. gun)
Lggr	Long shell
LIG	Leichte Infanterie Geschutz (light infantry how)
Mots	Motorized

## GERMAN

## ABBREVIATIONS

Mrs	Morser (heavy how)
MV.	With delay action
Nb	Smoke
Ngl	Nitroglycerine
O.V.	Without delay
Pak	(Panzer abwehr Kanone) at gun
Ph	Phosphorous
P.S.Gr	Steel AP shell
Pzbr	AP
Pzgr )	AP shell
Pz Gr )	
Pz.Spr.Gr.	HE AP Shell
S. Art.	Medium Arty.
S. FH.	Heavy field howitzer
SPH	Schwere Feldhaubitze (medium field how)
S.F.K.	Rapid fire gun
Sfl	Selfstfahrlahrlafette (S.P.)
sIg	Schwere Infanterie geschutz (medium Inf. how)
Spat	
Sp.Gr.	Explosive shell
Spl. Gr.	Fragmentation shell
Stug	Sturm geschutz (assault gun)
Tr.Ldg.	Propelling charge
Vers.	Delay-action
Zdht.	Primer percussion
Z	Fuze
Zdg	Priming-detonation
zdig	Primer charge
Zt.Z	Time fuze
ZZ	Time fuze

## GERMAN

## (OGIVE) ADAPTER

SHELL GERMAN DESIGNATION		(1) HEIGHT	(2) NO. THREADS FUZE HOLE	(3) DIAM. OF FUZE HOLE	(4) DIAM. OF BASE	P.
105 SM	Gr Nb	.50	6	1.61	1.8	135
50 HE	Sprgr patr	.58	8	1.32	1.75	122
75 HC	Gr patr 38	2.26	6	.94	2.92	
75 HC	Gr patr 38	3.24	6	.94	2.92	
105HC	Gr 39 rot	3.38		2.36	3.60	
152HE	Sprgr 436(r)	4.28		1.58		
105HE	Sprgr patr	5.78				132
150HE		5.88				132
105HC	Gr 39	7.21	6	.94	3.95	135
150		9.00				

## GERMAN

## (BASE PLATE, BASE COVER) BASE PLUG

SHELL	GERMAN DESIGNATION	(1) DIAMETER	(2) THICKNESS	(3) METAL	P.
88HE	sprgr patr*	2.14	1.5	steel	128
105APC	psgr patr				
150HE	Jgr 33 *	4.4	2.5	steel	
150HE	Gr 19	4.8	2.0	steel	136
150HE AC	Gr 19 Bc				136
* May or may not have screw-in Base plate					

## GERMAN

## BOATTAIL

SHELL	GERMAN DESIGNATION	(1)	(2)	(3)	(4)	P
		DIAM. BASE	HEIGHT	DIAM. TOP	ANGLE	
47 HE		1.6	1.45	1.84	curved	
47 AP		1.73	.42	1.84	130	121
47APC		1.64	1.0	1.84	curved	
75 HE	Sprgr 34	2.48	1.44	2.95	120	126
75 HC	Gr 38	2.48	1.30	2.95	120	
76.2HE	Sprgr 284(r)	2.36	1.90	3.00	160	
76.2HE	Sprgr (36)	2.48		3.00		
88 HE	Sprgr (41)	3.03		3.46		128
105HE	Gr 38	3.35		4.14		
105HE	Gr 38 stg	3.35		4.14		
105SM	Gr Nb	3.35		4.14		135
105HE/ Incend.	Gr Spr Br	3.44		4.14		132
105HE						132
Super	G F	3.66		4.14		133
105HE	Gr 19	3.46		4.14		132
150HE	Gr 19	5.2		5.9		136
150HE	Gr 19 stg					136
	FES	5.2		5.9		
150HE	Gr 36 FES	5.2		5.9		
150HE	Gr 19 Nb	5.2		5.9		136
150HE	Gr 38 Nb	5.2		5.9		
152HE	Sprgr 436(r)	4.92		5.99		
170HE	Gr 39	5.99		6.7		
210HE	Gr 18	7.48		8.27		
210HE	AC					
	Gr 18 Be	7.48		8.27		

## GERMAN

## BOURRELET

SHELL	GERMAN DESIGNATION	(1)	(2)	(3)	P.
		DIAMETER	HEIGHT FROM BASE	WIDTH	
47 HE	Sprgr patr	1.85	4.16	.25	121
47 AP	Pzgr patr	1.85	3.4	.4	
47APC	Pzgr	1.85	3.46	.35	
50 HE	Sprgr patr	1.96	5.75	.6	122
50APC	Pzgr patr	1.96	3.8	.65	124
75 HE	Sprgr patr				126
	34	2.95	6.78	.5	
75 HC	Gr patr 38	2.95	6.7	1.36	
75APC	Pzgr patr				
	KwK	2.95	4.9	.7	
76.2HE	Sprgr patr				
	284 (r)	3.	6.4	.65	
88 HE	Sprgr patr				128
	L/4, 5 Kz	3.46	6.43	.9	
88APC	Pzgr patr	3.46	4.3	1.	131
105HC	Gr 39 rot	4.14	10.25	.8	135
105HE	Gr 38	4.14	8.89		132
105HE					133
Super	F. H. Gr. F	4.14	7.44		135
105HC	10cm Gr 39 rot	4.14	10.19		
105HE	10cm Nbgr	4.14	7.82		132
105HE	F. H. Gr.41	4.14	9.03		132
105HE	10 cm Gr.19	4.14	7.88		132
105AP	Pzgr	4.14	6.13		
150HE	J. gr 33	5.91	16.51		
150HE	J. gr 33	5.91	9.70		
150HOW	Gr 19	5.91	12.35		136
150HOW	Gr 19	5.91	12.54		136
150HOW	Gr 19	5.91	11.6		136
150HOW	Gr 19	5.91	11.88		136
150HE	Gr 19 stg. FES	5.91	16.19		136
170HE		6.7	9.97		
170HE		6.7	10.41		
210HE	Gr 18	8.26			

## GERMAN

## BAND(S) COLOR

SHELL	GERMAN DESIGNATION	WIDTH	LOCATION	BLACK	BLUE	GRAY	GREEN	RED	WHITE	YELLOW	P.
75APC	Pzgr patr KwK	.6	B					1			126
75 HB	Sprgr patr 34		B							1	
105HC	Gr patr 38	.4	B					1			135
105APC	Pzgr rot		B					1			
150HE AC	Gr 19 rot Bc		B					1			136

A-Base  
B-Lower Body  
C-Upper Body  
D-Ogive

## GERMAN

## BODY, COLOR

SHELL	GERMAN DESIGNATION	BLACK	BLUE	GRAY	GREEN (O. D.)	RED (MAROON)	WHITE	YELLOW	P.
47 HG	Sprgr patr				X				
47 AP	Pzgr patr	D							121
47APC	Pzgr patr	X							
50 HE	Sprgr patr				X				122
50 HE	Sprgr patr	A			BCD				122
50APC	Sprgr patr	X							124
75 HE	Sprgr patr 34				X				126
75 HC	Gr patr 38	X			BCD				
75 HC	Gr patr 38			BCD	A				
75APC	Pzgr patr KwK	X							
76.2HE	Sprgr patr 284 (r)				BCD				
88 HE	Sprgr patr L/4, 5K2	A						BCD	128
88APC	Pzgr patr	X							131
88APC	Pzgr patr 39	ABC					D		131
105HC	10cm Gr 39 rot				X				135
128HE	Sprgr patr L/4, 5							X	
88 M. Ster	Leuchtgesch- oss L/4, 4				X				
152HE	Sprgr 436(r)				BCD				
100HE/ Czech	He MO 23							X	

A-Base  
B-Lower body  
C-Upper body  
D-Ogive  
X-Entire shell

## GERMAN

## DIAMETER

SHELL	GERMAN DESIGNATION	(1) BOURRELET	(2) BASE	(3) NOSE	P.
47 HE				1.03	
47 AP				-	121
47 APC				-	
50 HE				1.32	122
50 APC				-	124
75 HE	Jgr 18 & Jgr 18 A1	2.95	2.95	2.36	126
75 HC	Jgr 38	2.95	2.95	.94	
75 HE	Gr 15	2.95	2.95	2.36	
75 HC	Gr 39	2.95	2.95	2.36	
75 HE	Sprgr patr 34				126
75 SM	Nbgr	2.95	2.48	1.61	
75 APC	Pzgr 39	2.95	2.95	-	
75 HC	Gr 38	2.95	2.48	.94	
76.2HE	Sprgr patr (r)	3.00	2.36	1.58	
76.2APC	Pzgr 39	3.00	2.99	-	
76.2AP	Pzgr 40	3.00	2.99	-	
76.2HE	Sprgr patr (36)				
88 HE	Sprgr	3.46	3.46	2.36	128
88 APC	Pzgr	3.46	3.46	2.36	131
88 HE	Sprgr (41)	3.46	3.03	2.36	128
105HE	Gr 38	4.14	3.35	2.36	132
105HE	Gr 38 stg	4.14	3.35	2.36	132
105SM	Gr Nb	4.14	3.35	2.36	135
105AP	Pzgr	4.14	4.14	2.87	
105HC	Gr 39 rot	4.14	4.14	.94	135
105HE/ Incend.	Gr Spr Br	4.14	3.44	2.36	132
105HE Super	Gr F	4.14	3.66	2.36	135
105HE	Gr 19	4.14	3.46	2.36	132
105APC	Pzgr	4.14	4.14	2.87	
105HE AA	Sprgr	4.14	4.14	2.36	132
128HE AA	Sprgr	5.04		2.36	
150HE	Gr 38	5.91	5.91	2.36	
150 HE	Gr 19	5.91	5.2	2.36	
150HE	Gr 19 stg FES	5.91	5.2	2.36	136

## GERMAN

## DIAMETER

SHELL	GERMAN DESIGNATION	(1)	(2)	(3)	P.
		BOURRELET	BASE	NOSE	
150HE	Gr 36 FES	5.91	5.2	2.36	
150SM	Gr 19 Nb	5.91	5.2	2.36	
150SM	Gr 38 Nb	5.91	5.2	1.61	
150HC	Gr 39	5.91	5.91	1.61	
150HE	Gr 18	5.91	5.91	2.36	
150HE	Sprgr L/4, 6	5.91	5.91	2.36	
152HE	Sprgr 436 (r)	5.99	4.92	1.58	
170HE	Gr 39	6.7	5.99	2.36	
210HE	Gr 18	8.27	7.48	2.36	
210HE AC	Gr 18 Be	8.27	7.48	-	
210HE	Gr 17	8.27	8.27		
240HE	Sprgr L/4, 5	9.45	9.45		
280HE	Sprgr	11.02	11.02		
100HE	Mo 15	3.94	3.94		
	Czech, Mo 23,28	3.94	3.94		
75 HE	Czech	2.95	2.6	2.36	

## GERMAN

## FUZE

SHELL OR WEAPON	(1) DESCRIPTION	(2) HEIGHT	(3) DIAM. BASE	(4) METAL	(5) LOCATION	P.
88 & 105 Flak 88 & 105 Flak 105 & 150 FH,K 105 & 150 FH,K 105 & 150 FH,K	Zt Z S/30 Zt Z S/60Fg Dopp S/60 s Dopp S/60F1 Dopp S/60	3.75	2.36	AL		
75 Geb IIG 18 210 Mrs 18 105 FH Gr Nb 105 1FH 18 & K18 105 1FH 18 & K18 105 1FH 18 & K18	Dopp S/60Geb Dopp S/90 K1 Az 23 Nb Az 23(0.25) Az 23(0.15) Az 23/42 (0.15)	2.0 3.7 3.7 3.7	1.61 2.36 2.36	AL		
150 sFH 18 210 Mrs 18 150 sFH 18 210 Mrs 18	Az 23 umg (0.15) Az 23 umg (0.15) Az 23 umg Mo V Az 23 umg Mo V	3.7 3.7 3.7 3.7	2.36 2.36 2.36 2.36			
150 SIG 23 75 IG 18 105 Hollow Ch 75 HC 50 HE	SIGr 23 (0.40) IIGr Z 23nA (0.15) Az 38 Az 38 Az 39	.80 .80 1.30	2.36 2.36 1.30	AL AL AL	Nose Nose Nose	122
170 K 170 K 88 Flak 88 HE 76.2 HE 75 APC	Az 35 K Hbgr Z 35K Az 23/28 Az 23 FCV 40 3HA KTM-1 Bd Z f 7.5 cm Pzgr	1.7	1.56	AL iron & AL	Nose Base	128

## GERMAN

## (CANNELURES) GROOVES

SHELL	GERMAN DESIGNATION	(1) NUMBER	(2) HEIGHT FROM BASE	(3) WIDTH	P.
50 HE	Sprgr patr	2	.6	.22	122
50APC	Pzgr patr	2	.3	.24	124
75 HE	Sprgr patr				126
	34	1	1.7	.2	
75 HC	Gr patr 38	1	1.68	.22	
75APC	Pzgr patr				
	KwK	1	.46	.22	
88 HE	Sprgr patr				128
	L/4	2	.2	.28	
88APC	Pzgr patr	2	.2	.28	131
105HC	Gr 39 rot	2	.4	.44	135
105AP	Pzgr	2			
105APC	Pzgr rot	2			
105HE	Sprgr patr	2			132
	L/4				

GERMAN

(WRENCH HOLE, SHELL NOTCH KEY WAY) HOLE

SHELL	GERMAN DESIGNATION	(1) LOCATION	(2) NUMBER	(3) TYPE	P.
47APC	Pzgr patr	Base	1	Screw	
		Base plug	2	Round	
75 HC	Gr patr 38	Adapter	2	Flat	
				Back	128
88 HE	Sprgr patr L/40	Base	1	Oval	
88APC	Pzgr patr	APC	2	Oval	131
105HC	Gr 39 rot	Adapter	2	Flat	
				Back	135
		Adapter seat	2	Round	

## GERMAN

## LENGTH

SHELL	GERMAN DESIGNATION	(1) BASE BAND	(2) BAND BOURELET	(3) BOURELET NOSE	(4) TOTAL LENGTH UNFUZED	P.
100HE	Mo 15	.59			15.1	
100HE	Mo 23	.59			15.82	
75 HE	Gr 15 rot & Gr 15 Al	.71			10.00	126
75 HC	Gr 39	.71			10.40	
150HE	Gr 18	.91			19.83	
150HE	Gr 38, Gr 33	.95			22.82	
150SM	Gr 38	.95			22.82	
75APC	Pzgr patr 39 & Gr rot Pz	1.00	3.21	7.0	11.92	
75APC	Pzgr patr 39	1.00	4.88	4.34	10.88	
76.2APC	Pzgr patr 39	1.00			11.92	
76.2AP	Pzgr patr 40	1.00			9.45	
75 HE	Jgr & Jgr 18 Al	1.10	4.38	4.38	10.00	126
75 HC	Jgr 38	1.10			8.35	
88 AP	Pzgr patr 40	1.10			13.0	
128HE	L/4, 5	1.18			18.21	
88 HE	L/4, 5 KZ	1.38	1.77	8.7	11.9	128
88APC	Pzgr patr 39	1.38	1.77	8.7	13.3	131
105APC	Pzgr rot	1.50			15.42	
100HE	Mo 15	1.58			15.1	
75 HE		2.16			11.19	
105AP	Pzgr	2.17			10.82	
105HC	Gr 39 rot	2.17			14.48	135
105HC	Gr 39 rot	2.17			18.9	135
75 HC	Gr patr 38	2.2	3.7	4.78	11.22	
75 HC	Gr patr 38	2.2	3.88	3.60	10.40	
75 HE	Sprgr patr Kwk, Sprgr patr 34 & gr 34 AL	2.28	3.81	4.88	11.53	126
75 SM	Nbgr patr & Gr rot Nb	2.28			11.53	
75 HE	Gr rot & Gr rot (bo. pr)	2.28			9.85	126

## GERMAN

## LENGTH

SHELL	GERMAN DESIGNATION	(1) BASE-BAND	(2) BAND-BOURRELET	(3) BOURRELET-NOSE	(4) TOTAL LENGTH UNFUZED	P
105HE (Super)	Gr F	2.36	4.31	9.56	16.77	133
105HE	Sprgr L/4, 4 KZ	2.48			14.38	132
100HE	MO 28	2.76			18.58	
150HE	Gr 19	3.23	8.44	10.63	23.08	136
150SM	Gr 19 Nb	3.23			23.08	
150HE	Gr 19 stg FES	3.23			22.68	136
150SM	Gr 38 Nb	3.23			24.71	
150HE AC	Gr 19 Be	3.23			23.58	136
76.2HE	Sprgr Patr	3.23			11.92	
105HE	FHGR, FHGr 38, FHGR 38 stg, FHGR 41	3.38			15.53	
105HE/Incend.	Gr Br	3.38			15.53	
105HE/Incend.	Gr Nb, Gr 38 Nb, Gr 40 Nb	3.38	4.88	6.75	17.31	
76.2HE	284 (r) & 28 T (r)	3.42	2.22	5.78	12.2	
105HE	Gr 19	3.58	3.63	6.75	15.53	132
152HE	Sprgr 436(r)	3.62			25.50	
170HE	Gr 39	3.94	5.38	8.13	29.2	
150HE	Gr 36 FES	4.42			23.08	
210HE	Gr 18 & Gr 18 stg	4.62			34.60	
210HE AC	Gr 18 Be	4.62			31.60	
170HE/Bc	Gr 38 (Hb)	4.92	4.0	19.13	31.0	
105 shot					12.6	
150HE/Bc	Hbgr 16				29.60	
150HE	Gr 18				23.68	
150HE AC	Gr 19 rot Be				23.58	136
150HE	L/4, 6				22.9	
150HE	Hpgr SAP				24.51	
150AP	Pzgr				23.52	

## GERMAN

## LENGTH

SHELL	GERMAN DESIGNATION	(1) BASE-BAND	(2) BAND - BOURRELET	(3) BOURRELET- NOSE	(4) TOTAL LENGTH UNFUZED	P.
150HE/Bc	Sprgr L/4, 6 Lz				26.7	
150HE/Bc	Sprgr L/45 Bdz				25.91	
170HE	Sprgr L/4, 7 Kz				31.52	
203HE/Bc	Sprgr L/4, 7 Kz				37.54	
203HE/Bc	Sprgr L/4, 7 Kz m Bd Z				37.58	
210HE/Bc	Gr 18				42.75	
210HE	Gr 17, Gr 17 vmg				31.60	
240HE/Bc	Sprgr L/4, 5 m Bd Z				42.75	
240HE/Bc	Sprgr L/4, Z M Bdz Ukz				39.2	
240HE/Bc	Sprgr L/4, Z M Bdz U Kz					
240HE	Sprgr L/4, 1 m Bd Z				38.44	
280HE/Bc	Sprgr L/4, 1 K z				44.78	
280HE/Bc	Sprgr L/4, 4 m Bd Z ukz				49.45	
280HE	Sprgr L/3, 5				39.37	
88HE	Sprgr patr				12.63	128
76.2APC	Sprgr patr 39 rot				11.96	
150AP/Bc	Pz sprgr L/3, 8				21.77	

## GERMAN

## NOSE

SHELL	GERMAN DESIGNATION	(1) DIAMETER	(2) WALL THICK- NESS TOP THREAD	(3) WALL THICK- NESS BOTTOM THREAD	(4) NO. OF THREADS	P.
75 HC	Gr 38	.94	.14	.28	6	
105HC	Gr 39 rot	.94	.14	.24	6	135
75 HC	Jgr 38	.94	.14	.28	6	
47 HE	Sprgr patr	1.03	.14	.18	6	
50 HE	Sprgr patr	1.32	.14	.40	10	122
76.2HE	Sprgr patr (r)	1.58	.14	.28	9	
152HE	Sprgr 436 (r)	1.58				
75HE	Sprgr patr 34	1.61	.20	.40	15	126
75 SM	Nbgr	1.61				
76.2HE	Sprgr patr (36)	1.61				
150SM	Gr 38 Nb	1.61				
150HC	Gr 39	1.61				
75 HE	Czech	2.36				126
210HE	Gr 18	2.36				
170HE	Gr 39	2.36				
150HE	Sprgr L/4,6	2.36				
150HE	Gr 18	2.36				
150HE	Gr 36 FES	2.36				
150SM	Gr 19 Nb	2.36				
75HE	Jgr 18 & Jgr 18 Al	2.36				126
75 HE	Gr 15	2.36				126
75 HC	Gr 39	2.36				
88 HE	Sprgr	2.36	.26	.42	8	128
88APC	Pzgr	2.36				131
88 HE	Sprgr (41)	2.36				128
105HE	Gr 38	2.36				132
105HE	Gr 39 stg	2.36				132
105SM	Gr Nb	2.36	.12	.40		135
105HE/ Incen.	Gr Spr. Br	2.36				
105HE/ Super	Gr F	2.36				133

## GERMAN

## NOSE

SHELL GERMAN DESIGNATION		(1) DIAMETER	(2) WALL THICK- NESS TOP THREAD	(3) WALL THICK- NESS BOTTOM THREAD	(4) NO. OF THREADS	P.
105HE	Gr 19	2.36				132
105HE	AA Sprgr	2.36				132
128HE	AA Sprgr	2.36				
150HE	Gr 38	2.36				
150HE	Gr 19	2.36				136
150HE	Gr 19 stg FES	2.36				136
105AP	Pzgr	2.87				
105APC	Pzgr	2.87				

## GERMAN

## ROTATING BANDS

SHELL GERMAN DESIGNATION		(1) WIDTH	(2) NUMBER	(3) DISTANCE BETWEEN	(4) " " "	(5) METAL	P.
75 HE	Jgr 18	.24	1	-	.39	B M or FE	126
75 HC	Jgr	.24	1	-	.39	B M or FE	
75 HE	Gr 15	.43	1	-	.33	B M	126
75 HC	Gr 39	.43	1	-	.33	B M	
150HE	Gr 38, 33	.43	1	-	.42	B M or FE	
150SM	Gr 38	.43	1	-	.42	B M or FE	
88 HE AA	Sprgr patr L/4	.47	2	.20	.34	B M or FE	128
88APC	Pzgr patr	.47	2	.20	.34	B M or FE	131
88 AP	Pzgr patr 40	.47	2	.20	.34	FE	
150HE	Gr 19	.47	2	.20	.46 .58	B M	136
150SM	Gr 19 Nb	.47	2	.20	.46 .58	B M	
150SM	Gr 38 Nb	.47	2	.20	.46 .58		
150AC	Gr 19 Be	.47	2	.20	.46 .58	B M	
75 HE	Czech.	.47	2	.16	.29	FE	126
76.2HE	Sprgr patr 28 d (r)	.51	1	-	.29	CU	
100HE	Mo 15, 23 Czech.	.51	1	-	.34	CU	
105HE	Gr 38	.59	1	-	.41	B M or FE	132
105SM	Gr Nb	.59	1	-	.41	B M or FE	135
105HE/ Incen.	Gr. Spr Br	.59	1	-	.41		
105HC	Gr 39	.59	1	-		B M or FE	135
105HE	Gr 18	.59	1	-	.58	B M	132
210HE	Gr 18	.59	2	.39	.41	B M	
210AC	Gr 18 Bc	.59	2	.39	.41	B M	
75 SM	Nb gr patr	.63	1	-	.29 .33	B M or FE	
75 HE	Sprgr patr	.63	1	-	.29 .33	B M or FE	126
100HE	Mo 28, Czech	.63	1	-	.34	CU	
75APC	Pzgr patr 39	.67	1	-	.24 .33	B M or FE	

## GERMAN

## ROTATING BANDS

SHELL	GERMAN DESIGNATION	(1) WIDTH	(2) NUMBER	(3) DISTANCE BETWEEN	(4) " r "	(5) METAL	P.
75 HC	Gr patr 38	.67	1	-	.29		
76.2HE	Sprgr patr	.67	1	-	.33	B M or FE	
76.2APC	Pzgr patr				.29	B M or FE	
	39	.67	1	-	.29		
					.33	B M or FE	
76.2AP	Pzgr patr						
	40	.67	1	-	.29	B M or FE	
105AP	Pzgr	.67	1	-	.41	B M	
105HC	Gr 39 rot	.67	1	-	.41	B M	135
105HE/							133
Super	Gr F	.67	1	-	.41	B M	
105 HE	Gr 19	.67	2	.24	.36	B M	132
105HE AA	Sprgr patr						132
	L/4	.67	2	.24	.36	B M or FE	
152HE	Sprgr 436						
	(R)	.83	1	-		CU	
128HE AA	Sprgr patr						
	L/4	.87	2	.32		FE	
150HE	Gr 19 stg						136
	FES	.87	1	-	.46	FE	
150HE	Gr 36 FES	.87	1	-	.46	FE	
150APC	Pzgr rot	.91	1	-	.36	B M	
170HE	Gr 39	1.02	2	.39	.44	B M	
170HE/							
BC	Gr 39 (Hb)	1.02	2	.39	.44	B M	

GERMAN KEYING OR KNURLING — ROTATING BANDS



75 HE, LIG 18



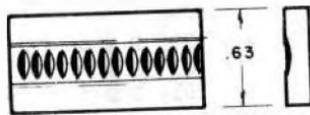
75 HE, LIG 18



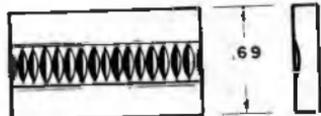
88 HE & AP, PAK 3B 2 BANDS



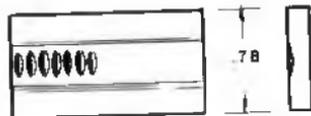
75 HE & AP, PAK 40



105 HE HG B BE, LFH 18  
105 HE LFH 18M



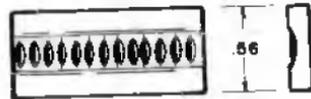
105 HE K 18 2 BANDS  
105 AP K 18 1 BAND



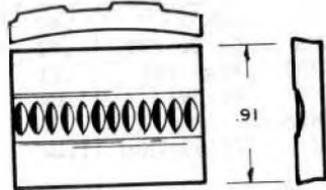
105 HE, LG 40



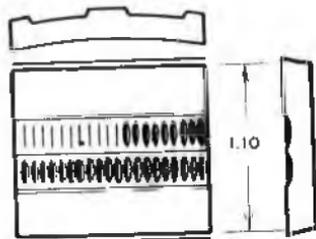
150 HE, SIG 33 1 BAND  
150 HE, SFH 18 2 BANDS



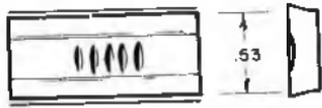
150 HE, SFH 18 2 BANDS



150 HE, SFH 18



170 HE, K 18 2 BANDS



210 HE, MRS 18 2 BANDS

SHELL	(1) DESCRIPTION	(2) LOCATION	(3) MEANING	P.
47 HE	1940 AKV 1-1 14DOB40	body adapter		
47 AP	47 cm m 35 173/40 40 er 96	base fuze  base		121
47 APC	1941 bxb 8-926 980 Pla 16 8-41	L body base fuze adapter		
50 HE	589 589  ezd 98b 16 1 43	above bourrelet u body body		122
50 APC	41 gtc 484c FES	base		124
75 HE	$\frac{1}{3}$ 21	u body u body		126
75 HC	13 unt 11 42 9024 9024  41 aug 8 a 95541	body adapter above bourrelet u body body		
75 HC	9 12 42	body		
76.2 HE (Rus)	bBP3 23 - 42 □ □ □ 290	body		
88 HE	KPS 43 elg 3 41 W xx 43	body		128
88 APC	FES 41 bwg 40	body		131
105 HC	91 443	body		135
88 HE	42 cxx 1 Ob Pr zguz 13 Ng 12 FES	body		128

## GERMAN

## STENCILING

SHELL	DESCRIPTION	COLOR	LOCATION	MEANING	P.
47 HE	Dc.27.1140 14	black	adapter		
	dc.23.40	black	u body		
47 AP	0 117	black	L body		121
	e 11z	white	body		
	211240E	red	body		
47 APC	Pla 55 41 L	red	u body		
	Pla 55 41 L	red	L body		
50 HE	L v 29.	black			122
	10 .40. v				
50 APC	33 )				124
	L9405 cwg )	red	body		
	9 41				
	T P				
75 HE	III	black	ogive		126
	FES	white	L body		
75 HC	IV	dark			
	Bg 145 41Y	blue	body		
		dark			
76.2 HE	16 K1 23	blue	L body	date	
	T P	red	body		
	K1 23 941N	red	body		
76.2 HE		black	nose		
88 HE	IV	black	body		
	o.5.4.4. IKw	black	nose		128
	slg 3 4	black	body		
88 APC	FES	white	body		131
	28	red	body		
	251141 H	red	body		
105 HC	I I	black	body		
	91 We 7.4.43				
	we 6.4.4.3				
	H 1/C		Adapter		

## GERMAN

## THREAD COUNT

SHELL	GERMAN DESIGNATION	(1) BASE	(2) FUZE SEATING	(3) ADAPTER (OGIVE) SEATING	P.
47 HE	Sprgr patr	-	6		
47 AP	Pzgr patr	13	-	-	121
47APC	Pzgr patr	16	-	-	
50 HE	Sprgr patr	-	10		122
50APC	Pzgr patr	10	-	-	124
75 HE	Sprgr patr				126
	34	-	14	-	
75 HC	Gr patr 38	-	6	12	
75 HC	Gr patr 38	-	6	12	
75APC	Pzgr patr				
	KwK	6	-	-	
76.2HE	Sprgr patr			6	
	284 (r)	-	9	6	
88 HE	Sprgr patr	10	7	-	128
88APC	Pzgr patr	6	-	-	131
105HC	Gr 39 rot	-	7	10	135

## GERMAN

## WALL THICKNESS

SHELL GERMAN DESIGNATION		(1) BASE, CENTER	(2) CENTER-R. B.	(3) BOURRELET	(4) FUZE, ADAPTER SEATING TOP THREAD	W.
47 AP	Pzgr patr	.18	.4	-	-	121
47APC	Pzgr patr	.18	.4	-	-	128
88 HE	Sprgr patr L/4	*.35, .96	.58, .54	.56	.27	
50 AP	Pzgr patr	.40	.44	-	-	123
50APC	Pzgr patr	.40	.44	-	-	124
50HE	Sprgr patr	.50	.25	.18	.14,.14	122
88APC	Pzgr patr	.50	.65	-	-	131
75 HC	Gr patr 38	.64	.40	.25	.14	126
75 HE	Sprgr patr 34	.66	.42	.35	.24	
47 HE	Sprgr patr	.70	.37	.22	.12	
76.2HE	Sprgr patr 284	.70	.46	.52	.14,.18	
105HC	Gr 39 rot	1.26	.55	.35	.14,.12	135

\* In case shell has screw-in Base or Base-fuze, this measurement is wall at bottom of opening.

## GERMAN

## CHARACTERISTICS OF WEAPONS

WEAPON	MAXIMUM RANGE	DEPTH OF GROOVE	WIDTH OF GROOVE	NUMBER OF GROOVES	WIDTH OF LAND PLUS GROOVE	SPECIAL CHARACTER	P.
Gun 47 mm SP							121
Pak sfl							121
Gun 47 mm							121
Spat							122
Gun 50 mm							122
Kwk							
Gun 50 mm							
Kwk (high vol.)							
Gun 50 mm	HE 2,640						
Pak 38	AP 1,450						
Gun Inf 75 mm	3,900			24	.39		
LIG 18							
Gun Inf Mtn 75mm				24	.39		
Loeb IG 18							
Gun Mtn 75mm				28	.33		
GebK 15							
Gun tank 75mm				28	.33		126
Kwk 38							
Gun field 75mm				28	.33		
FK 16 na							
Gun field 75mm				28	.33		
LFK 18							
Gun Mtn 75mm				28	.33		
GebG 36							
Gun tank 75mm				32	.29		
Kwk 40							
Gun assault 75mm				32	.29		126
Stuk 40							
Gun AT 75mm				32	.29		
Pak 40							
Gun recoilles 75 mm	9,000						
LG 40				28	.33		
Gun field 76.2mm							
FK 296 (Russ 36)				32	.29		
Gun AT 76.2mm							
Pak 36				32	.29		
Gun AA 88mm							128
Flak 18, 36&37				32	.34		-131

## GERMAN

## CHARACTERISTICS OF WEAPONS

WEAPON	MAXIMUM RANGE	DEPTH OF GROOVE	WIDTH OF GROOVE	NUMBER OF GROOVES	WIDTH OF LAND PLUS GROOVE	SPECIAL CHARACTER	
Gun tank 88mm Kwk 36				32	.34		128-131
Gun AP 88mm Pak 38	16,200			32	.34		128-131
Gun AA 88mm Flak 41				32	.41		128-131
How field 105mm 1FH 18 & 1FH 16 Stak 42	11,670			32	.41		132-135
How field 105mm 1FH 18M	13,450			32	.41		
How recoilles 105 1G 40 & 1G 42	8,700			36	.36		132-135
Gun field 105mm sK 18	20,800			36	.36		
Gun AA 105mm Flak 38				36	.36		132-135
Gun turret 105mm 1g KT				36	.36		
Gun casement 105 10 cm KR				36	.36		132-135
Gun 105MM K 17 & K 17/O4				35	.36		
Gun AA 128mm Flak 40				44	.42		135
Gun Inf 150mm sIG 33	5,140			40	.45		
How field 150mm sFH 18	14,500 to 16,400			32	.58		135
How field 150mm sFH 13							
How turret 150mm sHT							135
Gun 150mm K 16 & K 18							
Gun 150mm K 39							135
Gun Railway 150mm K (E)							

## GERMAN

## CHARACTERISTICS OF WEAPONS

WEAPON	MAXIMUM RANGE	DEPTH OF GROOVE	WIDTH OF GROOVE	NUMBER OF GROOVES	WIDTH OF LAND PLUS GROOVE	SPECIAL CHARACTER	P.
Gun w/how car 150 K ins Mrs LAF							
How Russian 152mm KanH L 33/1(r) (Russ 37)							
Gun w/how car 170mm K1 Mrs I				48	.44		
Gun 170mm K 18	32,300			48	.44		
Gun railway 170mm Kan (E)							
Gun railway 203mm Kan (E)							
How 210mm Mrs 18	18,400			64	.42		
How long 210mm lg Mrs 18							
Gun railway 240mm Th Br K (E)							
Gun railway 240mm Kan (E)							
Gun railway short 240mm Kz Br Kan (E)							
Gun railway long 280 mm lg u 8 Br Kan (E)							
How coast 280mm HL/12 & Kat H							
How Skoda 100mm 100/22				36	.35		
Gun. DP Czech 75mm 75/50 or 75/49				32	.29		

## MILLIMETERS TO INCHES

## CONVERSIONS

MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
1	.09937	34	1.34	67	2.62	101	3.97		
2	.0787	35	1.38	68	2.68	101.6	4.0		
3	.1181	36	1.42	69	2.72				
4	.1575	37	1.46	69.8	2.75	102	4.2		
5	.1969	38	1.49			103	4.05		
6	.2363	38.1	1.5	70	2.76	104	4.09		
6.4	.25			71	2.78	105	4.14		
		39	1.54	72	2.84				
7	.2756	40	1.58	73	2.88	106	4.18		
8	.315	41	1.61	74	2.91	107	4.22		
9	.354	42	1.65	75	2.95				
10	.3937	43	1.69	76	2.99				
11	.433	44	1.73	76.2	3.0				
12	.473	44.5	1.75						
12.7	.500			77	3.03				
		45	1.77	78	3.07				
13	.512	46	1.81	79	3.11				
14	.551	47	1.85	80	3.15				
15	.591	48	1.89	81	3.18				
16	.63	49	1.93	82	3.22				
17	.67	50	1.87	82.6	3.25				
18	.709	50.8	2.0						
19	.748			83	3.26				
19.1	.75			84	3.3				
		51	2.01	85	3.34				
		52	2.05	86	3.38				
20	.788	53	2.08	87	3.42				
21	.826	54	2.12	88	3.46				
22	.866	55	2.18	88.9	3.5				
23	.906	56	2.2						
24	.945	57	2.24						
25	.985	57.2	2.25	89	3.51				
25.4	1.0			91	3.58				
		58	2.28	92	3.62				
26	1.02	59	2.32	93	3.66				
27	1.06	60	2.36	94	3.70				
28	1.10	61	2.40	95	3.74				
29	1.14	62	2.44	95.4	3.75				
30	1.18	63	2.48						
31	1.22	63.5	2.5	96	3.78				
31.8	1.25			97	3.82				
		64	2.52	98	3.86				
32	1.26	65	2.56	99	3.9				
33	1.30	66	2.6	100	3.937				

## DECIMALS TO FRACTIONS IN INCHES

## CONVERSIONS

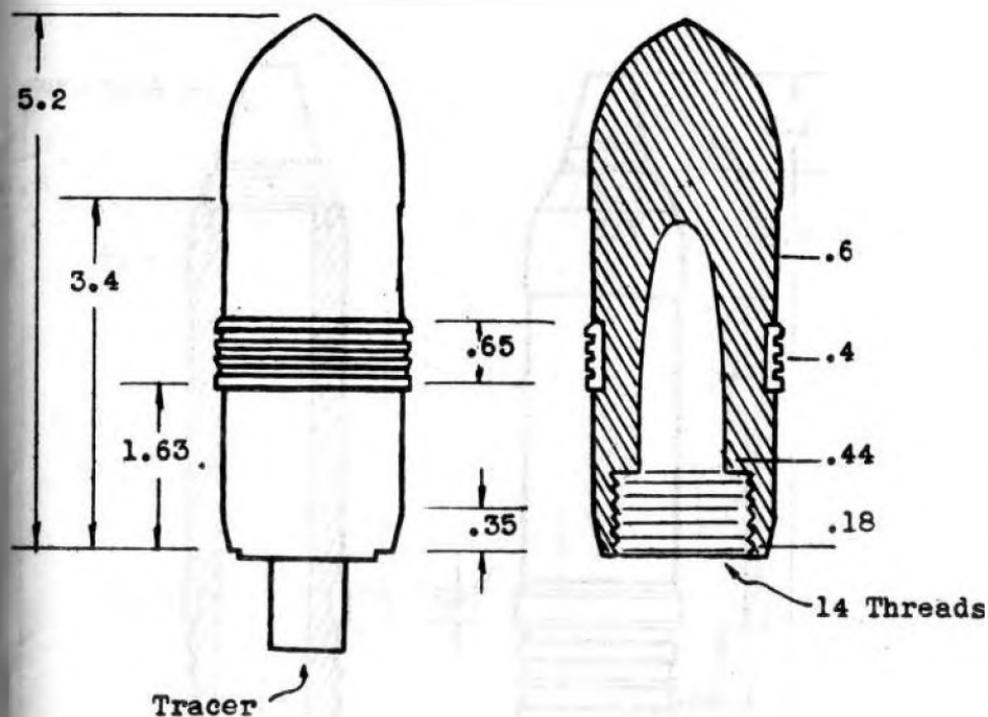
FRACTION	DECIMAL	FRACTION	FRACTION	DECIMAL	FRACTION
1/64	.0156			.625	5/8
	.0312	1/32			
3/64	.0468			41/64	.6406
	.0625	1/16			.6562
5/64	.0781			43/64	.6719
	.0937	3/32			.6875
7/64	.1094			45/64	.7031
	.125	1/8			.7187
				47/64	.7344
9/64	.1406				.75
	.1562	5/32			
11/64	.1719			49/64	.7657
	.1875	3/16			.7812
13/64	.2031			51/64	.7964
	.2187	7/32			.8125
15/64	.2344			53/64	.8281
	.25	1/4			.8438
				55/64	.8594
17/64	.2656				.875
	.2812	9/32			
19/64	.2969			57/64	.8906
	.3125	5/16			.9062
21/64	.3281			59/64	.9219
	.3437	11/32			.9375
23/64	.3594			61/64	.9531
	.375	3/8			.9687
				63/64	.9843
25/64	.3906				1.0
	.4062	13/32			
27/64	.4219				
	.4375	7/16			
29/64	.4531				
	.4687	15/32			
31/64	.4844				
	.5	1/2			
33/64	.5156				
	.5312	17/32			
35/64	.5469				
	.5625	9/16			
37/64	.5781				
	.5937	19/32			
39/64	.6094				

REVENUE		EXPENSE		BALANCE	
DATE	DESCRIPTION	DATE	DESCRIPTION	DATE	DESCRIPTION
1911	...	1911	...	1911	...
1912	...	1912	...	1912	...
1913	...	1913	...	1913	...
1914	...	1914	...	1914	...
1915	...	1915	...	1915	...
1916	...	1916	...	1916	...
1917	...	1917	...	1917	...
1918	...	1918	...	1918	...
1919	...	1919	...	1919	...
1920	...	1920	...	1920	...
1921	...	1921	...	1921	...
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1927	...	1927	...	1927	...
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1932	...	1932	...	1932	...
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47 mm AP

GERMAN

SCALE .5



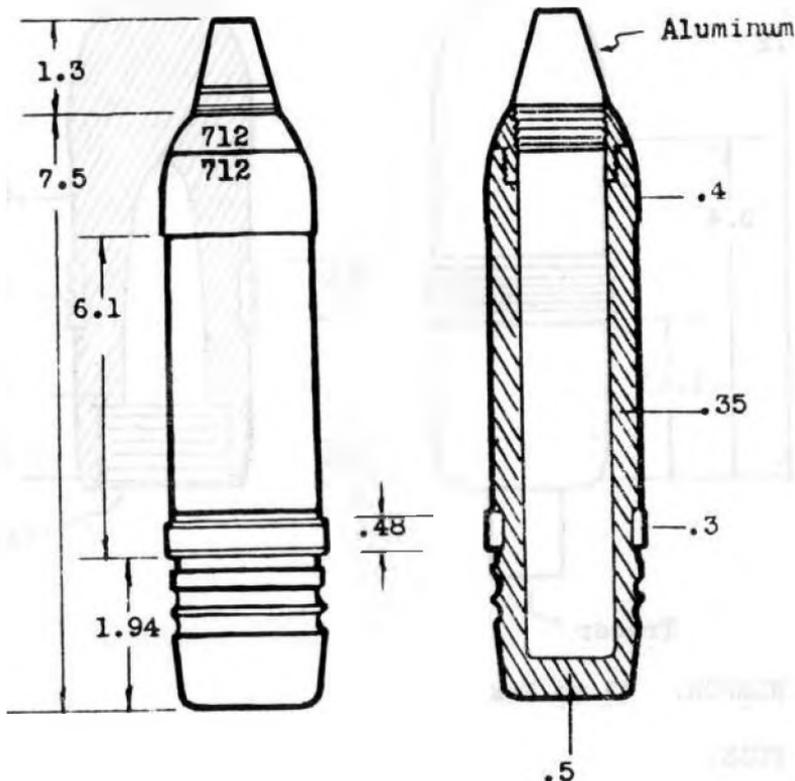
WEAPON: 47 mm KwK

FUZE:

SPECIAL MARKINGS:

OTHER DATA: Copper rotating band

SCALE .4



WEAPON: 50 mm KwK

FUZE: Az 39

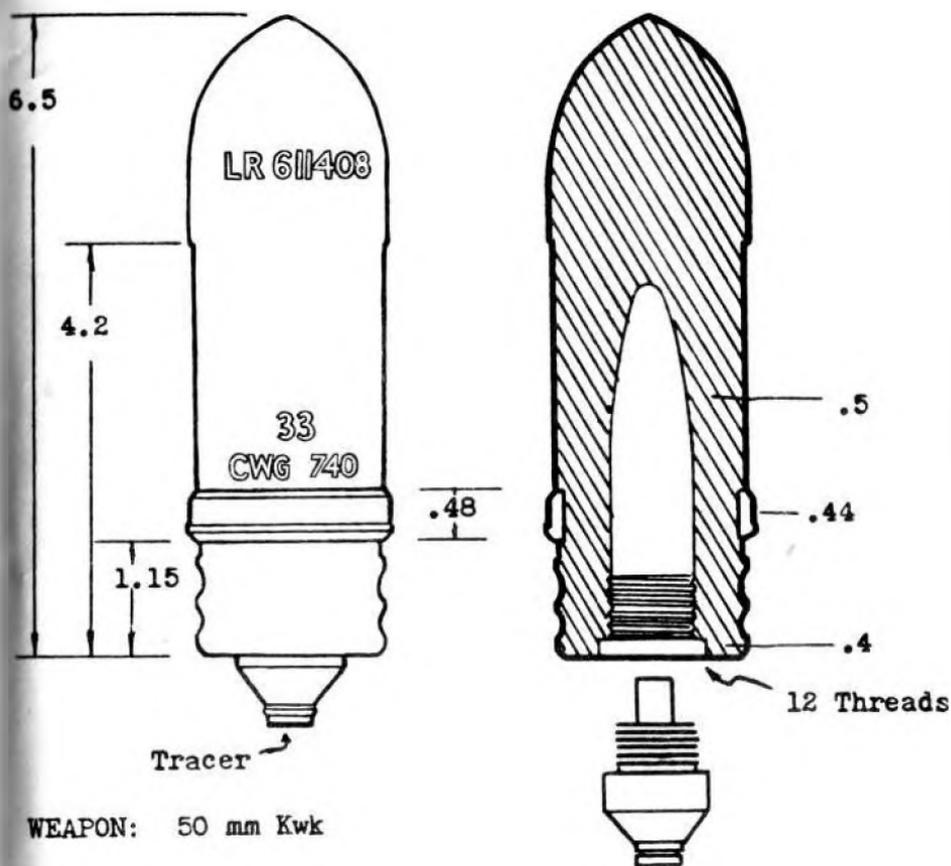
SPECIAL MARKINGS :

OTHER DATA: Soft iron rotating band

50 mm AP

GERMAN

SCALE .5



WEAPON: 50 mm Kwk

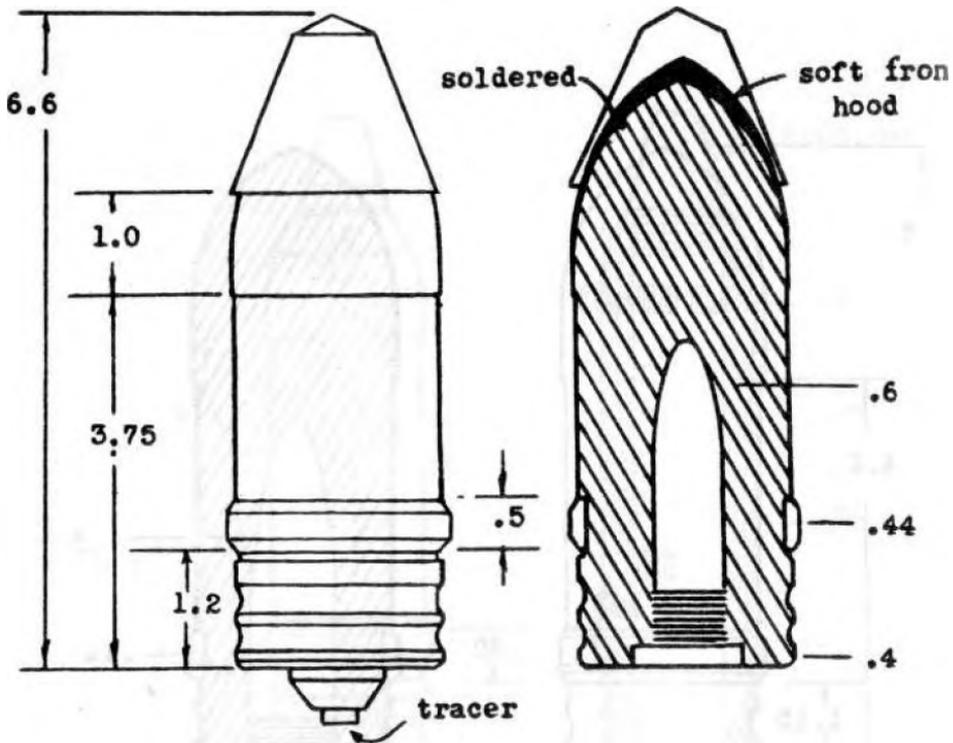
FUZE:

SPECIAL MARKINGS: Lr 611408 stenciled in red on nose  
33 Cwg 7 40 stenciled in red on body

50 mm APC

GERMAN

SCALE .5

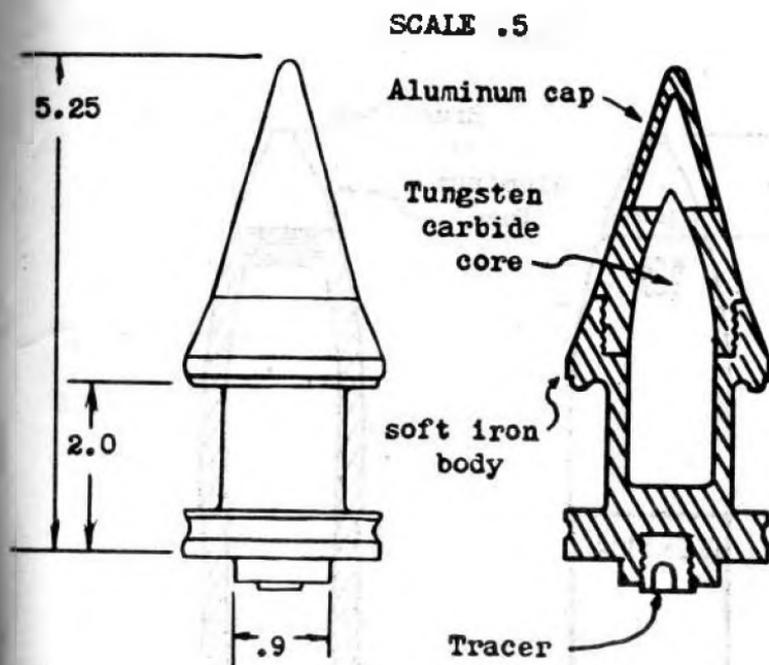


WEAPON: 50 mm KwK

FUZE:

SPECIAL MARKINGS: 8v1214 stenciled in red on body

OTHER DATA: Soft iron rotating band



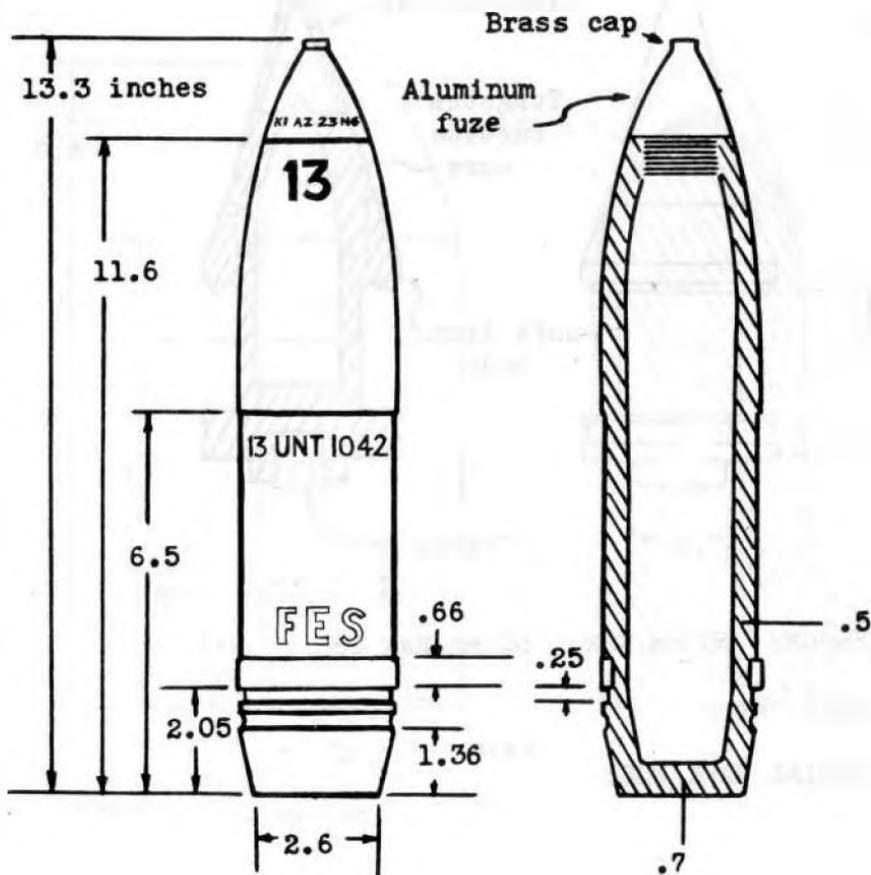
WEAPON: 50 mm KwK, 50 mm Pak 38

FUZE: None

SPECIAL MARKINGS:

OTHER DATA: Same cartridge case as H.E.  
Spaghetti sticks propelling charge.

SCALE .25



WEAPON : 75 mm KWK

FUZE : AZ 23 Same as employed on 105 mm Smoke

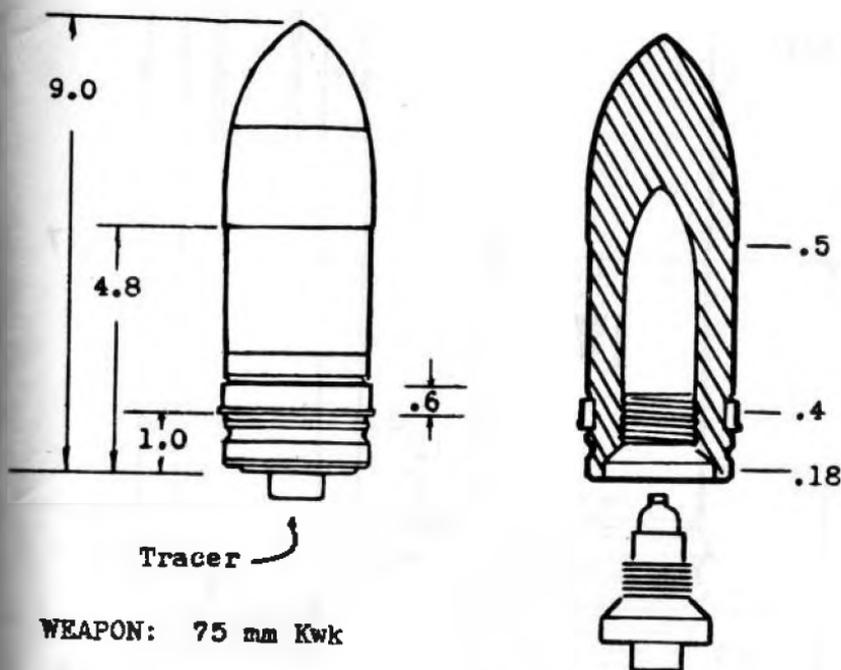
SPECIAL MARKINGS : FES stenciled in white on body  
 13 stenciled in black on nose  
 13 unt 1042 stamped on body

OTHER DATA : Knurling under rotating band same as found on 88 mm and 105 mm.

75 mm AP

GERMAN

SCALE .25



WEAPON: 75 mm Kwk

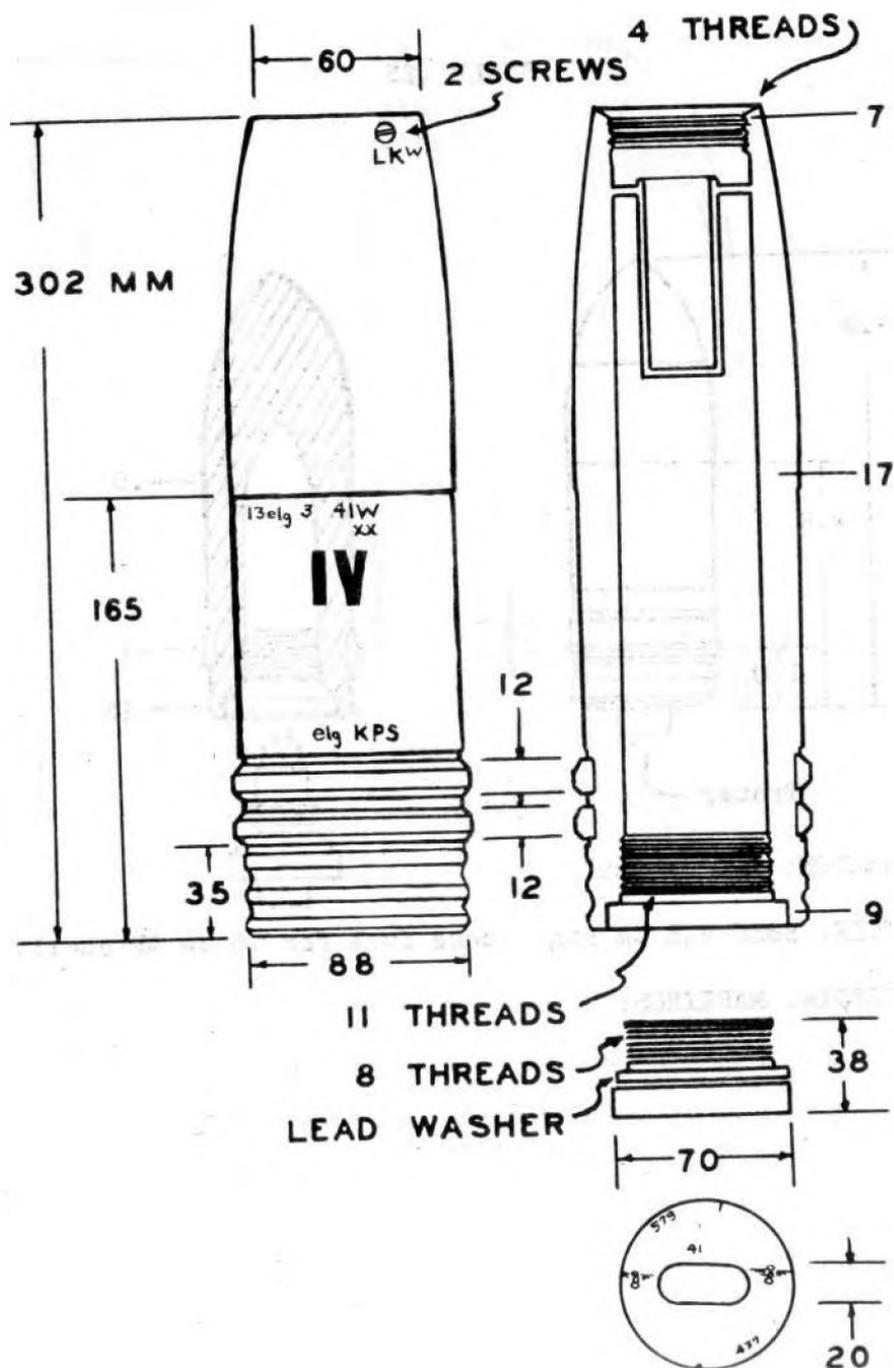
FUZE: BdZf 7.5 Cm Pzgr (base fuze for 75 mm AP shell)

SPECIAL MARKINGS:

88 MM HE

GERMAN

SCALE .35



SCALE 35

88 mm HE

**WEAPONS**

GUN 88 mm SP (sil) Flak 18  
GUN 88 mm MP Flak 18, 36, 38

**FUZE**

AZ 23128 Fcv 40

**SPECIAL MARKINGS**

Stenciled on body:

Color:

IV  
0.5.4.4. LKw  
elg 3 4

black

Stamped on body

KPS  
43 elg 3 41 w  
xx 43

Stamped on base plug

41 579 437



waA222

**OTHER DATA:** Approximate weight of shell 20 lbs.  
Approximate range 16,200 yds.

88 mm APC

WEAPONS

GUN 88 mm SP (sll) Flak 18  
GUN 88 mm MP Flak 18, 36, 38

FUZE

Edz 8.8 Cm Pz gr  
(base fuze for 88 mm AP shell)

SPECIAL MARKINGS

Stenciled on body:

Color:

FES  
28251141 H  
28251141 H

white  
red  
red

Stenciled on fuze:

Color

3 C



WAA411

white

Stamped on body:

1941

Stamped on base:

FES 41 bwg 40  
28 : 11 : 41

Stamped on fuze:

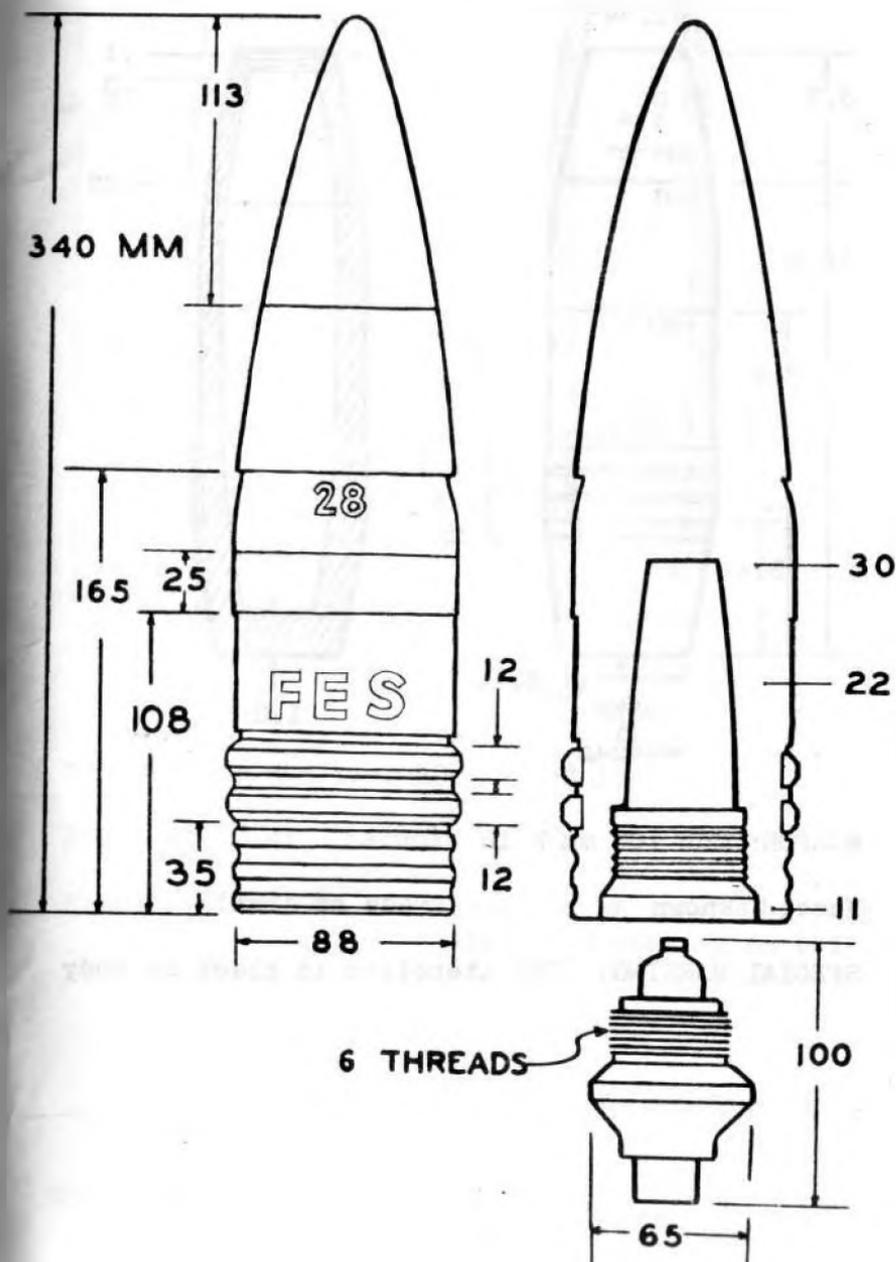
41 byw  
Bdz f 8.8 Cm pzgr

OTHER DATA: This weapon is used in practically all cases for direct fire. Consequently, any range approaching the maximum seldom would be attempted and with a large percentage of targets existing nearer to the 3-5,000 yard range, depending on their nature. Approximate weight of shell 22 lbs.

88 MM APC

GERMAN

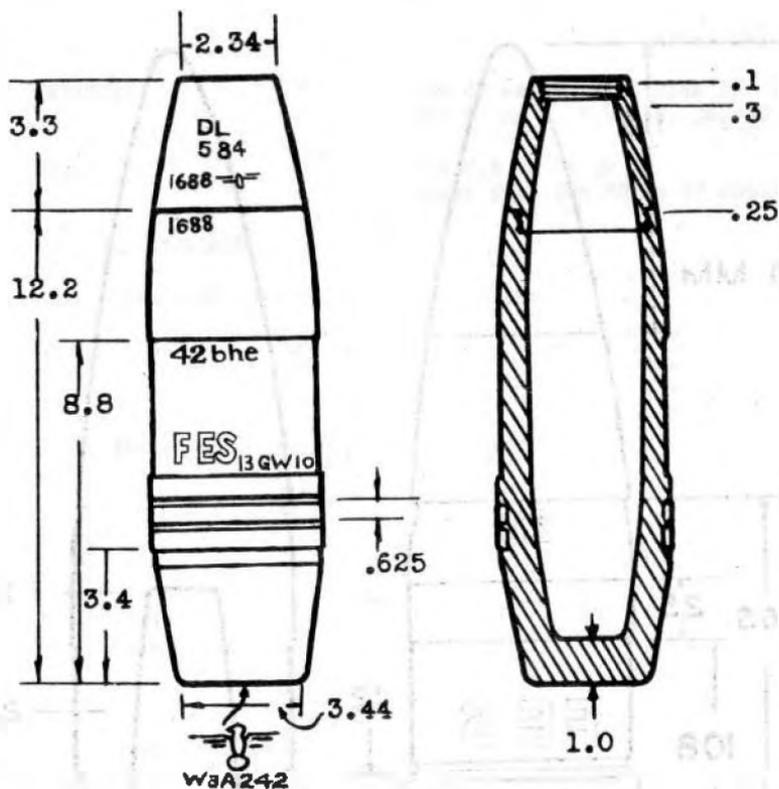
SCALE .35



105 mm HE

GERMAN

SCALE .2

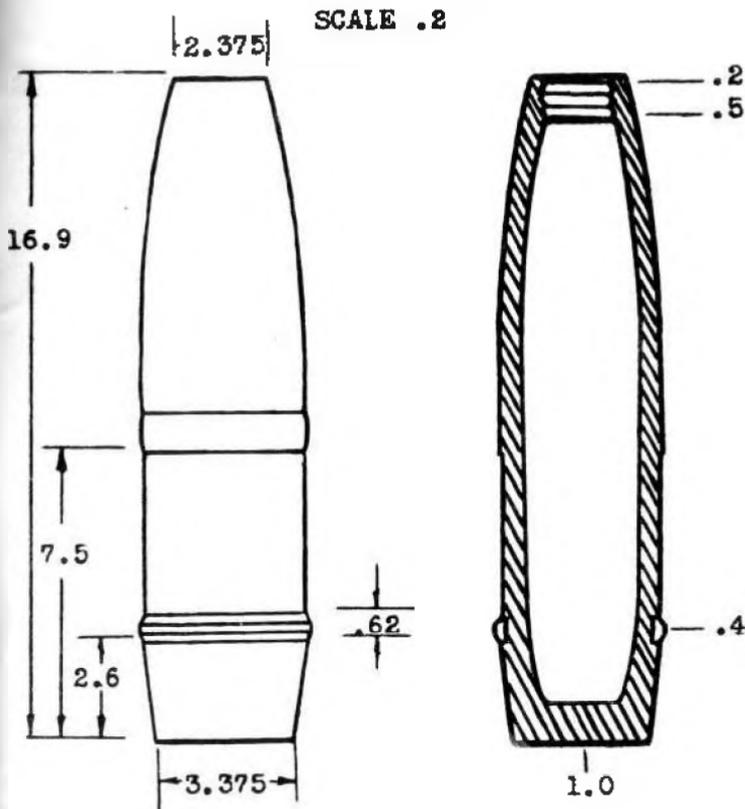


WEAPON: Gun 105 mm K 18

Fuze: Unknown (made of iron)

SPECIAL MARKING: FES stenciled in black on body

OTHER DATA: Soft iron rotating band.



WEAPON: Gun-Howitzer 105 mm LFH 18

FUZE: AZ 23-41 (aluminum)

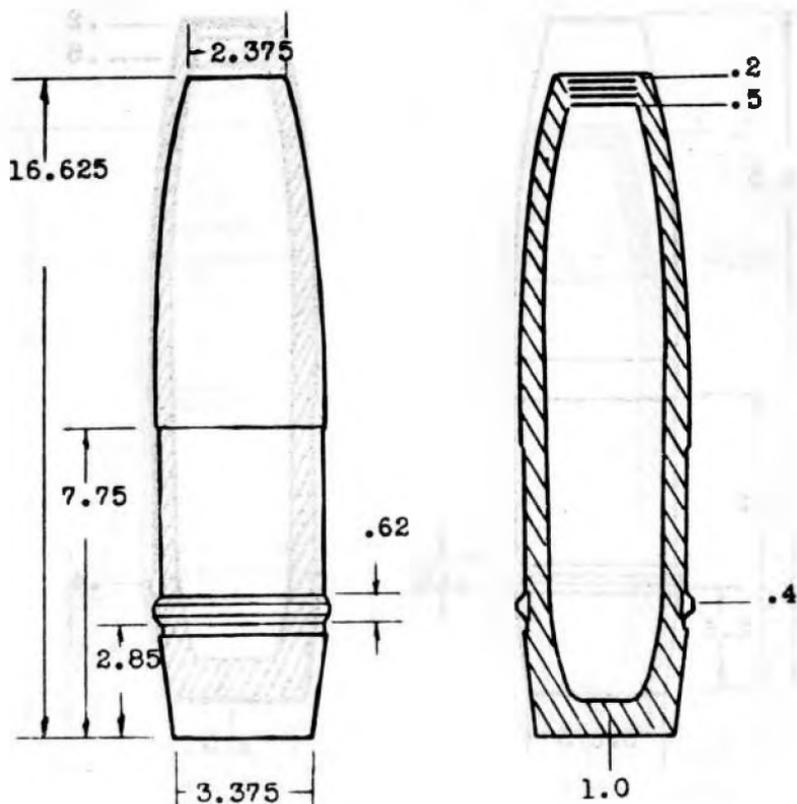
SPECIAL MARKINGS: FES stenciled in on body  
 13 A siz 1.4.3 stamped on body

OTHER DATA: Soft iron rotating band

105 mm HE

GERMAN

SCALE .2



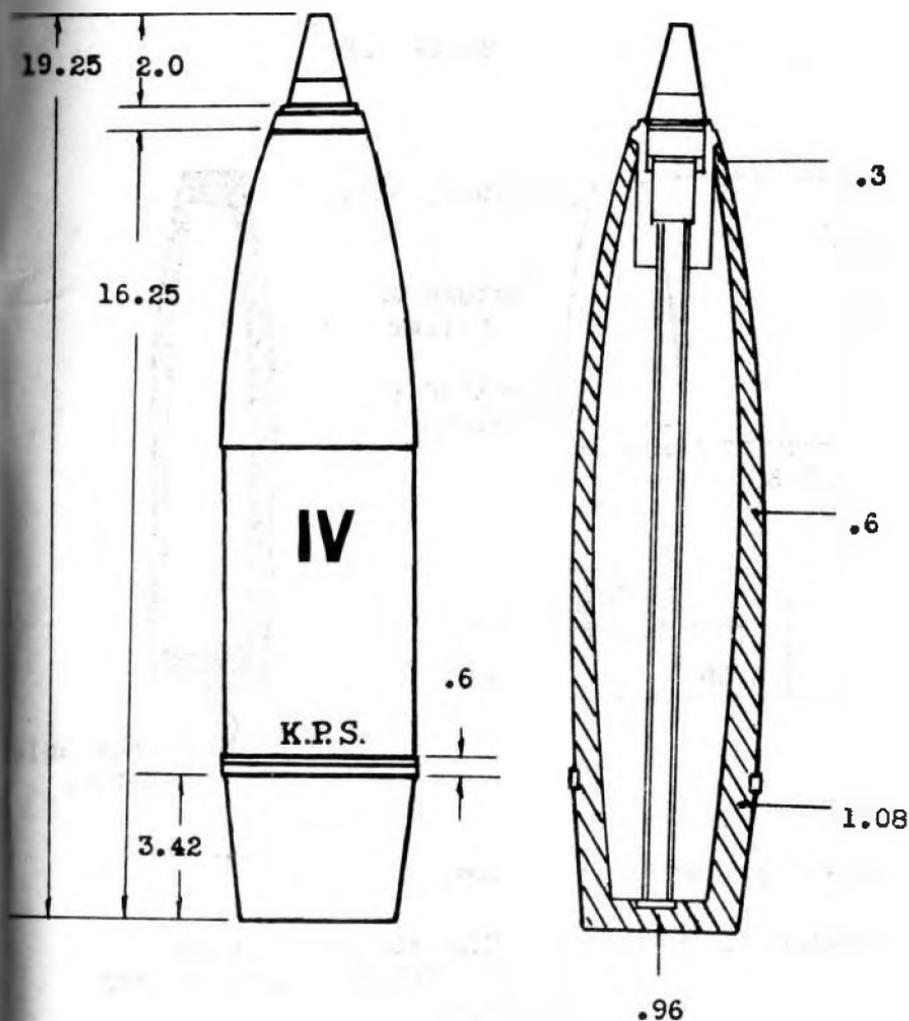
WEAPON: Gun-Howitzer 105 mm LFH 18

FUZE: AZ 23

SPECIAL MARKINGS:

OTHER DATA: Iron rotating band

SCALE .25



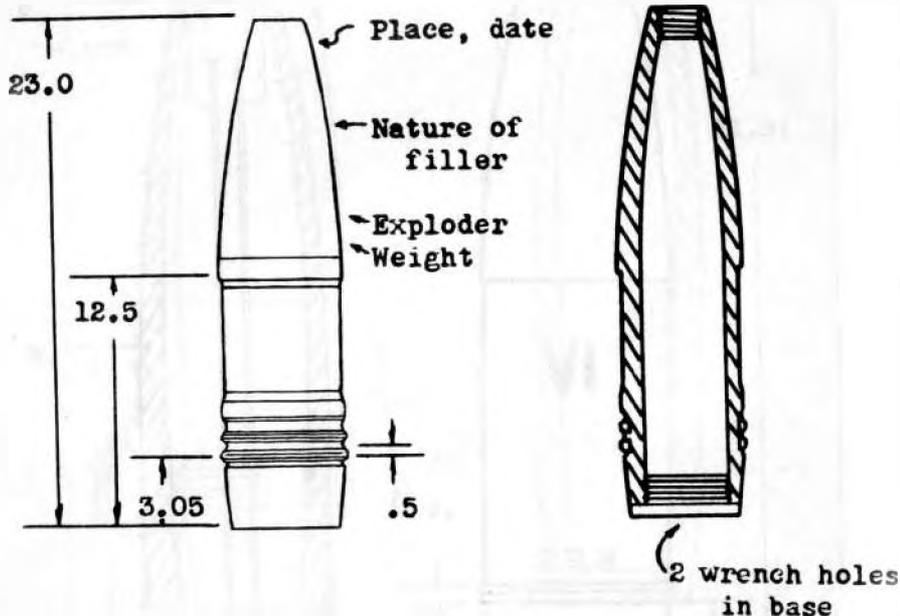
**WEAPON:** Gun-Howitzer 105 mm LFH

**FUZE:** kl. Az. 23 Nb. This is the D.A. and Graze type fuze. It contains no magazine.

**SPECIAL MARKINGS:** IV stenciled in black on body  
Nb stenciled in black on body  
K.P.S. stamped on body

**OTHER DATA:** Smoke cloud has diameter of 80-100 feet

SCALE .1



WEAPON:

FUZE: AZ 23 (aluminum)

SPECIAL MARKINGS: 3g 174OA stamped on nose  
 14 35 III stenciled on body  
 in black  
 3g 174OR stamped on body

OTHER DATA: with exploder 36 (?)

NOTES

NOTES