TM E9-1901

WAR DEPARTMENT TECHNICAL MANUAL

IDENTIFICATION OF JAPANESE SHELLS AND SHELL FRAGMENTS; LOCATION OF ENEMY BATTERIES

WAR DEPARTMENT • *14 MAY 1945*

RESTRICTED

PART ONE—GENERAL

Section I

INTRODUCTION

1. PURPOSE.

a. This manual is designed to aid counterbattery and other artillery intelligence personnel. Combat experience has proven that the system and techniques presented herein will assist materially in:

(1) Speedy location and silencing of active enemy batteries.

(2) Ready identification of enemy artillery and mortars by caliber and type from shell fragments.

b. The methods described in this manual comprise one of the basic means of obtaining information of the existence and location of enemy weapons. These methods are used almost invariably in connection with one or more of the other sources of counterbattery information. The principal sources are:

(1) Crater analysis and fragment identification (via shellreps).

(2) Interpretation of air photos.

(3) Field artillery observation battalions (sound and flash).

(4) Air observers (air OP's) and ground observers.

(5) Interrogation of prisoners of war and friendly civilians.

c. Crater analysis and shelling reports (shellreps) are used to check and verify battery locations obtained by these other means. Also these other sources are used to verify information from shelling reports and crater analysis.

2. IMPORTANCE.

a. Speedy location and identification of enemy artillery and mortars are of paramount importance in combat. Unceasing effort and all possible means and methods must be employed to provide *promptly* the information necessary to knock out such enemy weapons. This mission and the gathering of information essential to its accomplishment are of vital interest to all soldiers.

b. Information of the location, mass, disposition, and zones of fire, by caliber and type, of the enemy artillery, mortar, and rocket weapons is of great value in estimating enemy tactical capabilities. The success of an entire operation depends to a considerable extent upon the accuracy, completeness, and timeliness of this information.

c. Systematic examination of craters and shell fragments may disclose information about new types of enemy ammunition and weapons, a knowledge of which may permit us to develop early and effective counter measures. This knowledge may also suggest improvements in our own ammunition and weapons.

Section II

SHELLING REPORTS (SHELLREPS)

3. GENERAL.

a. Whenever or wherever enemy artillery, rocket, or mortar shelling is observed, it must be reported back immediately to where the information can be evaluated and acted upon. These shelling reports, now commonly called "shellreps," are rendered through channels according to a definite procedure and form by the individual or unit observing or experiencing the enemy fire.

4. VALUE.

a. Shellreps are basic and extremely valuable information; they are literally the keystone of efficient counterbattery or counter mortar intelligence. In addition to helping locate enemy guns speedily, shellreps:

(1) Tell when enemy guns are firing.

(2) Indicate which batteries are active.

(3) Indicate number, caliber, and type of guns firing.

(4) Report effectiveness of enemy shelling.

(5) Indicate zones of fire of enemy weapons.

(6) Indicate new locations.

(7) Make possible prompt retaliatory fire when location of offending batteries is established.

(8) Serve to alert sound and flash, air OP's, and other agencies.

b. The value of shellreps depends chiefly upon:

(1) Their accuracy and completeness.

(2) Speed of transmission.

(3) Number received.

c. Because silencing of enemy batteries is of vital interest to all soldiers, all should be encouraged to submit shelling reports, regardless of arm or service. However, a smaller number of reports which are complete and accurate are of greater value than many reports of a general nature. The best reports, therefore, are submitted by trained men who have actually surveyed the craters in the shelled area and have either analyzed the available shell fragments or submitted them for analysis along with their reports. Since a high percentage of all

enemy concentrations will fall somewhere near an artilleryman, artillerymen should be especially trained so that their reports will be accurate, complete, and prompt.

5. ACCURACY.

a. Shellreps are usually based upon hearing, visual observation, or crater analysis, or sometimes a combination of these. Reports based on hearing are generally unreliable as to direction. The human ear is not capable of judging direction better than an accuracy of about 5 degrees, and there are many other factors that will tend to make reports even less accurate. The most reliable, accurate, and informative reports are based on crater analysis, explained in the next section, or based on direct visual observation of the flash of the enemy weapon, measured by an aiming circle, BC scope, or similarly accurate, properly oriented, sighting device.

6. SHELLING REPORT FORM.

a. A suggested form for observer's report to his headquarters is form "A," page 28. This form is suitable for printing on a card to be glued into the Field Message Book. Form "B," page 29, is suitable for recording this information at battalion and higher headquarters as the reports are received.

b. The following is a detailed explanation of the purposes of the information required in the shellrep form (page 28):

(A). Time and unit reporting: Needed for future reference.

(B). Location of observer: Accurate location of the observer is essential in plotting reported azimuths. When crater analysis is made of several craters in same shelling, *average* of coordinates should be given.

(C). Azimuth of direction from which shelling came: This is determined in any of three ways:

1. Sound. Estimation of direction by ear is too inaccurate, except for very short distances when such inaccuracy is not as important as at greater distances. It should be used for mortar locations only.

2. Furrow or Crater. This method is most reliable and most accurate. Experienced observers can get within 5 to 15 mils in a single compass reading which should not require more than 5 minutes. An average of several readings will greatly increase accuracy. Always state the compass reading in magnetic north or grid north. An aiming circle will give more accurate direction.

3. Flash. An accurate means of obtaining direction to enemy gun is by direct measurement of the visible gun flash through a properly oriented, accurately located aiming circle or BC scope.

(D). Distance in yards should be given whenever possible. The *slope of fall* in mils, when obtained in crater analysis, is usually of greater value than the estimated distance or location.

(E). Coordinates of the area shelled are valuable as they may indicate the enemy intentions. Accuracy of the locations aids in eliminating duplicate reports.

(F) and (G). Time "From-to": Should be given accurately. It may be that the shelling can be tied into sound or flash locations which were taken at the same time. Also, reports of two or more observers may be tied together, permitting artillery to locate and neutralize the correct gun location immediately without wasting time and ammunition in firing on a dozen different targets with only a "hope."

(H). Number, caliber, and type of guns: The principal method of determining the number of guns is by the time interval between bursts or the number of bursts which come practically simultaneously. Character of sound is sometimes an indication of caliber to experienced personnel, but fragment identification is a positive and more reliable method of determining caliber and sometimes type of enemy guns. Type of gun, whether howitzer or rifle, as well as caliber is valuable information and should be determined whenever possible.

(I). Number and type of shells: Number of shells falling into an area as well as type (HE, smoke, time, etc.) may give us a real clue as to what the enemy is trying to accomplish. It can also indicate the amount of ammunition available or the importance of the target to him.

(J). Nature of fire: Counterbattery, registration, harassing, interdiction, OP neutralization, preparation, etc.

(K). Damage: The damage done will often determine counterbattery priority. This information should never be sent "in the clear" on voice radio or if telephone wires may be tapped by the enemy.

(L). Flash-bang (seconds): A flash-bang report is of exceptional value as it not only gives accurate direction but also approximate range to enemy guns. The method is simple. Time is taken at sight of flash (stop watch is highly desirable), then the observer hears the report (bang) of the *gun shooting* (not the ballistic "crack" or sound of the shell in the air) and time is again noted. Since flashes are seen instantaneously, and it is known how fast sound travels (approximately 370 yards per second), the time interval indicates range. Because of lag in individual reaction time, a correction of approximately 200 yards should be deducted from all ranges determined by this method.

(M). Remarks: Enter here anything especially noted.

7. REPORTING NEW SHELLS.

a. Shells or fragments found to have characteristics unlike those listed in this manual should be reported immediately to proper authorities.

b. To be of maximum value, fragments sent to the rear should be tagged with the following information:

(1) Time (date and time of day shell landed, if known).

(2) Location (place where shell was found as accurately as location can be given).

(3) Direction (approximate direction from which shell came and method used in determining that direction (survey of crater, sound, etc.)).

(4) Name and organization of person making report.

(5) References.

8. STANDARD OPERATING PROCEDURE.

a. A standard operating procedure for shellreps is recommended. The following is a suggested SOP:

(1) GENERAL SHELLREPS. Personnel in units of all branches immediately report hostile shelling, giving the following general information:

(a) Time.

(b) Where.

(c) Apparent direction to enemy guns.

(d) Number of guns firing and apparent caliber.

(2) CRATER OR TEAM SHELLREPS. Artillery personnel, learning of this hostile shelling through own observations or through general shellreps, dispatch trained teams immediately to the shelled areas, including those from which general shellreps were submitted by other arms. These teams will make crater analysis and requisite survey.

(3) TEAMS. Each team consists of two men equipped with aiming circle, calipers, flexible steel rule, gunner's quadrant (when available), and dia-meter or substitute. The Compass M2 can substitute for an aiming circle.

(4) Each artillery battalion maintains three teams, each higher headquarters maintains one, and the observation battalions maintain four. In addition, the artillery forward observer, the artillery liaison section, and the infantry company teams also make crater analyses (primarily enemy mortar craters) using prismatic compass only. Unless artillery battalions or higher artillery headquarters direct otherwise, teams automatically assume the following responsibilities:

(a) Direct support battalions for areas actually occupied by infantry.

(b) General support battalions and higher artillery headquarters for areas within 1,500 yards of their location.

(5) Completed reports are forwarded immediately, usually by telephone, and coded if reported by radio. Time of the actual shelling

is reported accurately. Direct support artillery acts on mortar shelling reports ("mortreps").

(6) Any knowledge of hostile shelling beyond the limits of responsibility listed in step (4), above, is forwarded to suitable artillery headquarters for survey.

9. PERSONNEL AND TRAINING REQUIRED.

a. A single individual can perform the necessary operations in each area; however, for speed and other practical considerations, a crew of two or three is recommended.

b. Inexperienced personnel can get accurate direction from ricochet furrows with very little instruction. More instruction or experience is necessary in the case of craters, certain types of ricochets, and for identification of fragments. Knowledge of the elements of exterior ballistics, Firing Tables, and their use is helpful, but knowledge of enemy ammunition and weapons is definitely necessary. Since the enemy may use captured weapons against us, familiarity with weapons of our allies is important.

c. Instruction should be by trained personnel who know shell crater analysis and shell fragmentation identification from actual experience. There are many fine points to crater analysis. For example, the slope of ground, the texture of soil, the over-all detonation pattern, etc., all have definite effects that can be compensated for, if known, in determining direction to the gun. Properly trained soldiers can select at sight craters giving most accurate results, and know where to find, with minimum effort, shell fragments most easily identifiable. Scouting and patroling should be emphasized so that maximum advantage is taken of terrain for protection against enemy fire.

d. It is often difficult to differentiate between hostile mortar and artillery shelling. However, there are basically no differences in the techniques for locating enemy mortars and artillery. Therefore, instruction of both shellrep and mortrep teams can and should be given at the same time.

Section III

LOCATION OF ENEMY BATTERIES AND MORTARS BY CRATER ANALYSIS

10. GENERAL.

a. The direction of flight of a projectile frequently can be determined quite accurately from its crater or ricochet furrow. By locating the crater accurately and measuring the direction of flight as indicated in the following paragraphs, back-azimuths can be obtained which will

pass through or very near the actual gun, battery, or battalion position. The position area of a battery can be located by plotting the intersection of the average back-azimuths from two or more widely separated groups of craters, and by other methods described herein. The direction to a battery can be determined with fair accuracy from the back-azimuth obtained from even one ricochet furrow or crater.

11. USES AND VALUE.

a. By analysis of shell craters, it is possible to:

(1) Verify, as active batteries, suspected locations which have been obtained by other means.

(2) Detect presence and approximate location of enemy batteries not previously suspected.

(3) Obtain an early indication of the general location or direction of the mass of enemy artillery.

(4) Assist air and ground observation in accomplishing counterbattery missions by greatly reducing the sector necessary to search.

(5) While a slow moving or static situation permits maximum employment and benefit of crater analysis and shellreps, crater analysis can be extremely important in a fast moving situation. For example, when advance elements, particularly armored, are held up by unexpected fire from guns that cannot be seen, information on whether the fire is from tank, antitank, or field artillery weapons may determine the next tactical move. As very often the other counterbattery intelligence means are absent or nonoperating at such a time, crater analysis will be frequently the only means available for speedy location and identification of these enemy guns.

12. INSPECTION OF SHELLED AREAS.

a. Inspection of shelled areas should be made as soon as possible. Reverse slopes, folds in the terrain, hedgerows, and buildings in shelled areas offer the greatest chance of finding ricochet furrows and other markings most useful in determining direction of flight and slope of fall, and also afford maximum protection for personnel making crater analysis.

13. CRATER SURVEY FOR LOCATION.

a. The area must be located sufficiently accurately for plotting on firing chart, map, or airphoto. Deliberate survey methods are not essential; hasty survey, by pacing distance and using the aiming circle for direction, usually is sufficient. Frequently a quick, short traverse to a known road junction, the battery position or OP, is all that is necessary. In some cases, the crater, or center of impact, can be located by pin-pricking an airphoto.

14. DETERMINATION OF DIRECTION AND ANGLE OF FALL.

a. Pattern. The pattern produced on the ground by the detonating shell gives a clear indication of the general direction from which artillery fire is received. This is illustrated in figures 1 and 2.

b. Factors Affecting Pattern.

(1) It must be kept in mind that due to irregularities of terrain and soil condition, the "typical" shell crater pattern is the exception, not the rule.

(2) The principal effect from fragmentation is always from side spray, with much less effect from nose spray. Back spray is negligible. The width, angle, and density of the side spray vary with different types of projectiles.

(3) In evaluating direction, due consideration must be given to the way the earth is thrown, the effect of stones, stumps, roots, variations in soil density and type, and the slope of terrain at the point of impact. Out of any group only those craters most clearly defined and nearest to typical should be utilized.

c. Range Dispersion. In case the firing has been from a single gun or a very limited number of guns, range dispersion will give a good indication of the direction of fire.

d. Marks on Vegetation and Other Objects. The direction from which a round was fired and its angle of fall are often accurately indicated by markings left as it cuts through trees, shrubs, grass, snow, and various objects.

e. Ricochet Furrows and Duds.

(1) Ricochet furrows usually furnish the best information. The average direction of a few such furrows from the same gun will give a line within a few mils of the true direction of flight. Ricochet can be found even at extreme ranges, on reverse slopes of hills or on stream banks. Of equal or superior value are grooves in thick grass or bushes, holes through materiel, buildings, trees, and other objects from which angle of fall also frequently may be determined.

(2) TECHNIQUE (fig. 3). Carefully remove loose dirt from furrow with hands, leaving smooth, hard channel intact. Drive two thin stakes or survey pins, one at each end of the usable part of the furrow. Be sure to set the stakes straight and in the center of the channel. These stakes represent the line of fire, the azimuth of which may be measured with an aiming circle placed 5 to 15 feet from the furrow and in line with it. The slope of fall can be determined with a Compass M2 sighted along the bottom of the furrow or entrance hole.

f. Fuze-quick Craters.

(1) At small angles of fall, fuze-quick craters furnish information nearly as accurate as that from ricochet furrows. Judging the direction

Figure 1—Shell Crater With Fuze Skid

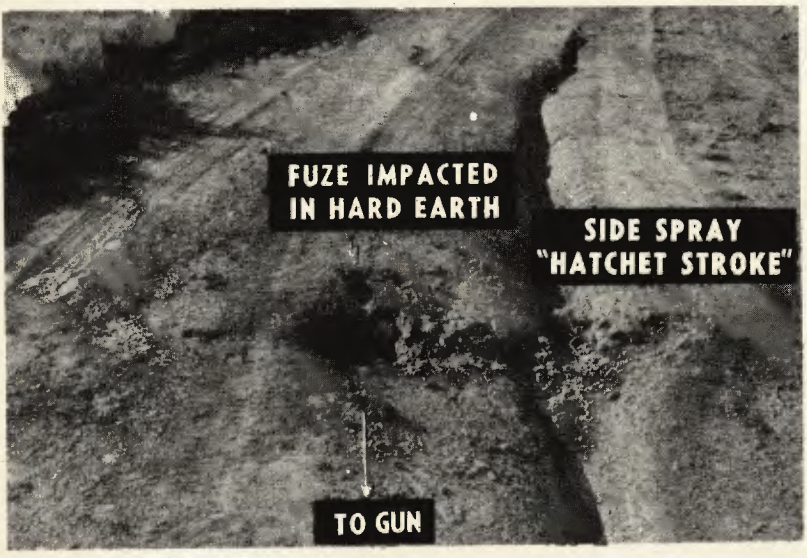


Figure 2—Shell Crater, Hard Earth

of the trajectory increases in difficulty with an increase in angle of impact; therefore, for equally practical results, more craters must be analyzed. If the angle of impact is small or moderate, the crater generally is pear-shaped. The crater usually is wider than it is long. If the angle of impact is larger, the crater generally is oval with the least diameter in the direction of flight.

(2) TECHNIQUES (figs. 4 and 5).

(a) Use of Channel in Ground Where Shell Entered and/or Left. Place a stake in center of channel. Place a second stake on opposite side of crater. Sight along these to obtain back-azimuth as with ricochet furrows. Position of fuze may give an excellent indication of direction of fire.

(b) Use of Side Spray Shown by Dirt and Cut Grass. Place a stake in the center of each line of side spray equally distant from the crater. Putting the aiming circle in the exact center of the crater, measure the angle between the stakes. The bisector of this angle is the approximate line of fire, and its azimuth, or back-azimuth, can be determined.

(c) The average of the back-azimuths obtained from steps *(a)* and *(b)*, above, will be more accurate than either method alone.

g. Deep Craters. Least reliable directions are from deep craters. However, in soft soil, good approximate direction can be obtained if a nose fuze has been employed and fuze and fragments are located. These will often be found in a tunnel in prolongation of the shell's line of flight. A line can be established from this in conjunction with other characteristics. The crater pattern ordinarily will be oval, narrowest diameter indicating direction of fire, and of varying depths.

h. Time Fire. Low air bursts can furnish excellent information of the line of flight of the projectile. In any time concentration there should be some impact bursts from which good direction lines can be obtained.

15. LOCATION OF BATTERIES.

a. General.

(1) Batteries may be indicated or located approximately from:

(a) Single back-azimuth rays plus analysis of terrain along the rays.

(b) Single rays plus slopes of fall.

(c) Single rays plus time reading from fuzes.

(2) Enemy batteries will be more accurately located by triangulation (long base intersection) from back-azimuths determined in different shelled areas.

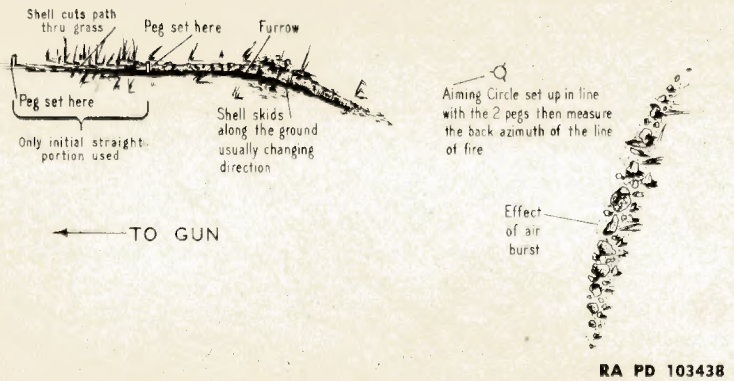


Figure 3—Typical Ricochet Markings

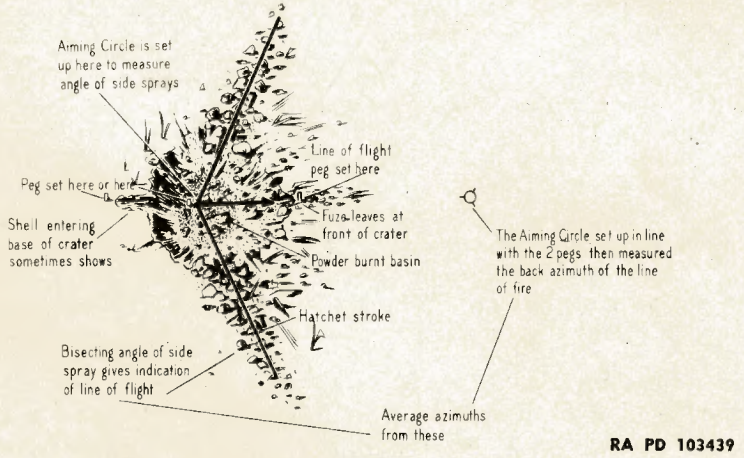


Figure 4—Typical Shell Crater, FQ (Small Angle of Fall)

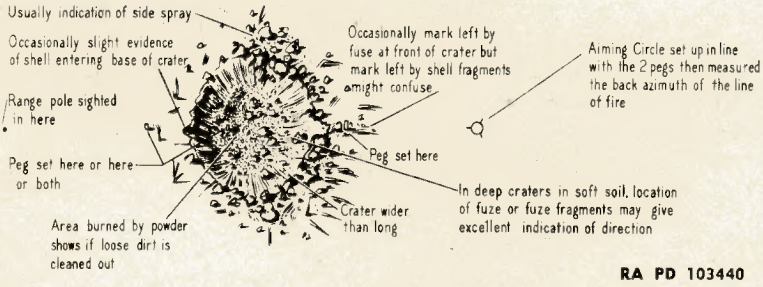


Figure 5—Typical Shell Crater, FQ (Larger Angle of Fall)

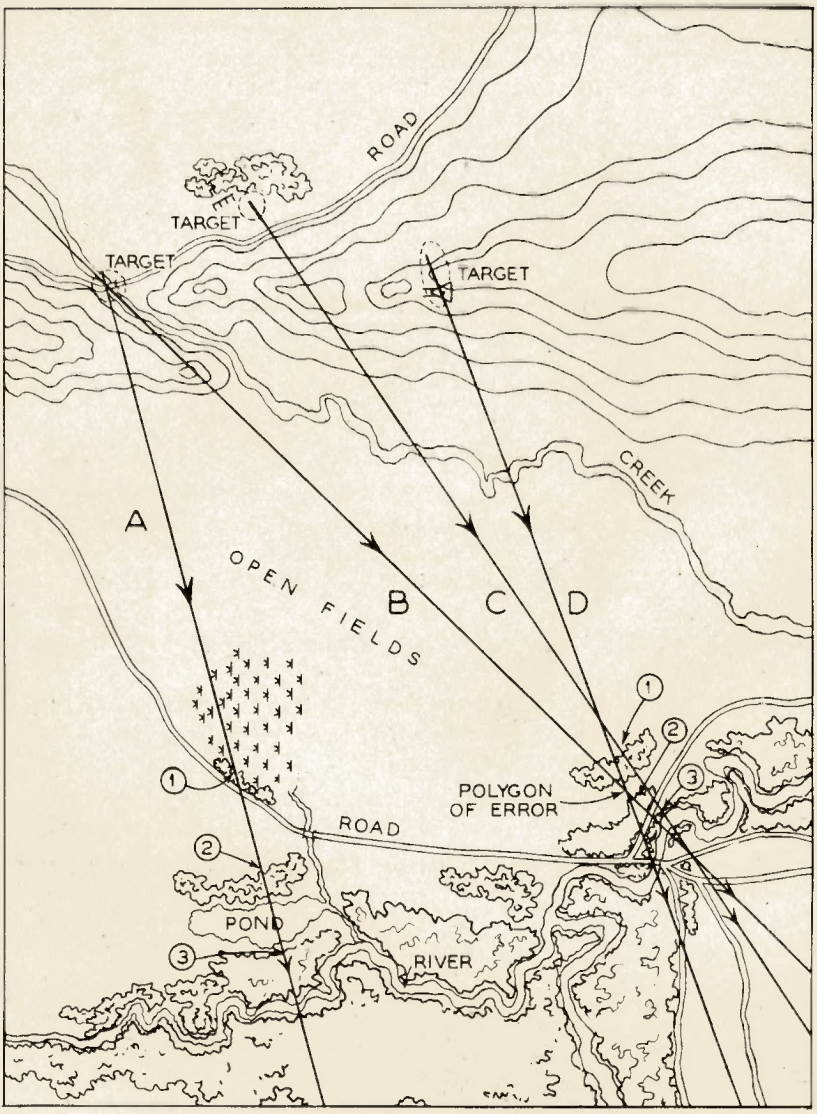


Figure 6—Terrain Analysis

b. Single-ray Method.

(1) BY INSPECTION. A mean back-azimuth obtained from a group of ricochet furrows and fuze-quick craters which closely match for direction will pass near or through the responsible battery position. Even with no means available for ascertaining the range, the single ray will narrow the search for the enemy battery and focus the attention of all target locating agencies in corps and smaller units. The capabilities and limitations of the weapons believed employed, as determined by identification of shell fragments, must be considered. For example, on ray A of figure 6, areas (1), (2), and (3) are probable locations for enemy guns. The examination of such areas by air or ground observers, or by means of stereoscopic pairs of airplane photographs may disclose the battery position. Possibility of use of unorthodox positions must not be overlooked.

(2) SLOPE OF FALL OR TIME SETTING FUZE. In either case, approximate ranges at times can be estimated or obtained closely from approximate range tables if caliber of weapon and type of ammunition employed are known.

c. Intersection Method.

(1) Basically, this method is long-base intersection of mean back-azimuth rays from widely separated shelled areas, where the rays originated from craters of shells of identical caliber and type, and perhaps have been further identified as having been fired from the same gun or battery, as explained in paragraph 17. The intersection of two or more, preferably at least three of these rays, is taken as the gun, battery, or battalion location.

(2) Figure 7 illustrates centers of battalion areas characteristically obtained by method in step (1), above, while figure 8 shows battery location as well as battalion areas.

(3) In case of a resulting small triangle or polygon of error, the center, as determined by usual means, can be taken as the location. In large polygons of error, the area should be inspected for probable locations as is done in single-ray method. Referring again to figure 6, the intersection of rays B, C, and D produce a triangle of error which contains probable battery positions at (1), (2), and (3). Suspected position (2) seems most probable as it is also nearest center of triangle.

(4) Time factor is important; due consideration must be given to possibility that guns may have moved.

d. False Intersections.

(1) When many batteries are active on a small front, the many back-azimuths tend to be dense and confusing. If all are plotted on the same map, many "false" intersections will be obtained. See figure 8. Most of these can be eliminated by simple inspection, since many false intersections will be within or near the front lines, as are (2),

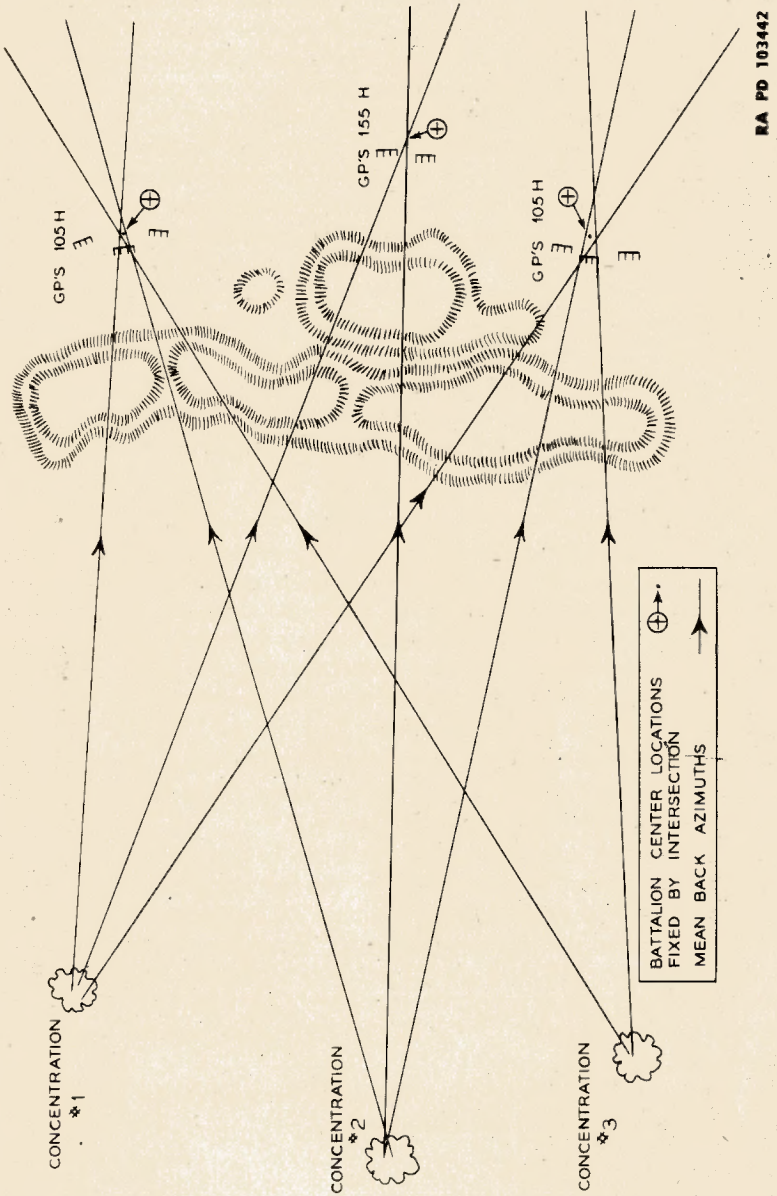


Figure 7—Intersection Method

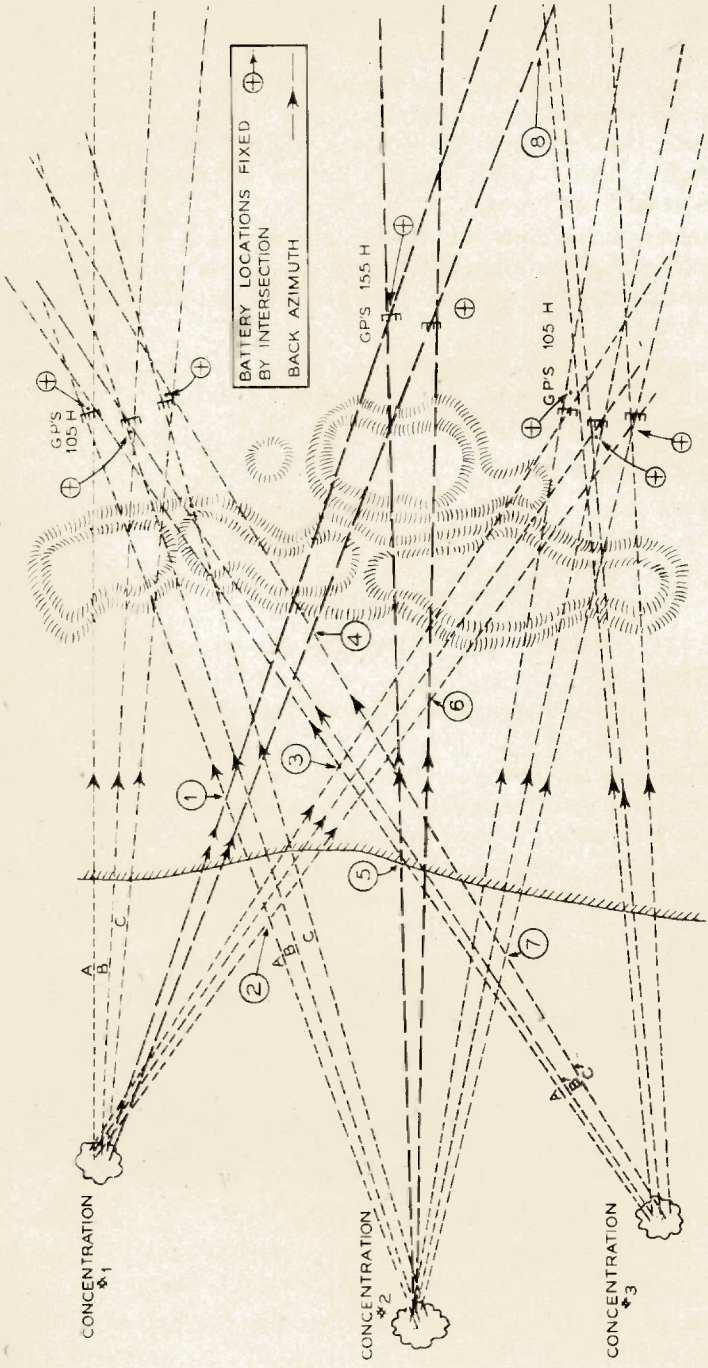


Figure 8—False Intersections

(3), and (7), or beyond the probable range of the two batteries as is (8). Intersections of different calibers, as are (1), (4), (5), and (6), are obviously false.

(2) It will be noted that rays marked "A" from each concentration match up on inspection as being all "left" back-azimuths at each concentration; those marked "B" are each "center" and those marked "C" are "right." All A's, B's, and C's usually intersect at the same respective battery locations.

(3) False intersections can be reduced by using different color rays for different caliber and type, and/or employing overlays according to caliber and type of weapon. Times of shelling should be marked along each ray.

e. Accuracy. With heavy caliber guns, the accuracy of this method will be improved by the application of metro and drift corrections to the direction of flight.

16. AIR OBSERVATION.

a. An air observer can discern the general direction of fire from a shell area, and by lining in with this can greatly narrow the sector of observation. The air observer also can locate and report shelled areas for later examination by ground personnel.

17. IDENTIFICATION OF INDIVIDUAL GUNS AND BATTERIES.

a. It is often possible to identify specific guns and batteries from shellreps alone.

(1) Each gun leaves distinctive marks on the rotating band, as shown in figure 9, and frequently on the bourrelet of the projectile fired. These marks may permit individual identification.

(2) Frequently, differences in ammunition and fuze lots will be found which may differentiate between battalions and sometimes batteries.

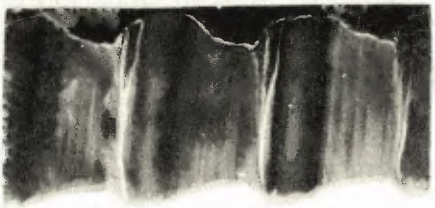
(3) Slight variations in design and manufacturing peculiarities show up very often in the rotating band keying and differentiate between ammunition lots. Keying or knurling in rotating band grooves and on the back of the bands themselves are excellent identifications of nationality, caliber, and type.

(4) In crater analysis, the differences in slopes of fall, burst patterns of the projectiles, directions of flight, and settings to time fuzes will all aid in distinguishing between batteries or battalions.

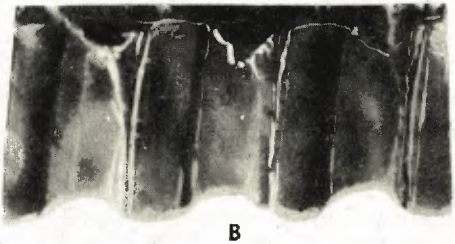
18. LOCATION OF ENEMY MORTARS.

a. Counter-mortar organization and technique are covered in Training Circular No. 7, 1945, to which reference is made.

b. Basically, mortar crater analysis is similar to that of artillery shell crater analysis.



A



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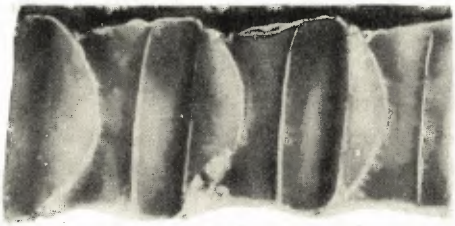
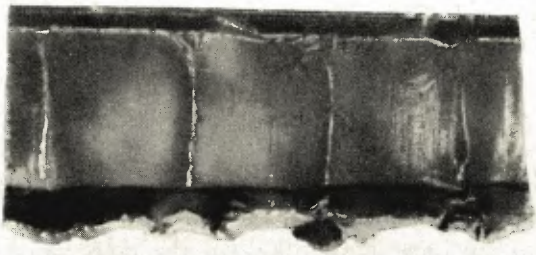


C



D

A — SECTION OF BAND FROM RECOVERED 75-MM SHELL FIRED FROM A NEW GUN. NOTE UNSYMMETRICAL ENGRAVING DUE TO VARIABLE TWIST OF RIFLING AND SCORINGS ON FORWARD COVERS OF RIDGES.

B — SECTION OF 75-MM BAND FROM RECOVERED 75-MM SHELL FIRED FROM A SLIGHTLY WORN GUN.

C — RECOVERED 75-MM BAND FIRED FROM WORN GUN.

D — RECOVERED BAND FIRED FROM A VERY WORN GUN

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Figure 9—Rotating Band

Section IV

IDENTIFICATION OF ENEMY SHELLS AND SHELL FRAGMENTS

19. GENERAL BASIS OF FRAGMENT ANALYSIS.

a. The caliber of a shell, as well as the type of weapon from which it was fired, can be determined in nearly all cases by analysis of its fragments. Dimensions of projectiles vary with caliber and type. Identification is frequently possible if fragments can be found and these measurements taken. Japanese shells have been found to be excellently manufactured and with very small tolerances of error. This fact should aid materially in identification of Japanese projectiles.

(1) FRAGMENTS SOUGHT. Caliber is determined best from duds, next best from undeformed or little deformed fragments of low order bursts. Shell detonation tends to distort and stretch fragments; therefore, thick base sections, including rotating band grooves, are most informative and permit the speediest identification. With experience, however, caliber can be determined accurately from small fragments of high order bursts.

(2) ROTATING BANDS.

(a) Pattern of imprints, width, number, size of band or bands, dimensions of keying imprints within the groove or on the back of bands give very important indication as to caliber and type. Keying design is almost always conclusive as to nationality.

(b) The width of the imprint of the land plus that of the groove is an indication of caliber. This width, groove plus land, is termed "r" and may be found for each caliber shell by the following formula:

$$r = \frac{C\pi}{N} \qquad \text{or} \qquad C = \frac{rN}{\pi}$$

where C = caliber, N = number, and $\pi = 3.1416$. "r" is relatively constant throughout the life of the weapon. See figure 9.

(3) MARKINGS AND OPENINGS. On the body of the projectile itself or on fragments, bits of paint, stenciling, stampings, openings, thread counts, adapters, etc., are important clues to the properly trained and equipped investigator. See figure 9.

(4) FUZES. Fuzes and fuze fragments must be considered cautiously as the same fuze may be used with a number of different caliber shells. They can be made of different materials (aluminum, copper, brass, plastics, iron, steel, etc.) and have characteristic appearances, shapes, details, openings, and stampings.

(5) CRATERS. The size, width, and depth of the crater is some indication of caliber; however, this is generally unreliable.

20. NOMENCLATURE.

a. The Japanese ordinarily assign each different type of projectile a model number. Before 1926 the model number of weapons and equipment was indicated by the year of the reign in which the model was adopted. Since 1926 the model has been numbered from what is assumed to be the founding of the Japanese Empire.* The last two digits of this number are used up to the year 1940. Models adopted in 1940 are designated as "0" (zero). Models adopted in 1941 are designated "1," and so on.

b. A comparative table indicating the western year, the Japanese year, and the model number corresponding thereto follows:

Western Year	Japanese Year	Model No.
1926	2586	86
1927	2587	87
1928	2588	88
1929	2589	89
1930	2590	90
1931	2591	91
1932	2592	92
1933	2593	93
1934	2594	94
1935	2595	95
1936	2596	96
1937	2597	97
1938	2598	98
1939	2599	99
1940	2600	0
1941	2601	1
1942	2602	2
1943	2603	3
1944	2604	4
1945	2605	5

c. This method of assigning model numbers is in general use in both the Army and the Navy.

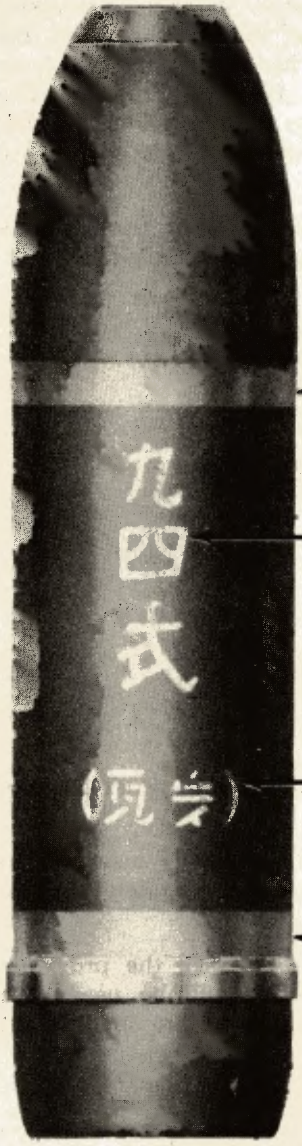
d. The caliber of Japanese ammunition is usually measured in centimeters. The Japanese refer to caliber approximately; for instance, a 75-mm gun is known as a 7 cm gun.

e. Model numbers assigned to artillery refer to the projectile only, as the same model number ammunition will be used with different cartridge cases and propelling charges to fire in different guns.

21. MARKINGS.

a. General. Although model numbers are assigned to projectiles, Japanese characters giving this model number are painted on the projectile only when there is a chance of confusion with similar projectiles. The same holds true for the model number of the gun from

*For a more detailed explanation of Japanese year dates, see TM E30-480 Handbook on Japanese Military Forces, dated 15 September 1944.



COLOR OF BAND INDICATES:
YELLOW = HE
NO BAND = BLACK POWDER
} OLD MARKING SYSTEM

MODEL NUMBER OF PROJECTILE *(STENCILED) (SHOWN ONLY IF THERE IS CHANCE OF CONFUSION WITH ANOTHER PROJECTILE)*

TYPE OF EXPLOSIVE *(MARKING SHOWN IS MIXTURE OF AMMONIUM NITRATE, GUANIDINE NITRATE, AND CYCLONITE. NO MARKING INDICATES TNT)*

COLOR OF BAND INDICATES:
WHITE = STEEL
GREEN = SEMI-STEEL
NO BAND = CAST IRON
} OLD MARKING SYSTEM

REFERENCE: 75-A-5

RA PD 103448

Figure 10—Markings on Japanese Projectiles

Figure 11—Markings on Japanese Projectiles—Contd.

which fired, which is painted on the cartridge case only when there is a chance of confusion with similar rounds. Japanese characters indicating the model number of the projectile and that of the gun from which fired are painted on the original ammunition crate.

b. Stenciling on the Projectile (figs. 10 and 11).

(1) WEIGHT CLASSIFICATION (USUALLY WHITE).

++ 1.5% to 2.5% overweight
+ 0.5% to 1.5% overweight
± Within 0.5% under and 0.5% overweight
— 0.5% to 1.5% underweight
— — 1.5% to 2.5% underweight.

(2) DATE OF FILLING (USUALLY WHITE). Two numbers separated by a dot. The first number indicates year Showa (add number to 1925 to convert to our calendar; for instance 14 year Showa would be 1939). The second number indicates the month (4 would be the 4th month or April).

(3) SYMBOL INDICATING ARSENAL OR DEPOT WHERE FILLED (USUALLY WHITE). Model number of projectile: (White) Occurs only when there is a chance of confusion with another projectile.

(4) SPECIAL SHELLS. For symbols used, see figure 12.

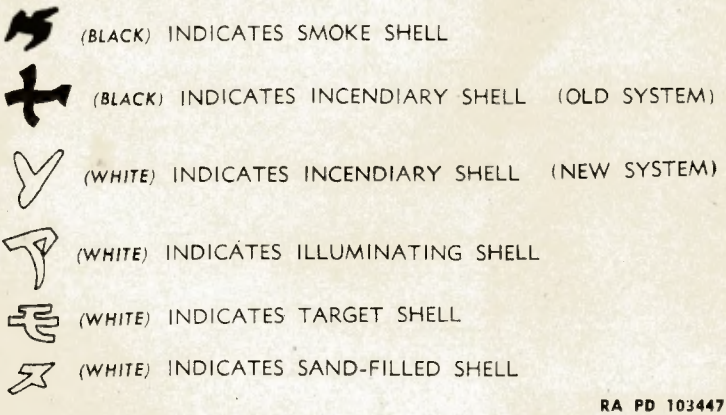


Figure 12—Japanese Symbols Indicating Type of Shell

c. Stampings on the Projectile.

(1) An unidentified number is stamped on the adapter and also on the body of the projectile just below the adapter.

(2) An inspection stamp, a symbol indicating place of manufacture of the shell body, and the date of manufacture, giving the month and year (Showa), are stamped in a row around the body of the projectile.

22. COLOR OF PROJECTILE.

a. Army.

(1) For all HE, APHE, hollow charge, and shrapnel projectiles, the body is painted black. Incendiary and gas projectiles are painted gray. Smoke projectiles (WP) in 75-mm have been recovered painted white, however others have been recovered in 150-mm painted black.

(2) Color bands indicate condition, type of projectile, and/or type of steel. Recently the Japanese simplified their system of color bands, omitting some of the bands. The old and new color system, referred to throughout the manual, refer to before and after this change in color bands. A red band at the nose indicates explosive filled in both the old and new system. In chemical shells, this band applies to the burster.

Old System

Yellow band at bourrelet	HE
White band at center of body	AP
Green band adjacent to white	Tracer
White band at rotating band	Steel
Green band at rotating band	Semi-steel

New System

Yellow band at center of body	HE steel
Green band at center of body	HE semi-steel
White band at center of body	AP tracer

b. Navy.

(1) The color scheme employed by the Navy indicates type of projectile by over-all body color.

Maroon	HE common (includes high capacity nose fuzed projectiles and solid base fuzed projectiles)
White	AP
Blue	Illuminating (reported)
Red	Illuminating (recovered in 14 cm)
Red	Shrapnel—incendiary (recovered in 12 cm AA)
Black	Practice (inert loaded)

(2) Color bands are used to give additional information.

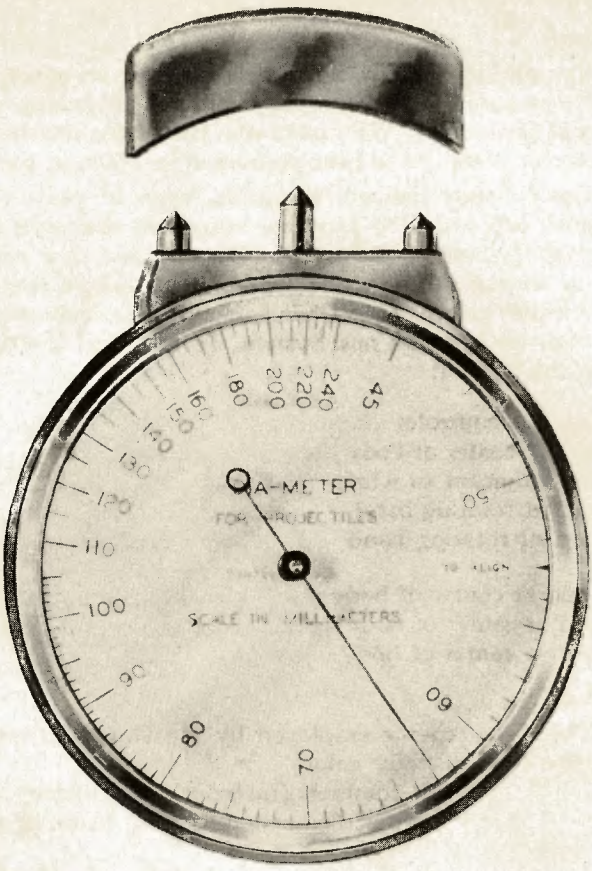
Green at nose	HE filled
Red tip on nose	Base fuzed
Band at center of body	Center of gravity

Section V

READY REFERENCE IDENTIFICATION SYSTEM

23. BASIS FOR THIS SYSTEM.

a. Any two shells of different caliber and type necessarily have certain differences in size and shape. Even shells of similar caliber



RA PD 103445

Figure 13—Dia-Meter

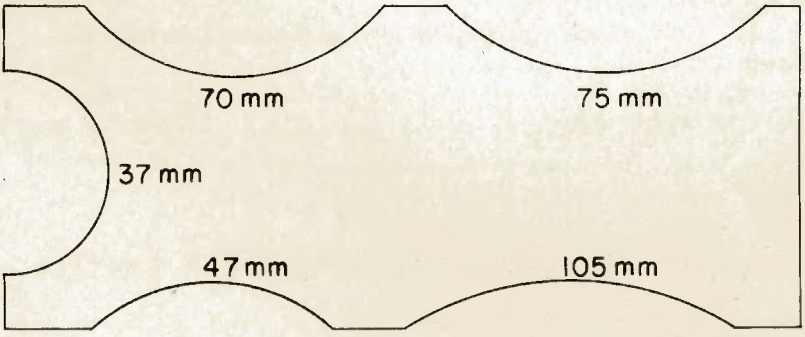


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Figure 14—Example of Template

and type may have great difference in some respect. By breaking down a shell into its significant or "critical" dimensions and characteristics, as shown in section VIII, and arranging these into a series of tables with columns for individual items, as in section VI, systematic elimination or selection is possible, resulting in the correct identification of a shell from a few clues from a small fragment or two.

24. TOOLS AND INSTRUMENTS.

a. List of Equipment.

RULE, steel, flexible, 12 inch (graduated in millimeters and inches —3-fold type). Alternative: RULE, steel, flexible, 6 inch (graduated in millimeters, in tenths, and in inches, hundredths, and sixty-fourths).

CALIPERS, firm-joint, outside, 8 inch. Alternative: CALIPERS, micrometer, outside, set.

DIA-METER (fig. 13). Alternative: TEMPLATE (fig. 14).

b. The Dia-Meter.

(1) Ordinarily, curvature or diameter of an undeformed shell fragment cannot be obtained except by special means. An instrument capable of measuring diameter from fragments is the Dia-Meter. The Dia-Meter is made by conversion of the Geneva Lens Measure. See figure 13.

(2) OPERATION. To measure diameter, press the plunger end firmly against the shell or undeformed fragment in a plane perpendicular to the actual or estimated vertical axis. Oscillate the instrument in the hand slightly and take the least reading, which will be the diameter. The shell or fragment should be smooth and free from dirt, and an average of several readings should be used.

c. Template.

(1) A simple template can be made in the field for the measurement of diameter of artillery shell fragments. It can be made from aluminum or other metal stock, stamped and milled to the desired segment diameters in millimeters by local ordnance facilities. It is illustrated in figure 14.

(2) USE. This device can differentiate between shells of fairly widely differing calibers, but is considerably less accurate than the Dia-Meter. However, its simplicity of construction and its ready procurement are definite advantages.

25. DESCRIPTION OF READY REFERENCE SECTION.

a. Ready Reference Section , Part Two, consists of tables, drawings, and shell descriptions. Tables are of critical shell characteristics and other identifying information arranged alphabetically by subject. The most significant characteristic in each table is listed in the first

column following the nomenclature (translated Japanese designation). A combination of the first three columns in each table gives the number of the drawing which illustrates any particular shell.

b. Drawings of shells are arranged by caliber and type. The type of shell is indicated by letters as follows:

Letter	Type of shell
A	HE
B	AP (including APHE)
C	Hollow charge
D	Shrapnel
E	Incendiary
F	Smoke
M	Mortar
R	Rocket

c. Different modifications of the same caliber and type are indicated by arabic numbers, thus the drawing of the first 70-mm HE shell is marked 70-A-1. A second HE shell in this caliber would be marked 70-A-2, etc. Each drawing shows enough of the exterior of the shell to give all of the known markings in addition to a cutaway view giving critical dimensions. All measurements are given in inches. Also listed, when known, are weapons and fuzes commonly used with each shell.

26. METHOD OF USE.

a. To identify a shell or shell fragment, turn to table giving details of any critical characteristics noted or dimension measured. Scanning appropriate column, check shells listed having characteristics 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 the first three columns in each table.

(1) EXAMPLE 1:

A shell fragment, including most of the base, has been recovered. Critical dimensions have been determined as follows:

	Inches
Diameter of base	2.62
Wall thickness at center of base	.83
Width of the one rotating band seat	.40
Wall thickness at lower edge of rotating band	.50

To use the tables for the above shell identification, proceed as follows:

(a) From the list of tables in the table of contents, you find that "Diameter" is on page 34. Turn to page 34, follow down the column headed "Base" until you come to 2.62. You see that two pro-

jectiles have a base diameter of 2.62 inches; 7 cm Model 94 HE and 7 cm Model 97 HE Semi-steel.

(b) Next, from the list of tables you find that "Wall Thickness" is on page 45. Turn to page 45. Follow down column headed "Center of Base" until you come to .83. This eliminates the projectile 7 cm Model 97 HE Semi-steel, and you are referred to page 75-A-5 for a drawing of the remaining projectile, 7 cm Model 94 HE. From this drawing you can see that the other two dimensions closely agree. The fragment thus is identified as from a 7 cm Model 94 HE projectile and weapons employing this projectile are listed.

(2) EXAMPLE 2:

Another shell fragment has been recovered. This fragment has been distorted by the burst so the measurements are not too accurate. Approximate dimensions have been determined as follows:

	Inches
Two rotating band seats-width of each	.42
Distance between rotating band seats	.25
Length from band to bourrelet	2.33
Surface length bourrelet to nose	4.05

(a) Using the list of tables as described above, turn to "Rotating Band and Seat," page 42, follow down the column headed "Width of Rotating Band Seat" until you come to 42. There is no projectile listed opposite .42. Knowing that the measurement of .42 is not accurate, look for those having a width of rotating band seat close to .42 and that have two bands. There are two projectiles, 7 cm Model 90 HE Pointed AA (75-A-1) and 7 cm Model 90 Pointed (75-A-2).

(b) Next, using the list of tables, turn to "Ogive," page 40, scan down the column headed Surface Length Bourrelet to Nose, looking for the figure 4.05. The figure 4.02 opposite 7 cm Model 90 HE Pointed AA (75-A-1) is the only one reasonably close. Turning to page 75-A-1, it is noted from the drawing that the other dimension closely agrees. Thus the fragment is identified as the 7 cm Model 90 HE Pointed AA.

27. SPECIAL SECTION ON ROTATING BAND SEAT FRAGMENTS.

a. Field experience has shown that the fragment most frequently found is that of the seat just under the rotating band. Therefore, plates showing actual size of this portion of the shell only, are shown on pages 48 to 57 inclusive. If a fragment of the rotating band seat is found, first turn to these plates where it may be possible to make positive identification of the shell by matching the fragment with the drawings, thus avoiding reference to other tables or drawings. Note that projectiles of different calibers often use the same type of band seat and that the drawings in this section are arranged by type of band seat, all known projectiles having the same type being grouped together.

Form "A" Individual

SHELLING REPORT

(Use for Artillery, Mortars, and Rockets)

Date .....

(A) Who reporting ..... Time .....

(B) Your map location .....

(C) Estimated direction (Y-azimuth) of enemy guns by crater, flash, smoke, sound (tell which) .....

(D) Estimated distance or location of guns, or slope of fall (averaged) .....

(E) Coordinates of shell area ..... Or direction (Y-azimuth) and estimated distance from you .....

(F) Time shelling started ..... (G) Ended .....

(H) Number and type caliber of guns firing .....

(I) Number of shells; type of fire (time, rico, perc) .....

(J) Nature of shelling ..... (CB, Regist., Harassing, OP, Neut., (Preparation), (Interdiction).

(K) Damage (NEVER send by radio "in the clear") .....

(L) Flash-bang (time interval between flash and gun sound) .....

(M) Remarks (Include anything special you note) .....

HELP YOUR ARTILLERY KNOCK OUT THE ENEMY'S BY GETTING THIS, COMPLETE AS POSSIBLE, TO HEADQUARTERS IMMEDIATELY AND ACCURATELY.

SHELLING REPORT

Form "B"

Received by_____ Date_____ Organization_____

A	B	C	D	E	F	G	H	I	J	K	L	M
Reported by (Time)	Map Location of Obsvr.	Direction by Flash, Sound, or Furrow	Distance or Location; Slope of Fall	Area Being Shelled	Time From	Time to	No. Cal. and Type of Guns	No. and Type of Shells	Nature of Fires*	Damage †	Flash-Bang Seconds	Remarks

*CB, Regist., Harassing, O.P. Neut., Inf. Neut. (Preparation) Interdiction.

†WILL NEVER be sent "in the clear" by radio.

Section VI

TABLES

28. BASE PLUG.

Drawing Nos.			Japanese Designation (Translation)	Diameter	Length of Plug	Length of Threaded Portion
Caliber	Type Shell	No. in Series				
81	M	1	8 cm Model 100 HE Mortar	1.22	3.60	.51
81	M	2	8 cm Model 98 HE Mortar	1.22	3.60	.51
81	M	3	8 cm HE Mortar [Naval]	1.22	3.75	.78
90	M	1	9 cm Model 94 HE Mortar	1.34	4.54	.60
90	M	2	9 cm HE Mortar Semi-Steel	1.34	4.54	.60
75	B	1	7 cm Model 1 APHE	1.58	1.88	1.43
150	M	1	15 cm Model 96 HE Mortar	2.12	8.93	1.00
76	A	1	8 cm HE AA [Naval]	2.45	1.19	.98
76	A	2	8 cm HE [Naval]	2.47	1.30	1.09
120	A	2	12 cm HE [Naval]	3.60	1.76	1.39
127	A	1	127 mm HE AA [Naval]	3.82	1.93	1.50
120	A	3	12 cm HE [Naval]	3.95	1.62	1.38
140	A	2	14 cm HE [Naval]	4.37		
140	A	3	14 cm HE-Capped [Naval]	4.39	2.01	1.65
140	A	1	14 cm HE [Naval]	4.62		

29. BOATTAIL.

Drawing No.			Japanese Designation (Translation)	Surface Length Sloping Wall	Perpendicular Length Sloping Wall	Diameter of Base
Caliber	Type Shell	No. in Series				
75	B	1	7 cm Model 1 APHE	.53	.52	2.65
75	A	5	7 cm Model 94 HE	.77	.75	2.62
75	A	6	7 cm Model 97 HE Semi-Steel	.77	.75	2.62
88	A	1	8 cm Model 100 HE Pointed AA	1.21	1.19	3.11
75	A	3	7 cm Model 90 HE Pointed	1.43	1.41	2.65
75	A	4	7 cm Model 90 HE Pointed	1.43	1.41	2.65
75	A	1	7 cm Model 90 HE Pointed AA	1.45	1.42	2.62
75	A	2	7 cm Model 90 HE Pointed	1.45	1.42	2.65
105	A	1	10 cm Model 91 HE Pointed	2.08	2.05	3.41

30. BOURRELET.

Drawing No.			Japanese Designation (Translation)	Diameter	Width Bourrelet Band	Distance Rotating Band to Bourrelet	Distance Bourrelet to Nose
Caliber	Type Shell	No. in Series					
70	A	1	7 cm Model 92 HE	2.74		4.43	2.92
75	A	1	7 cm Model 90 HE Pointed AA	2.94	.60	2.30	4.02
75	A	2	7 cm Model 90 HE Pointed	2.94	.60	2.30	5.22
75	A	3	7 cm Model 90 HE Pointed	2.94	.60	5.31	5.22
75	A	4	7 cm Model 90 HE Pointed	2.94		2.91	5.82
75	A	5	7 cm Model 94 HE	2.93		6.41	3.31
75	A	6	7 cm Model 97 HE Semi-Steel	2.94			
75	A	7	7 cm Model 98 Modified HE	2.94		5.28	3.75
75	A	8	75 mm HE [Dutch Bofors]	2.94		5.04	2.49
75	B	1	7 cm Model 1 APHE	2.94			
75	C	1	7 cm Model 2 Hollow Charge	2.94			
75	D	1	7 cm Model 90 Shrapnel	2.94		5.24	1.92
75	D	2	2.95 inch Shrapnel [U. S.]	2.94		4.72	.70
75	E	1	7 cm Incendiary	2.94		6.47	2.80
75	F	1	7 cm Model 90 Smoke (WP)	2.94		5.96	3.30
76	A	1	8 cm HE AA [Naval]	2.98		3.81	3.70
76	A	2	8 cm HE [Naval]	2.98			
81	M	1	8 cm Model 100 HE Mortar	3.17			1.41
81	M	2	8 cm Model 98 HE Mortar	3.17			1.41
81	M	3	8 cm HE Mortar [Naval]	3.18			1.49
88	A	1	8 cm Model 100 HE Pointed AA	3.44		2.77	5.33
90	M	1	9 cm Model 84 HE Mortar	3.53			2.69
90	M	2	9 cm HE Mortar Semi-Steel	3.53			2.19
105	A	1	10 cm Model 91 HE Pointed	4.12	.80	5.88	7.64
105	A	2	10 cm Model 91 HE	4.12		9.03	5.16
120	A	1	12 cm HE AA [Naval]	4.69		3.15	7.26
120	A	2	12 cm HE [Naval]	4.70		4.20	7.20
120	A	3	12 cm HE [Naval]	4.70			
127	A	1	127 mm HE AA [Naval]	4.98		1.80	9.45
140	A	1	14 cm HE [Naval]			7.44	7.63
140	A	2	14 cm HE [Naval]	5.50		7.44	11.19
140	A	3	14 cm HE-Capped [Naval]	5.48		6.75	9.47
150	A	1	15 cm Model 92 HE	5.83		11.57	7.95
150	F	1	15 cm Model 13 Smoke (WP)	5.87		8.85	8.02
150	M	1	15 cm Model 96 HE Mortar	5.90			5.60
200	R	1	20 cm HE Rocket [Naval]	7.96			

31. CANNELURES (Grooves).

Drawing No.			Japanese Designation (Translation)	Number	Width	Distance from Base
Caliber	Type Shell	No. in Series				
75	B	1	7 cm Model 1 APHE	1	.30	.80
75	D	1	7 cm Model 90 Shrapnel	1	.34	.82
76	A	1	8 cm HE AA [Naval]	1	.18	.46
120	A	1	12 cm HE AA [Naval]	1	.32	.83
127	A	1	127 mm HE AA [Naval]	1	.32	.64
88	A	1	8 cm Model 100 HE Pointed AA	2	.25	1.38

32. DIAMETER (External).

Drawing No.			Japanese Designation (Translation)	Base	Bourrelet	Nose (Excluding Adapter)
Caliber	Type Shell	No. in Series				
81	M	1	8 cm Model 100 HE Mortar	1.22	3.17	2.00
81	M	2	8 cm Model 98 HE Mortar	1.22	3.17	2.00
90	M	2	9 cm HE Mortar Semi-Steel	1.25	3.53	
90	M	1	9 cm Model 94 HE Mortar	1.27	3.53	1.94
81	M	3	8 cm HE Mortar [Naval]	1.36	3.18	2.21
150	M	1	15 cm Model 96 HE Mortar	2.09	5.90	2.42
75	A	1	7 cm Model 90 HE Pointed AA	2.60	2.94	2.11
75	A	5	7 cm Model 94 HE	2.62	2.93	1.66
75	A	6	7 cm Model 97 HE Semi-Steel	2.62	2.94	1.66
75	A	2	7 cm Model 90 HE Pointed	2.65	2.94	1.70
75	A	3	7 cm Model 90 HE Pointed	2.65	2.94	1.70
75	A	4	7 cm Model 90 HE Pointed	2.65	2.94	1.70
75	B	1	7 cm Model 1 APHE	2.65	2.94	
70	A	1	7 cm Model 92 HE	2.73	2.74	1.66
75	A	7	7 cm Model 98 Modified HE	2.92	2.94	1.25
75	A	8	75 mm HE [Dutch Bofors]	2.92	2.93	2.72
75	C	1	7 cm Model 2 Hollow Charge	2.92	2.94	1.25
75	D	1	7 cm Model 90 Shrapnel	2.92	2.94	2.60
75	E	1	7 cm Incendiary	2.92	2.94	2.03
75	F	1	7 cm Model 90 Smoke (WP)	2.92	2.94	1.66
75	D	2	2.95 inch Shrapnel [U. S.]	2.93	2.94	2.85
76	A	1	8 cm HE AA [Naval]	2.96	2.98	2.11
76	A	2	8 cm HE [Naval]	2.98	2.98	1.78
88	A	1	8 cm Model 100 HE Pointed AA	3.11	3.44	2.36
105	A	1	10 cm Model 91 HE Pointed	3.41	4.12	1.90
105	A	2	10 cm Model 91 HE	4.09	4.12	1.66
120	A	1	12 cm HE AA [Naval]	4.68	4.69	2.28
120	A	2	12 cm HE [Naval]	4.69	4.70	2.31
120	A	3	12 cm HE]Naval]	4.69	4.70	
127	A	1	127 mm HE AA [Naval]	4.96	4.98	2.31
140	A	3	14 cm HE-Capped [Naval]	5.46	5.48	
140	A	1	14 cm HE [Naval]	5.47		2.31
150	F	1	15 cm Model 13 Smoke (WP)	5.80	5.87	1.72
150	A	1	15 cm Model 92 HE	5.81	5.83	1.66
200	R	1	20 cm HE Rocket [Naval]	7.27	7.96	2.30
140	A	2	14 cm HE [Naval]		5.50	

33. FINS.

DRAWING NO.			Japanese Designation (Translation)	Number of Fins	Maximum Diameter of Fins	Thickness of Fins	Number Rows of Holes
Caliber	Type Shell	No. in Series					
81	M	1	8 cm Model 100 HE Mortar	6	3.16	.08	3
81	M	2	8 cm Model 98 HE Mortar	6	3.16	.08	3
90	M	1	9 cm Model 94 HE Mortar	6	3.52	.08	4
90	M	2	9 cm HE Mortar Semi-Steel	6	3.52	.08	4
150	M	1	15 cm Model 96 HE Mortar	6	5.85	.12	5
81	M	3	8 cm HE Mortar [Naval]	12	3.18	.06	3

34. FUZE.

Drawing No.			Japanese Designation (Translation)	Type	Location	Metal	Length	Maximum Diameter
Caliber	Type Shell	No. in Series						
70	A	1	7 cm Model 92 HE	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	1	7 cm Model 90 HE Pointed AA	Model 89 Time	Nose	Brass	3.79	2.10
75	A	2	7 cm Model 90 HE Pointed	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	3	7 cm Model 90 HE Pointed	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	4	7 cm Model 90 HE Pointed	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	5	7 cm Model 94 HE	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	6	7 cm Model 97 HE Semi-Steel	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	7	7 cm Model 98 Modified HE	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
75	A	8	75 mm HE [Dutch Bofors]	Selective -Super-Quick or Short Delay	Nose	Brass	3.00	2.25
75	B	1	7 cm Model 1 APHE	Model 1 Medium Short Delay	Base	Steel	1.88	2.05
75	C	1	7 cm Model 2 Hollow Charge	Model 88 Instant.	Nose	Brass or Steel	2.83	1.25
75	D	1	7 cm Model 90 Shrapnel	Model 5 Combination	Nose	Brass	2.90	2.59
75	D	2	2.95 inch Shrapnel [U. S.]	07 21 second comb.	Nose	Brass	2.56	2.38
75	E	1	7 cm Incendiary	Model 88 Instant.	Nose	Brass or Steel	2.83	1.25
75	F	1	7 cm Model 90 Smoke (WP)	Model 88 Instant.	Nose	Brass or Steel	2.83	1.25
76	A	1	8 cm HE AA [Naval]	Navy Powder Time	Nose	Brass	3.79	2.10
76	A	2	8 cm HE [Naval]	Navy Model 5	Nose	Brass	1.88	1.77
81	M	1	8 cm Model 100 HE Mortar	Model 100 Mortar Fuze	Nose	Brass	2.07	1.26
81	M	2	8 cm Model 98 HE Mortar	Model 93 Mortar Fuze	Nose	Brass	2.07	1.25
81	M	3	8 cm HE Mortar [Naval]	Navy Mortar Fuze	Nose	Brass	2.70	1.34

88	A	1	8 cm Model 100 HE Pointed AA	Model 100 Mechanical Time and Percussion	Nose	Aluminum	4.37	2.36
90	M	1	9 cm Model 94 HE Mortar	Model 93 Mortar Fuze	Nose	Brass	2.07	1.25
90	M—	2	9 cm HE Mortar Semi-Steel	Model 93 Mortar Fuze	Nose	Brass	2.07	1.25
105	A	1	10 cm Model 91 HE Pointed	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
105	A	2	10 cm Model 91 HE	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
120	A	1	12 cm HE AA [Naval]	Navy Model 91 Series	Nose	Stainless Steel	2.99	2.30
120	A	2	12 cm HE [Naval]	Navy Model 88	Nose	Brass	3.2	2.3
120	A	3	12 cm HE [Naval]	Navy Model 3	Base	Brass & Aluminum	5.31	1.55
127	A	1	127 mm HE AA [Naval]	Navy Model 91 Series	Nose	Stainless Steel	2.99	2.30
140	A	1	14 cm HE [Naval]	Navy Model 88	Nose	Brass	3.2	2.3
140	A	2	14 cm HE [Naval]	Navy Fuze	Base	Steel		3.00
140	A	3	14 cm HE-Capped [Naval]	Navy Fuze	Base	Steel		3.00
150	A	1	15 cm Model 92 HE	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
150	F	1	15 cm Model 13 Smoke (WP)	Model 88 Instant. Model 88 Short Delay	Nose	Brass or Steel	2.83	1.25
150	M	1	15 cm Model 96 HE Mortar	Model 93 Mortar Fuze	Nose	Brass	2.07	1.25
200	R	1	20 cm HE Rocket [Naval]	Rocket Fuze	Nose	Steel	2.87	1.29

35. LENGTH.

Drawing No.			Japanese Designation (Translation)	Base to Band Lower Edge	Band to Bourrelet	Bourrelet to Nose (Excluding Adapter)	Base to Bourrelet	Total Unfuzed	Total Fuzed
Caliber	Type Shell	No. in Series							
76	A	2	8 cm HE [Naval]	.44				9.90	11.00
140	A	1	14 cm HE [Naval]	.56	7.44	8.82	10.63	19.44	21.62
140	A	2	14 cm HE [Naval]	.56	7.44	11.19	10.62	21.81	21.81
140	A	3	14 cm HE-Capped [Naval]	.60	7.10	9.47	10.27	21.72	21.72
76	A	1	8 cm HE AA [Naval]	.76	3.81	3.70	5.57	9.27	12.64
120	A	2	12 cm HE [Naval]	.80	4.20	7.20	6.97	14.17	16.35
75	C	1	7 cm Model 2 Hollow Charge	.96	5.84	2.23	7.20	9.43	11.73
70	A	1	7 cm Model 92 HE	1.09	4.43	2.92	5.92	9.21	11.51
75	D	2	2.95 inch Shrapnel [U. S.]	1.20	4.72	.70	5.95	7.95	9.69
120	A	3	12 cm HE [Naval]	1.20				16.39	16.39
127	A	1	127 mm HE AA [Naval]	1.28	2.12	9.45		14.85	17.22
105	A	2	10 cm Model 91 HE	1.37	9.03	5.16	11.27	16.81	19.11
75	A	5	7 cm Model 94 HE	1.49	6.41	3.31	8.31	11.98	14.28
75	A	7	7 cm Model 98 Modified HE	1.50	5.28	3.75	7.18	10.93	13.23
75	E	1	7 cm Incendiary	1.50	6.47	2.80	8.37	11.94	14.24
75	A	8	75 mm HE [Dutch Bofors]	1.51	5.04	2.49	7.14	10.62	13.35
75	F	1	7 cm Model 90 Smoke (WP)	1.52	5.96	3.30	7.04	11.55	13.85
75	D	1	7 cm Model 90 Shrapnel	1.53	5.24	1.92	7.17	9.21	11.54
75	B	1	7 cm Model 1 APHE	1.54				9.32	10.28
75	A	6	7 cm Model 97 HE Semi-Steel	1.55				10.73	12.03
120	A	1	12 cm HE AA [Naval]	1.58	3.15	7.26	6.71	13.97	16.34
150	A	1	15 cm Model 92 HE	1.60	11.57	7.95	13.99	22.31	24.61
150	F	1	15 cm Model 13 Smoke (WP)	1.60	8.85	8.02	11.05	19.44	21.74
75	A	1	7 cm Model 90 HE Pointed AA	2.17	2.30	4.02	5.52	10.15	13.51
75	A	2	7 cm Model 90 HE Pointed	2.20	2.30	5.22	5.52	12.56	14.86
75	A	3	7 cm Model 90 HE Pointed	2.20	5.31	5.22	5.51	12.56	14.86
75	A	4	7 cm Model 90 HE Pointed	2.20	2.91	5.82	5.51	12.56	14.86
88	A	1	8 cm Model 100 HE Pointed AA	2.53	2.77	5.33	6.51	11.84	16.21
105	A	1	10 cm Model 91 HE Pointed	3.08	5.88	7.64	9.83	19.74	22.04
81	M	1	8 cm Model 100 HE Mortar			1.41	5.29	11.54	13.07
81	M	2	8 cm Model 98 HE Mortar			1.41	5.29	11.39	12.92
81	M	3	8 cm HE Mortar [Naval]			1.49	5.51	11.21	13.41
90	M	1	9 cm Model 94 HE Mortar			2.69	7.48	15.82	17.35
90	M	2	9 cm HE Mortar Semi-Steel			2.19	6.16	14.28	15.81
150	M	1	15 cm Model 96 HE Mortar			5.60	13.10	29.32	30.85
200	R	1	20 cm HE Rocket [Naval]					40.8	42.7

36. NOSE.

Drawing No.			Japanese Designation (Translation)	Diameter	Wall Thickness Bottom of Threads	Length of Threaded Portion	Number of Threads
Caliber	Type Shell	No. in Series					
75	A	7	7 cm Model 98 Modified HE	1.25	.34	.66	8½
75	C	1	7 cm Model 2 Hollow Charge	1.25	.50	.60	6
70	A	1	7 cm Model 92 HE	1.66	.44	.77	9½
75	A	5	7 cm Model 94 HE	1.66	.48	.75	8½
75	A	6	7 cm Model 97 HE Semi-Steel	1.66	.48	.75	8½
75	F	1	7 cm Model 90 Smoke (WP)	1.66	.45	.75	9½
105	A	2	10 cm Model 91 HE	1.66	.70	.77	9½
150	A	1	15 cm Model 92 HE	1.66	.65	.77	9½
75	A	2	7 cm Model 90 HE Pointed	1.70	.35	.59	7
75	A	3	7 cm Model 90 HE Pointed	1.70	.35	.59	7
75	A	4	7 cm Model 90 HE Pointed	1.70	.35	.59	7
150	F	1	15 cm Model 13 Smoke (WP)	1.72	.57	.55	6
76	A	2	8 cm HE [Naval]	1.78	.44	.75	9
105	A	1	10 cm Model 91 HE Pointed	1.90	.32	.56	5
90	M	1	9 cm Model 94 HE Mortar	1.94	.18	.45	6
81	M	1	8 cm Model 100 HE Mortar	2.00	.39	.46	6
81	M	2	8 cm Model 98 HE Mortar	2.00	.39	.46	6
75	E	1	7 cm Incendiary	2.03	.45	.56	5½
75	A	1	7 cm Model 90 HE Pointed AA	2.11	.35	.98	11
76	A	1	8 cm HE AA [Naval]	2.11	.52	.80	8½
81	M	3	8 cm HE Mortar [Naval]	2.21			7½
120	A	1	12 cm HE AA [Naval]	2.28	.76	1.14	10½
200	R	1	20 cm HE Rocket [Naval]	2.30	1.00	1.15	11
120	A	2	12 cm HE [Naval]	2.31	.65	.63	7
127	A	1	127 mm HE AA [Naval]	2.31	.70	1.14	11
140	A	1	14 cm HE [Naval]	2.31		1.19	
88	A	1	8 cm Model 100 HE Pointed AA	2.36	.42	.98	10
150	M	1	15 cm Model 96 HE Mortar	2.42	1.41	1.52	17
75	D	1	7 cm Model 90 Shrapnel	2.67	.20		
75	A	8	75 mm HE [Dutch Bofors]	2.72	.28	.84	6½
75	D	2	2.95 inch Shrapnel [U. S.]	2.85	.13	.25	5

37. OGIVE.

Drawing No.			Japanese Designation (Translation)	Surface Length Bourrelet to Nose	Perpendicular Length Bourrelet to Nose	Surface Length Screw-on Section	Diameter at Base Screw-on Section
Caliber	Type Shell	No. in Series					
75	D	2	2.95 inch Shrapnel [U. S.]	.70	.70		2.85
81	M	1	8 cm Model 100 HE Mortar	1.56	1.41		
81	M	2	8 cm Model 98 HE Mortar	1.56	1.41		
81	M	3	8 cm HE Mortar [Naval]	1.63	1.49		
75	D	1	7 cm Model 90 Shrapnel	1.95	1.92		
75	A	8	75 mm HE [Dutch Bofors]	2.50	2.49	1.00	2.72
75	E	1	7 cm Incendiary	2.85	2.80		
90	M	1	9 cm Model 94 HE Mortar	2.85	2.19		
70	A	1	7 cm Model 92 HE	3.00	2.92		
75	F	1	7 cm Model 90 Smoke (WP)	3.40	3.30	4.24	2.92
75	A	5	7 cm Model 94 HE	3.44	3.31		
76	A	1	8 cm HE AA [Naval]	3.74	3.70		
75	A	7	7 cm Model 98 Modified HE	3.97	3.75	2.02	2.66
75	A	1	7 cm Model 90 HE Pointed AA	4.03	4.02		
75	A	2	7 cm Model 90 HE Pointed	5.27	5.22		
75	A	3	7 cm Model 90 HE Pointed	5.27	5.22		
105	A	2	10 cm Model 91 HE	5.37	5.16		
88	A	1	8 cm Model 100 HE Pointed AA	5.38	5.33		
75	A	4	7 cm Model 90 HE Pointed	5.87	5.82		
150	M	1	15 cm Model 96 HE Mortar	6.02	5.60		
120	A	2	12 cm HE [Naval]	7.32	7.20		
120	A	1	12 cm HE AA [Naval]	7.37	7.26		
105	A	1	10 cm Model 91 HE Pointed	7.67	7.64		
150	A	1	15 cm Model 92 HE	8.35	7.95		
150	F	1	15 cm Model 13 Smoke (WP)	8.44	6.78		
127	A	1	127 mm HE AA [Naval]	9.57	9.45		
140	A	3	14 cm HE-Capped [Naval]	10.05	9.47		
140	A	1	14 cm HE [Naval]		7.63		
140	A	2	14 cm HE [Naval]		11.19		
90	M	2	9 cm HE Mortar Semi-Steel		2.19		
75	C	1	7 cm Model 2 Hollow charge			2.44	2.91

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38. ROTATING BAND AND SEAT.

Drawing No.			(Translation) Japanese Designation	Width of Rotating Band Seat	Type Band Seat (fig. 15)	Depth of Seat	Number of Bands	Distance Between Rotating Band Seats	Number of Knurlings Per Inch Under Band	Length of Knurling	Base to Band Lower Edge
Caliber	Type Shell	No. in Series									
70	A	1	7 cm Model 92 HE	.40	A	.08	1		17	.25	1.09
75	A	1	7 cm Model 90 HE Pointed AA	.40	B	.08	2*	.25	17	.25	2.17
75	A	2	7 cm Model 90 HE Pointed	.40	B	.08	2*	.25	17	.25	2.20
75	A	3	7 cm Model 90 HE Pointed	.40	A	.08	1*		17	.25	2.20
75	A	4	7 cm Model 90 HE Pointed	.40	A	.08	1		17	.25	2.20
75	A	5	7 cm Model 94 HE	.40	A	.08	1		17	.25	1.49
75	A	6	7 cm Model 97 HE Semi-Steel	.40	A	.08	1		17	.25	1.55
75	A	7	7 cm Model 98 Modified HE	.40	A	.08	1		17	.25	1.50
75	B	1	7 cm Model 1 APHE	.40	D	.08	1		12½	.18	1.54
75	C	1	7 cm Model 2 Hollow Charge	.40	A	.08	1		17	.25	.96
75	D	1	7 cm Model 90 Shrapnel	.40	A	.08	1		17	.25	1.53
75	E	1	7 cm Incendiary	.40	A	.08	1		17	.25	1.50
75	F	1	7 cm Model 90 Smoke (WP)	.40	A	.08	1		17	.25	1.52
88	A	1	8 cm Model 100 HE Pointed AA	.49	E	.13	2	.23	8½	.21	2.53
75	D	2	2.95 inch Shrapnel [U. S.]	.53	C	.08	1		25	.37	1.20
75	A	8	75 mm HE [Dutch Bofors]	.59	F	.08	1				1.51
150	F	1	15 cm Model 13 Smoke (WP)	.60	A	.15	1		18	.37	1.60
150	A	1	15 cm Model 92 HE	.82	A	.12	1		17	.55	1.60
105	A	1	10 cm Model 91 HE Pointed	.86	F	.12	1*				3.08
105	A	2	10 cm Model 91 HE	.86	F	.12	1				1.37
200	R	1	20 cm HE Rocket	.98	H						
76	A	1	8 cm HE AA [Naval]	1.00	H	.06	1				.76
76	A	2	8 cm HE [Naval]	1.00	G	.06	1				.44
140	A	2	14 cm HE [Naval]	1.12			2	.38			.56
140	A	3	14 cm HE-Capped [Naval]	1.12	I	.10	2	.33			.60
140	A	1	14 cm HE [Naval]	1.13			2	.37			.56
120	A	3	12 cm HE [Naval]	1.25	G	.10	1				1.20
120	A	2	12 cm HE [Naval]	1.97	J	.09	1				.80
120	A	1	12 cm HE AA [Naval]	1.98	J	.10	1				1.58
127	A	1	127 mm HE AA [Naval]	2.00	J	.11	1				1.28

*CAUTION: This shell also has a bourrelet band.

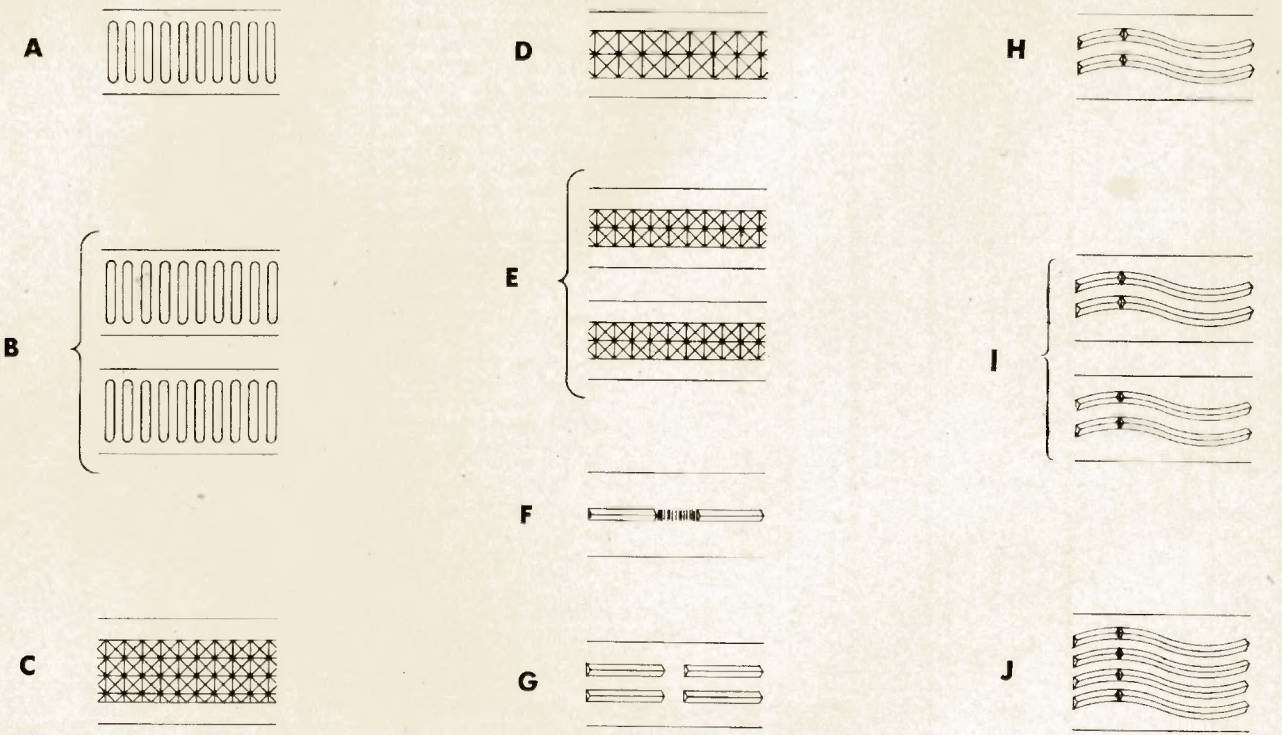


Figure 15—Type Band Seat (Column 6, "Rotating Band and Seat")

39. THREAD COUNT.

Caliber	Drawing No. Type Shell	Drawing No. No. in Series	Japanese Designation (Translation)	Fuze Pocket	Adapter Pocket	Screw-on Portion of Ogive	Base Plug
75	D	1	7 cm Model 90 Shrapnel	3			
75	A	8	75 mm HE [Dutch Bofors]	4½	6½		
75	C	1	7 cm Model 2 Hollow Charge	6		7	
81	M	1	8 cm Model 100 HE Mortar	7	6		4
81	M	2	8 cm Model 98 HE Mortar	7	6		6
90	M	1	9 cm Model 94 HE Mortar	7	6		9
120	A	2	12 cm HE [Naval]	7			10½
150	M	1	15 cm Model 96 HE Mortar	7	17		7
75	A	2	7 cm Model 90 HE Pointed	8	7		
75	A	3	7 cm Model 90 HE Pointed	8	7		
75	A	4	7 cm Model 90 HE Pointed	8	7		
81	M	3	8 cm HE Mortar [Naval]	8	7½		11
105	A	1	10 cm Model 91 HE Pointed	8	5		
105	A	2	10 cm Model 91 HE	8	9½		
70	A	1	7 cm Model 92 HE	8½	9½		
75	A	5	7 cm Model 94 HE	8½	8½		
75	A	6	7 cm Model 97 HE Semi-Steel	8½	8½		
75	A	7	7 cm Model 98 Modified HE	8½		5½	
75	E	1	7 cm Incendiary	8½	5½		
75	F	1	7 cm Model 90 Smoke (WP)	8½	9½	4½	
76	A	1	8 cm HE AA [Naval]	8½			10½
150	A	1	15 cm Model 92 HE	8½	9½		
150	F	1	15 cm Model 13 Smoke (WP)	8½	6	7	
76	A	2	8 cm HE [Naval]	9			12½
75	D	2	2.95 inch Shrapnel [U. S.]	10	5		
88	A	1	8 cm Model 100 HE Pointed AA	10			
120	A	1	12 cm HE AA [Naval]	10½			
75	A	1	7 cm Model 90 HE Pointed AA	11			
127	A	1	127 mm HE AA [Naval]	11			10½
200	R	1	20 cm HE Rocket [Naval]	11			8
75	B	1	7 cm Model 1 APHE				16
120	A	3	12 cm HE [Naval]				10½
140	A	3	14 cm HE-Capped [Naval]				12

40. WALL THICKNESS.

Drawing No.			Japanese Designation (Translation)	Center of Base	Upper Edge of Rotating Band	Lower Edge of Rotating Band	Bourrelet	Bottom of Threading at Nose
Caliber	Type Shell	No. in Series						
75	D	2	2.95 inch Shrapnel [U. S.]	.30	.22	.37	.22	.13
75	A	7	7 cm Model 98 Modified HE	.38	.41	.41	.17	.34
75	D	1	7 cm Model 90 Shrapnel	.39	.39	.41	.15	.20
75	E	1	7 cm Incendiary	.55	.38	.37	.33	.45
70	A	1	7 cm Model 92 HE	.57	.36	.38	.21	.44
75	F	1	7 cm Model 90 Smoke (WP)	.58	.37	.36	.34	.33
75	C	1	7 cm Model 2 Hollow Charge	.64	.41	.52	.27	.31
76	A	1	8 cm HE AA [Naval]	.65	.52		.52	.52
75	A	8	75 mm HE [Dutch Bofors]	.70	.46		.42	.28
120	A	3	12 cm HE [Naval]	.75	.69			
75	A	5	7 cm Model 94 HE	.83	.49	.50	.37	.48
105	A	2	10 cm Model 91 HE	.83	.63	.63	.53	.70
150	A	1	15 cm Model 92 HE	.86	.80	.83	.57	.65
140	A	3	14 cm HE-Capped [Naval]	.92	.92		.97	
88	A	1	8 cm Model 100 HE Pointed AA	.95	.53	.51	.54	.42
120	A	2	12 cm HE [Naval]	.97	.88		.88	.65
150	F	1	15 cm Model 13 Smoke (WP)	1.20	.69	.69	.64	.57
75	A	6	7 cm Model 97 HE Semi-Steel	1.23	.92	1.02	.47	.48
127	A	1	127 mm HE AA [Naval]	1.29	.90		.91	.70
76	A	2	8 cm HE [Naval]	1.30	.42		.42	.44
75	A	1	7 cm Model 90 HE Pointed AA	1.35	.59	.62	.44	.35
75	A	2	7 cm Model 90 HE Pointed	1.42	.59		.44	.35
75	A	3	7 cm Model 90 HE Pointed	1.42	.59	.59	.44	.35
75	A	4	7 cm Model 90 HE Pointed	1.42	.59	.59	.44	.35
105	A	1	10 cm Model 91 HE Pointed	1.42	.61	.61	.48	.32
120	A	1	12 cm HE AA [Naval]	1.51	.89		.86	.76
200	R	1	20 cm HE Rocket [Naval]	2.75	.47	.37	.47	.84
75	B	1	7 cm Model 1 APHE		.70	.68		
81	M	1	8 cm Model 100 HE Mortar				.33	.39
81	M	2	8 cm Model 98 HE Mortar				.33	.39
81	M	3	8 cm HE Mortar [Naval]				.33	
90	M	1	9 cm Model 94 HE Mortar				.18	
90	M	2	9 cm HE Mortar Semi-Steel				.42	
140	A	1	14 cm HE [Naval]		.98		1.00	
140	A	2	14 cm HE [Naval]		.98		1.00	
150	M	1	15 cm Model 96 HE Mortar				.38	1.31

Section VII
WEAPONS CHARACTERISTICS CHART

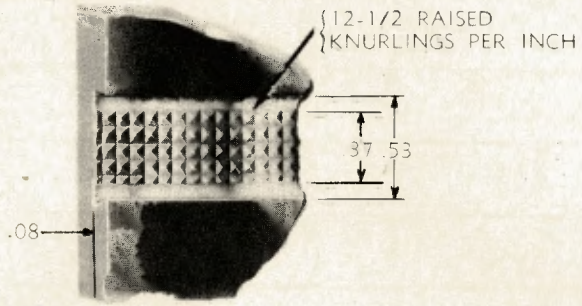
Caliber	Type	Nomenclature	Maximum Range			Weight of Shell	Rate of Fire	Maximum Elevation	Maximum Depression	Traverse	Transport	Remarks
			Pointed Shell	Common Shell	Muzzle Velocity							
MM			Yards	Yards	F/S	lbs.	RDS/Min	Mils	Mils	Mils		
70	How	7 cm Model 92 Infantry How.		3050	650	8.3	10	890	180	800	Horse	
70	Gun	7 cm Model 94 Tank Gun				8.3						
75	Gun	7 cm Model 41 Mountain Gun	7800	7000	1250	14.0	10	710	320	110	Pack or Horse	
75	Gun	7 cm Model 94 Mountain Gun	9080	7630	1260	14.0		800	180	800	Pack	
75	Gun	7 cm Model 38 Field Gun	9025		1706	14.0		280	140	120	Horse	
75	Gun	7 cm Modified Model 38 Field Gun	10900	8720	1740	14.0	10-12	800	140	120	Horse	
75	Gun	7 cm Model 41 Calvalry Gun	12000			14.0		280	140	210	Horse	
75	Gun	7 cm Model 95 Field Gun	12000	10030	1740	14.0		760	140	890	Horse	
75	Gun	7 cm Model 90 Field Gun	15300	10000	2230	14.0		760	140	760	Motor	
75	Gun	7 cm Model 88 Field AA Gun	15000		2360	14.4	10-15	1510	0	6400	Motor	
75	Gun	7 cm Model 11 Field AA Gun	11000		1740	14.4		1510	180	6400		
76	Gun	8 cm AA Gun [Naval]		11800	2220	13.5		1330	90	6400		
76	Gun	8 cm Low Angle Gun [Naval]		8700	2260	13.8		360	90	6400		
81	Mortar	8 cm Model 97 Mortar		3100		6.75					Man-load	

81	Mortar	8 cm Model 99 Mortar		2200		6.75		1250		120	Main-load	
81	Mortar	8 cm Model 3 Mortar [Naval]		3050		6.99						
88	Gun	8 cm Model 99 AA Gun	17500		2620	19.9	2-	1420	120	6400		Source: Prisoner of War
90	Mortar	9 cm Model 94 Mortar		4050		11.6				180		
90	Mortar	9 cm Model 97 Mortar		4050		11.						
100	Gun	10 cm Model 98 AA Gun	20400		3310	28.7	15	1600	180	6400		
105	How	10 cm Model 91 Howitzer	12000		1790	34.		1150	120	800		
105	Gun	10 cm Model 92 Gun	19840		2510	34.6		850	180	640	Motor	
105	Gun	10 cm Model 14 Gun	16500		2040	34.6		760	90	530		
105	Gun	10 cm Model 38 Gun	10900		1770	34.6		270	40	530		
120	How	12 cm Model 38 Howitzer		6300	900	44		750	90	1140		
120	Gun	12 cm AA Gun [Naval]		17100	2700	45.5	10-12	1330	180	6400		
120	Gun	12 cm Low Angle Gun [Naval]		16500	2700	45.4		590	120	6400		
127	Gun	127 mm AA Gun [Naval]		15400	2360	50.8	12-15	1590	140	6400		
140	Gun	14 cm Low Angle Gun [Naval]		19000	2780	84		530	120	6400		
150	How	15 cm Model 38 Howitzer				79.5		760	0	70		
150	How	15 cm Model 96 Howitzer	13000	11400	1773	79.5		1330	120	530	Motor	
150	How	15 cm Model 4 Howitzer		9480	1343	79.5		1160	90	110	Horse	
150	Gun	15 cm Model 45 Gun		15800	2500							
150	Gun	15 cm Model 89 Gun				88.5						
150	Gun	15 cm Model 96 Gun				111						
150	Mortar	15 cm Model 96 Mortar				56.6						
152	Gun	15 cm Low Angle Gun [Naval]		20900	2780							
200	Rocket	20 cm Rocket Launcher (Trough) [Naval]		1970		195						
200	Rocket	20 cm Rocket Launcher (Tube)		2800		195						

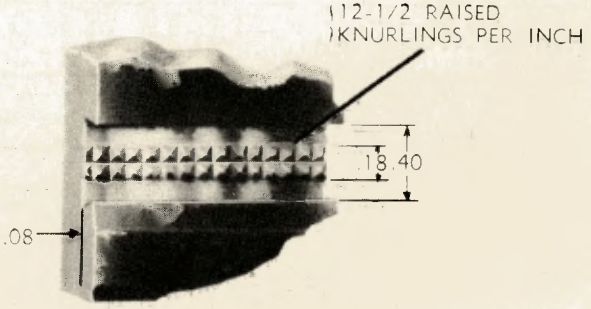
Note: Characteristics given above are the best available as of 1 May 1945. However, they have been compiled principally from captured documents. The information should be considered accordingly.

Section VIII

ILLUSTRATIONS OF FRAGMENTS OF ROTATING BAND SEATS (10 SEATS), 70-A-1 TO 200-R-1



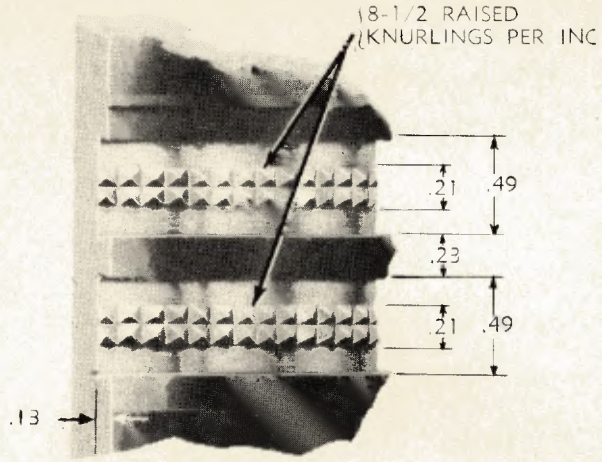
2.95 INCH MOUNTAIN GUN [U. S.]



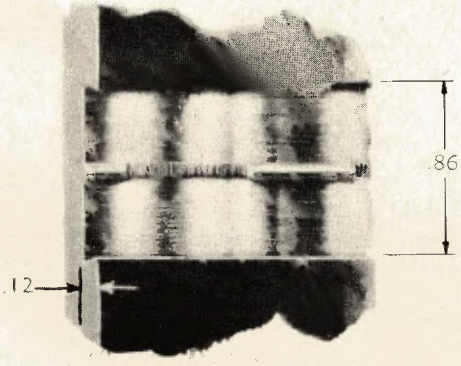
7CM MODEL 38 FIELD GUN
7CM MODEL 41 CAVALRY GUN
7CM MODIFIED MODEL 38 FIELD GUN
7CM MODEL 95 FIELD GUN
7CM MODEL 90 FIELD GUN
7CM MODEL 41 MOUNTAIN GUN
7CM MODEL 94 MOUNTAIN GUN

RA PD 103451

Figure 16—Rotating Band Seats—Details (Actual Size)



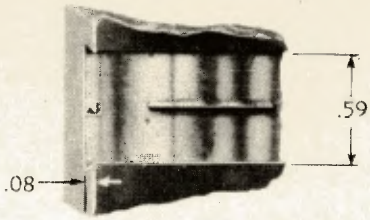
8CM MODEL 99 AA GUN



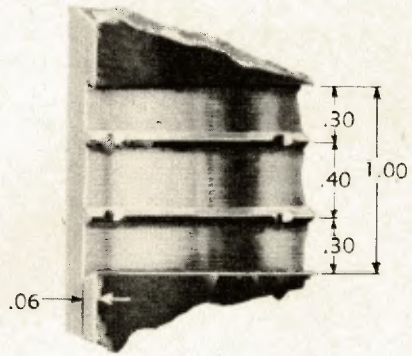
10CM MODEL 91 HOWITZER
10CM MODEL 92 GUN
10CM MODEL 14 GUN
10CM MODEL 38 GUN

RA PD 103452

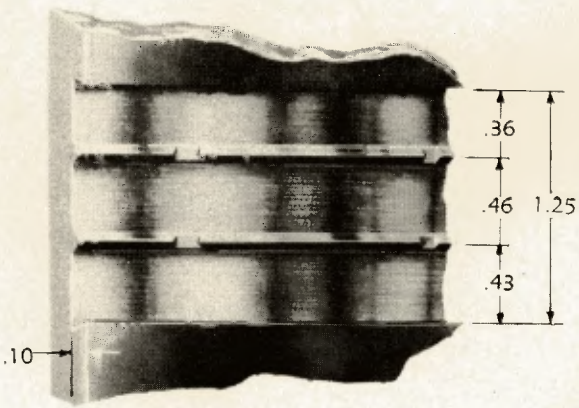
Figure 17—Rotating Band Seats—Details (Actual Size)—Contd.



75MM DUTCH BOFORS



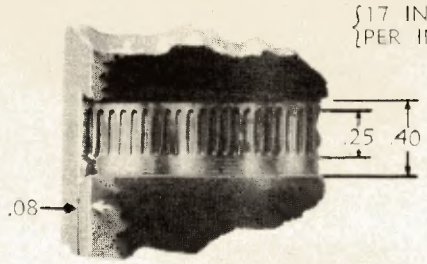
8CM LOW ANGLE GUN [NAVAL]



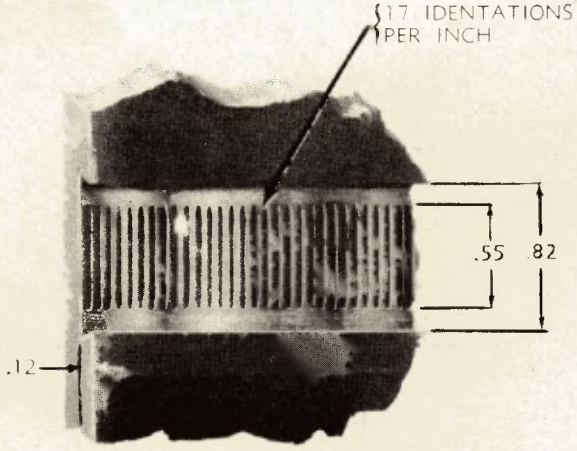
12CM LOW ANGLE GUN [NAVAL]

RA PD 103453

Figure 18—Rotating Band Seats—Details (Actual Size)—Contd.



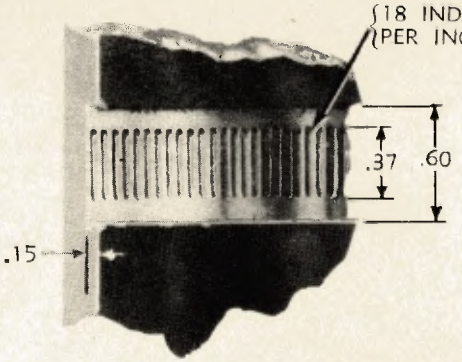
7CM MODEL 92 INFANTRY HOWITZER
7CM MODEL 38 FIELD GUN
7CM MODEL 41 CAVALRY GUN
7CM MODIFIED MODEL 38 FIELD GUN
7CM MODEL 95 FIELD GUN
7CM MODEL 90 FIELD GUN
7CM MODEL 88 FIELD AA GUN
7CM MODEL 41 MOUNTAIN GUN
7CM MODEL 94 MOUNTAIN GUN



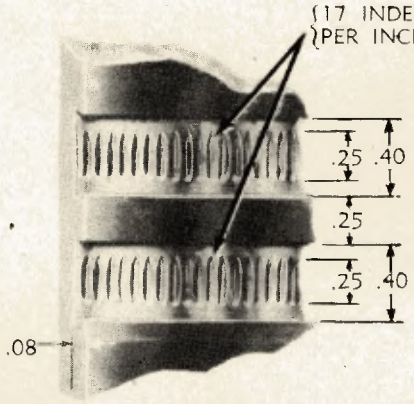
15CM MODEL 4 HOWITZER
15CM MODEL 38 HOWITZER

RA PD 103454

Figure 19—Rotating Band Seats—Details (Actual Size)—Contd.



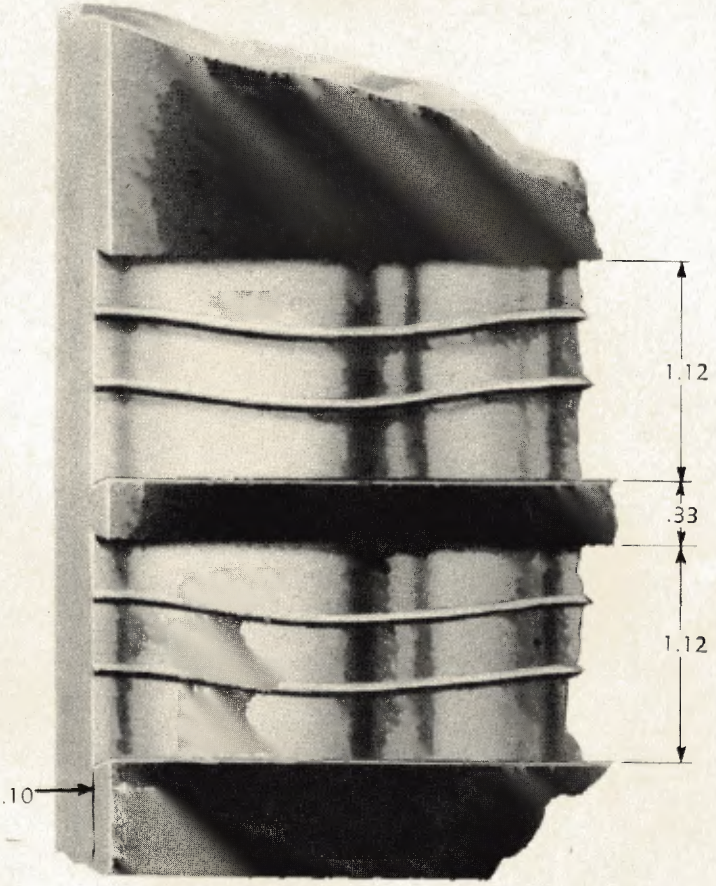
15CM MODEL 4 HOWITZER
15CM MODEL 38 HOWITZER



7CM MODEL 90 FIELD GUN
7CM MODEL 88 FIELD AA GUN

RA PD 103455

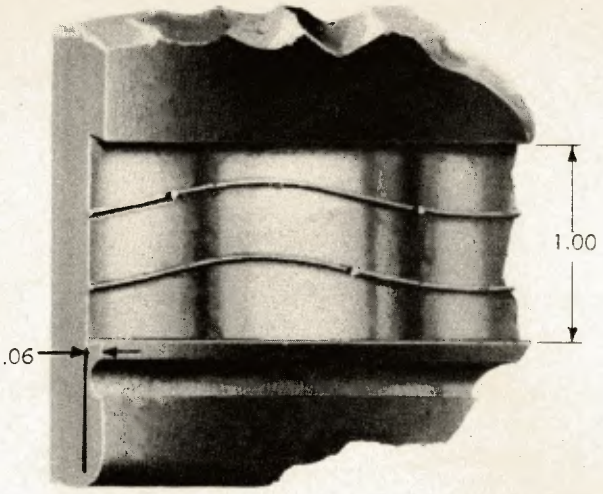
Figure 20—Rotating Band Seats—Details (Actual Size)—Contd.



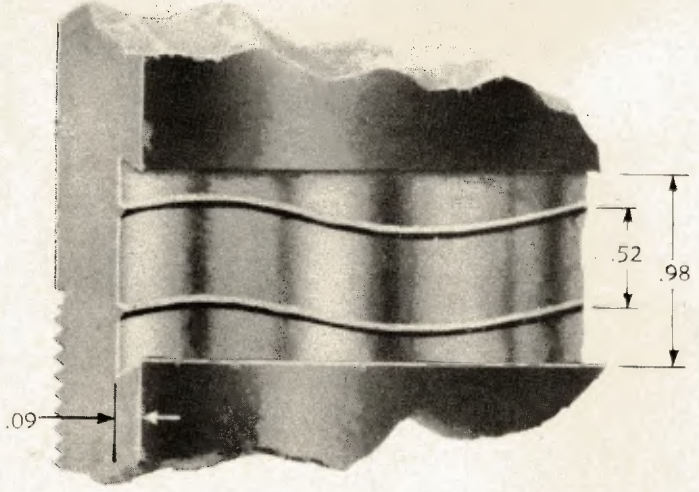
14CM LOW ANGLE GUN [*NAVAL*]

RA PD 103456

Figure 21—Rotating Band Seats—Details (Actual Size)—Contd.



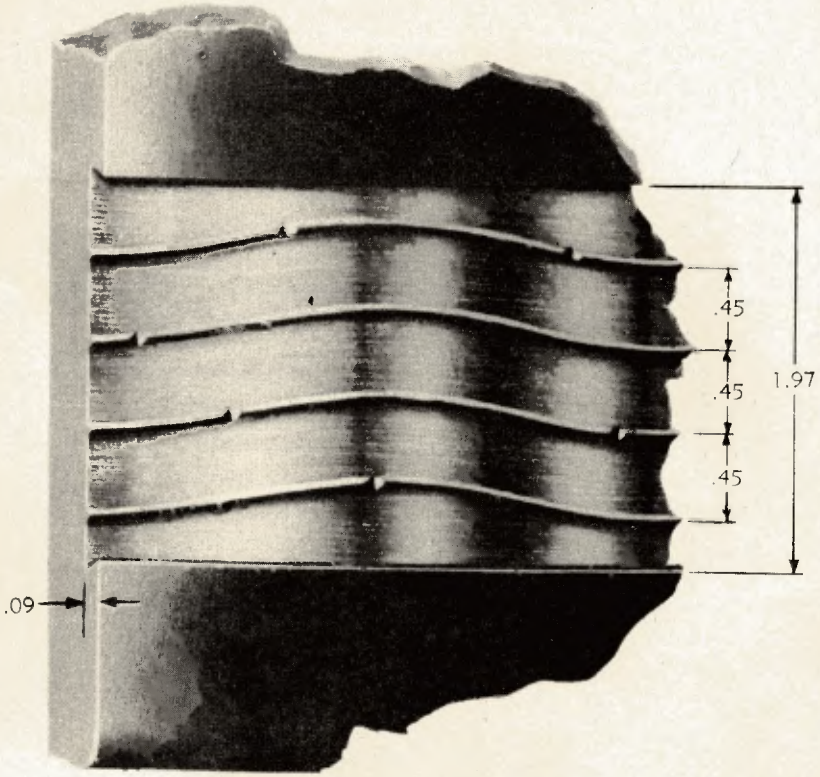
8CM AA GUN [NAVAL]



20CM AA ANTI SUB GUN [NAVAL]
20CM ROCKET
(SOME 20CM ROCKETS DO NOT HAVE THIS GROOVE)

RA PD 103457

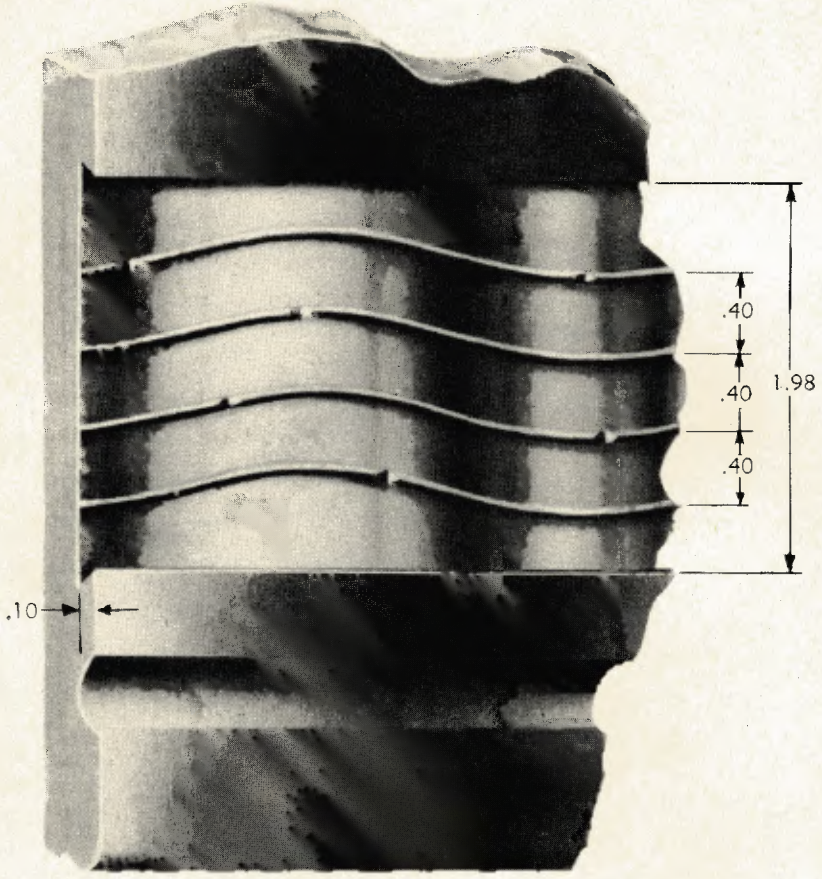
Figure 22—Rotating Band Seats—Details (Actual Size)—Contd.



12CM LOW ANGLE GUN [NAVAL]

RA PD 103458

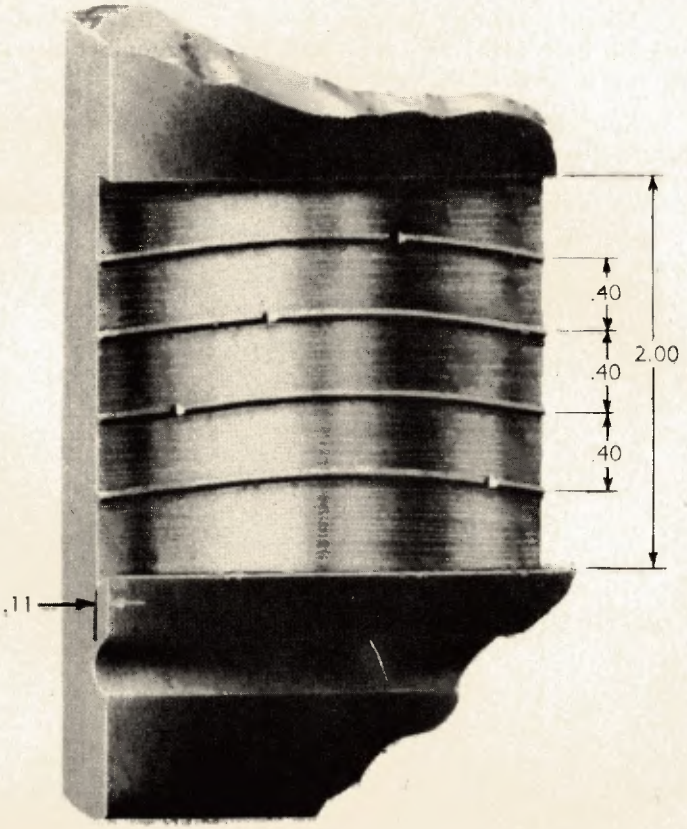
Figure 23—Rotating Band Seats—Details (Actual Size)—Conta.



12CM MODEL 11 AA GUN [NAVAL]

RA PD 103459

Figure 24—Rotating Band Seats—Details (Actual Size)—Contd.



127MM AA GUN [NAVAL]

RA PD 103460

Figure 25—Rotating Band Seats—Details (Actual Size)—Contd.

Section IX

PROJECTILE DATA AND ILLUSTRATIONS

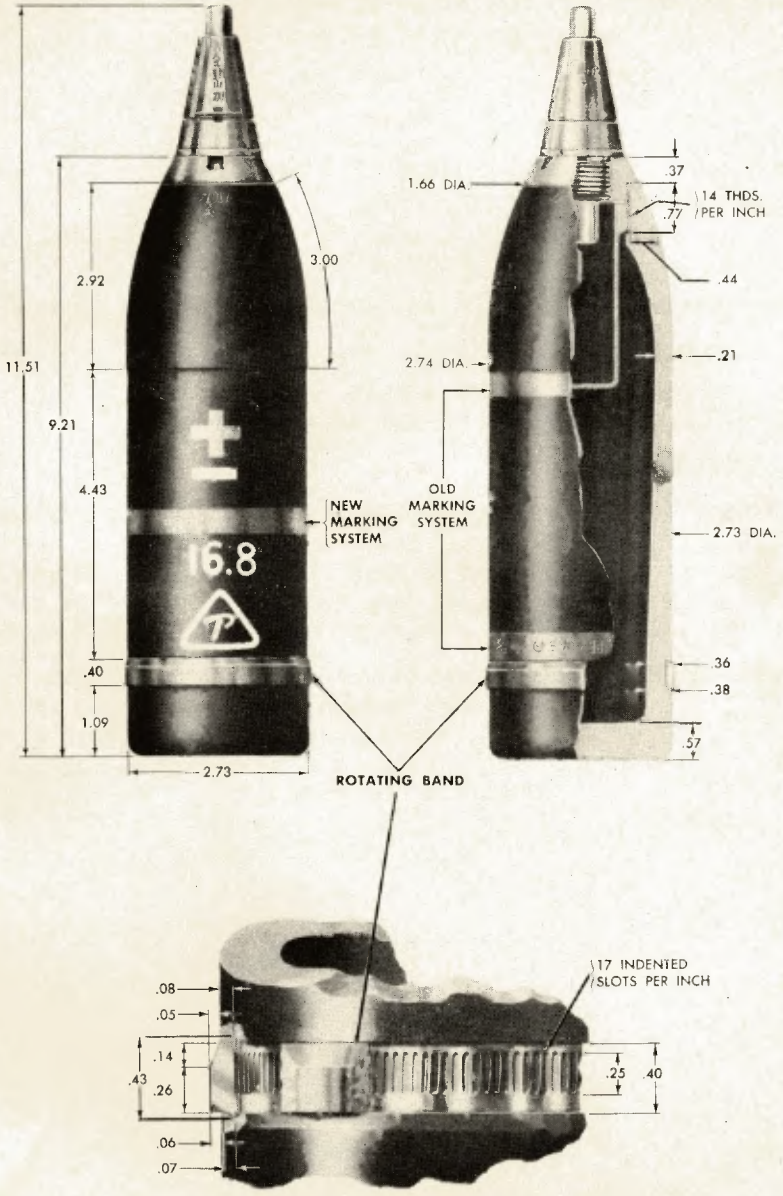
The drawings and data sheets are, keyed using the following system:

(1) The first number denotes the caliber of the shell, the letter denotes the type (HE, AP, etc.) and the last number denotes the number of the shell in its particular series.

(2) Thus 75-A-1 means a 7 cm high explosive shell which is number one in its own series.

This system is used to enable additional sheets to be inserted in correct position.

7CM (70MM) MODEL 92 HE



ALL DIMENSIONS IN INCHES

RA PD 103461

70-A-1

PROJECTILE: 7cm (70mm) MODEL 92 HE

WEAPONS: 7cm Model 92 Howitzer
7cm Model 94 Tank Gun

PROJECTILE:

Caliber	:	70mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	8.4 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

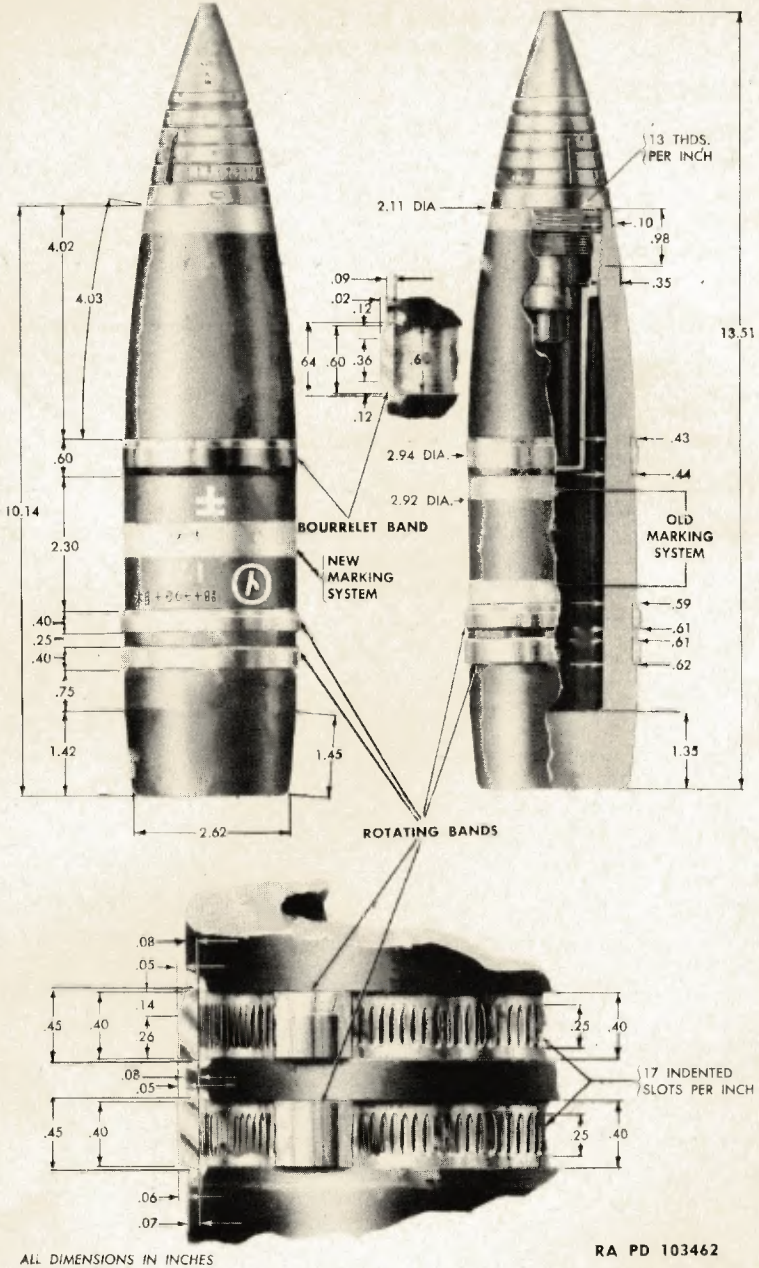
Weight	:	1.30 lbs.
Kind	:	TNT has been found
TRACER	:	None

FUZES: Model 88 Instantaneous (Howitzer—Mortar Type) Nose Fuze
Model 88 Short Delay (Howitzer—Mortar Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: Captured documents indicate that the Gun Type Fuze is used when this projectile is fired from the tank gun and that the Howitzer Mortar Type Fuze is used when this projectile is fired from the howitzer.

70-A-1

7CM (75MM) MODEL 90 POINTED AA



ALL DIMENSIONS IN INCHES

RA PD 103462

75-A-1

PROJECTILE: 7cm (75mm) MODEL 90 HE POINTED AA

WEAPONS: 7cm Model 88 Field AA Gun
7cm Model 88 Field AA Gun (Special)

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	14.4 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

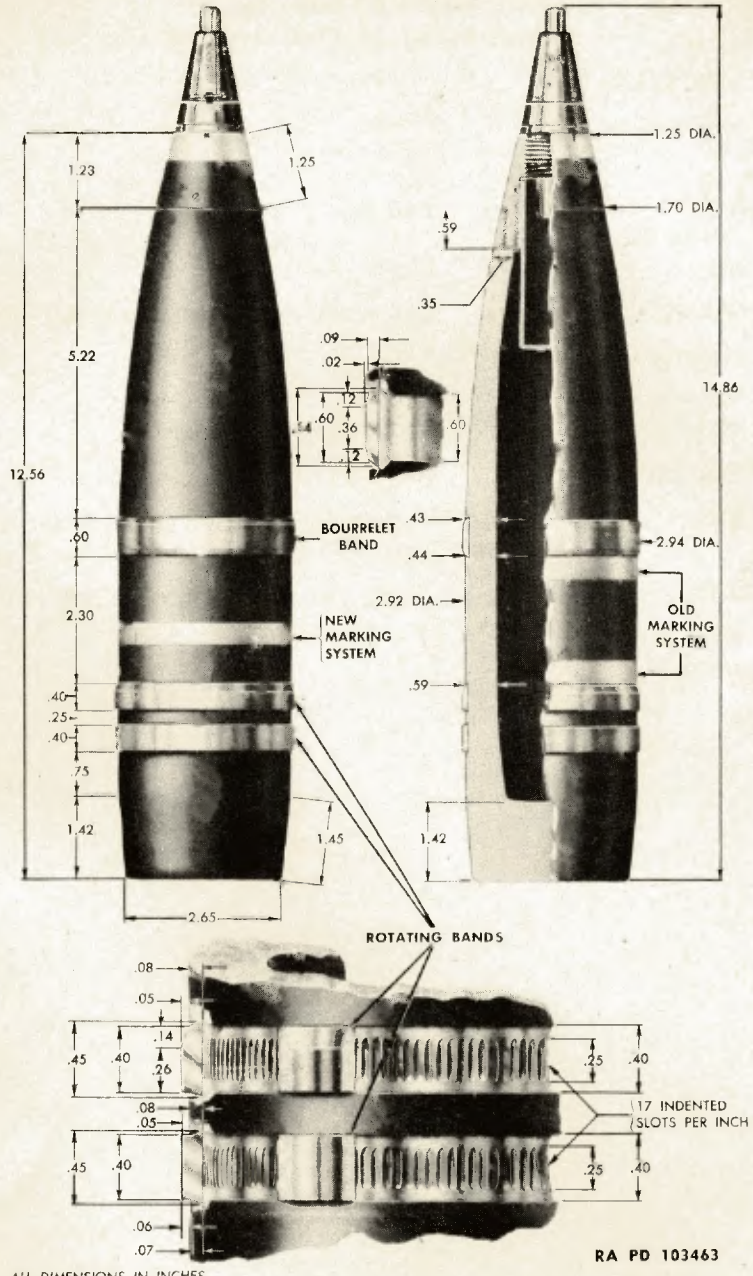
Weight	:	0.85 lb.
Kind	:	TNT has been found
TRACER	:	None

FUZES: Model 89 Time (Powder Train) Nose Fuze and Auxiliary Fuze

REMARKS:

75-A-1

7CM (75MM) MODEL 90 HE POINTED



ALL DIMENSIONS IN INCHES

RA PD 103463

75-A-2

PROJECTILE: 7cm (75mm) MODEL 90 HE POINTED

WEAPONS: 7cm Model 90 Field Gun
7cm Model 88 Field AA Gun (Special)

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	14.0 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

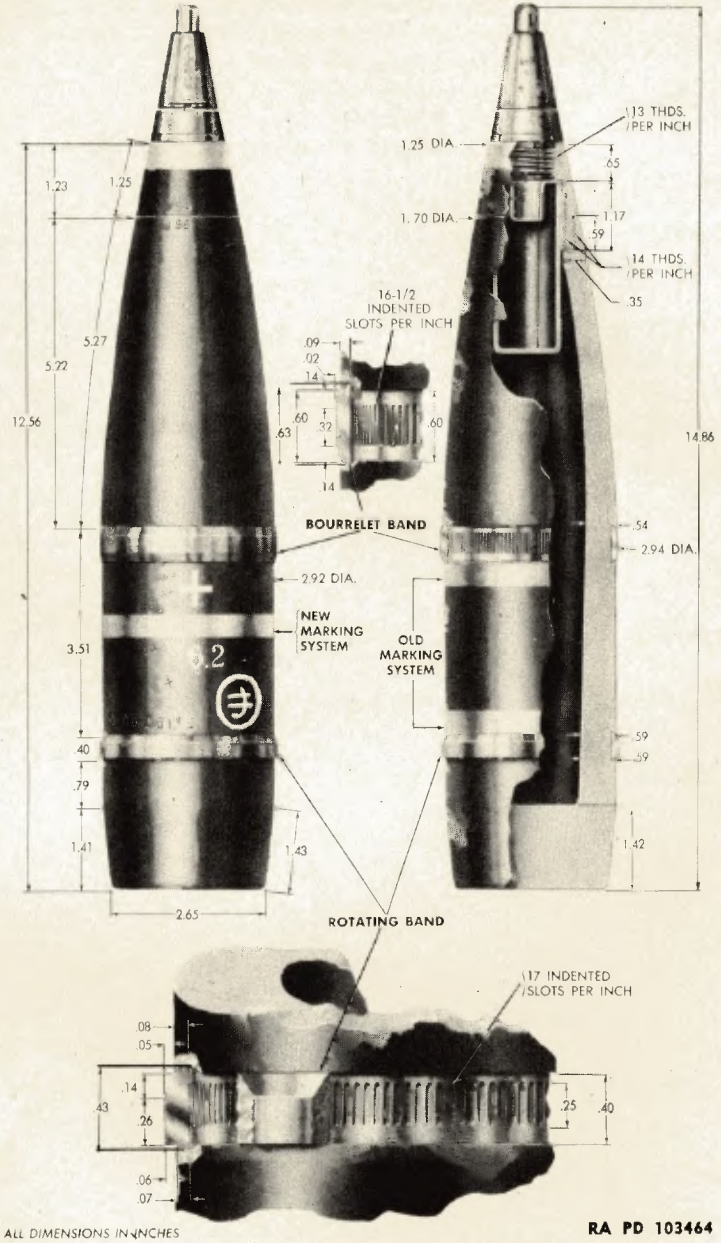
Weight	:	1.19 lbs.
Kind	:	TNT has been found
TRACER	:	None

FUZE: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: This projectile has two rotating bands and a bourrelet band

75-A-2

7CM (75MM) MODEL 90 HE POINTED



ALL DIMENSIONS IN INCHES

RA PD 103464

75-A-3

PROJECTILE: 7cm (75mm) MODEL 90 HE POINTED

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 90 Field Gun
7cm Model 94 Mountain Gun
7cm Model 88 Field AA Gun (Special)

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	14.0 lbs.
Color	:	Black
BANDS	:	One yellow or one white and one yellow

CHARGE:

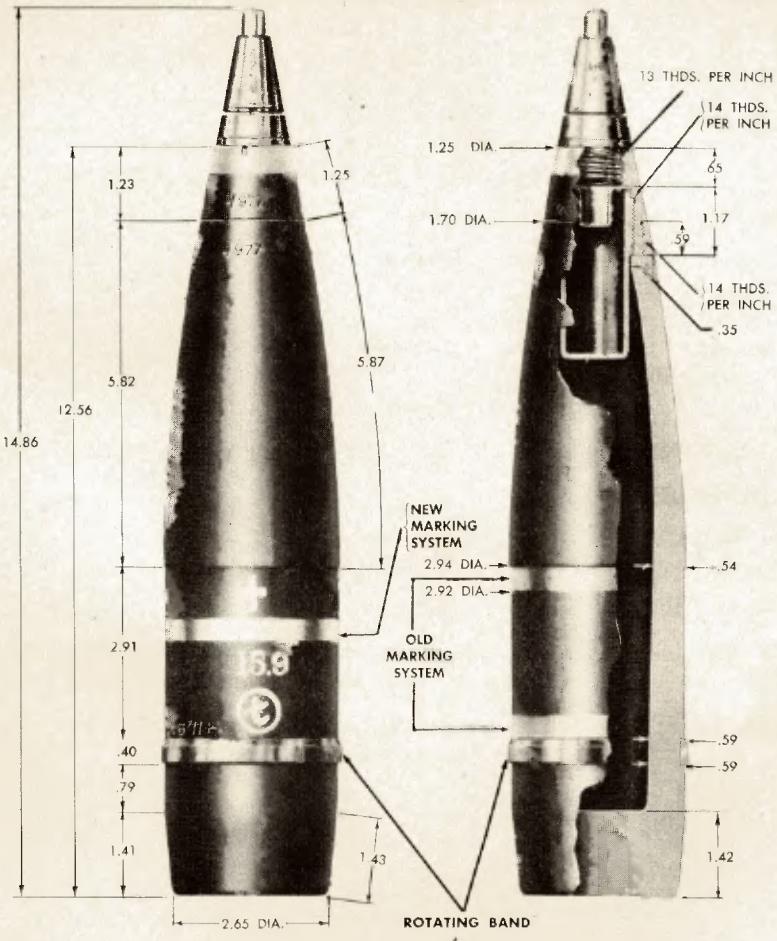
Weight	:	1.19 lbs.
Kind	:	TNT has been found
TRACER	:	None

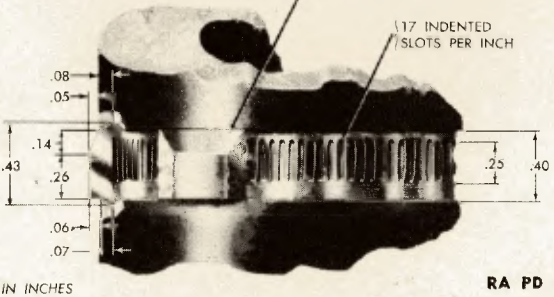
FUZES: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: This projectile has one rotating band and a bourrelet band.

75-A-3

7CM (75MM) MODEL 90 HE POINTED





ALL DIMENSIONS IN INCHES

RA PD 103465

75-A-4

PROJECTILE: 7cm (75mm) MODEL 90 HE POINTED

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 90 Field Gun
7cm Model 94 Mountain Gun
7cm Model 88 Field AA Gun (Special)

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	14.0 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

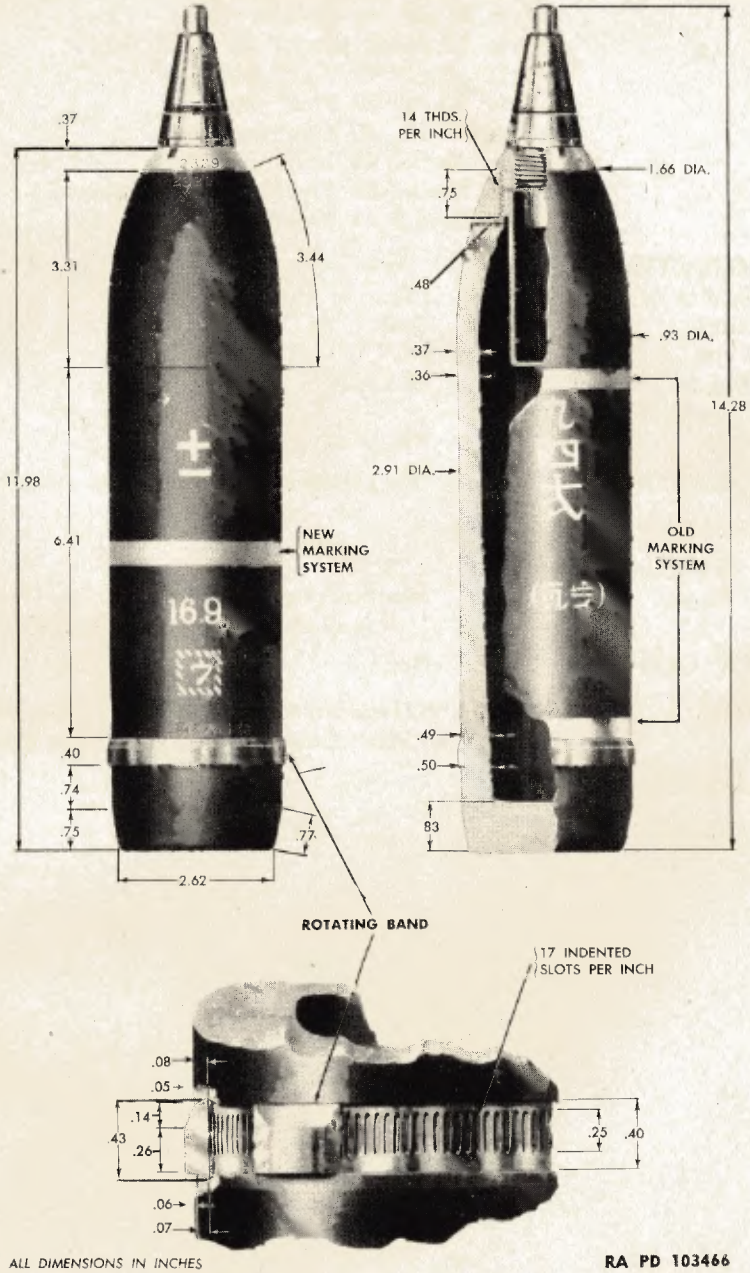
Weight	:	1.19 lbs.
Kind	:	TNT has been found
TRACER	:	None

FUZES: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: This projectile has one rotating band and does not have a bourrelet band.

75-A-4

7CM (75MM) MODEL 94 HE



ALL DIMENSIONS IN INCHES

RA PD 103466

75-A-5

PROJECTILE: 7cm (75mm) MODEL 94 HE

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 90 Field Gun
7cm Model 41 Mountain Gun
7cm Model 94 Mountain Gun
7cm Model 88 Field AA Gun (Special)
7cm Model 11 Field AA Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	13.3 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

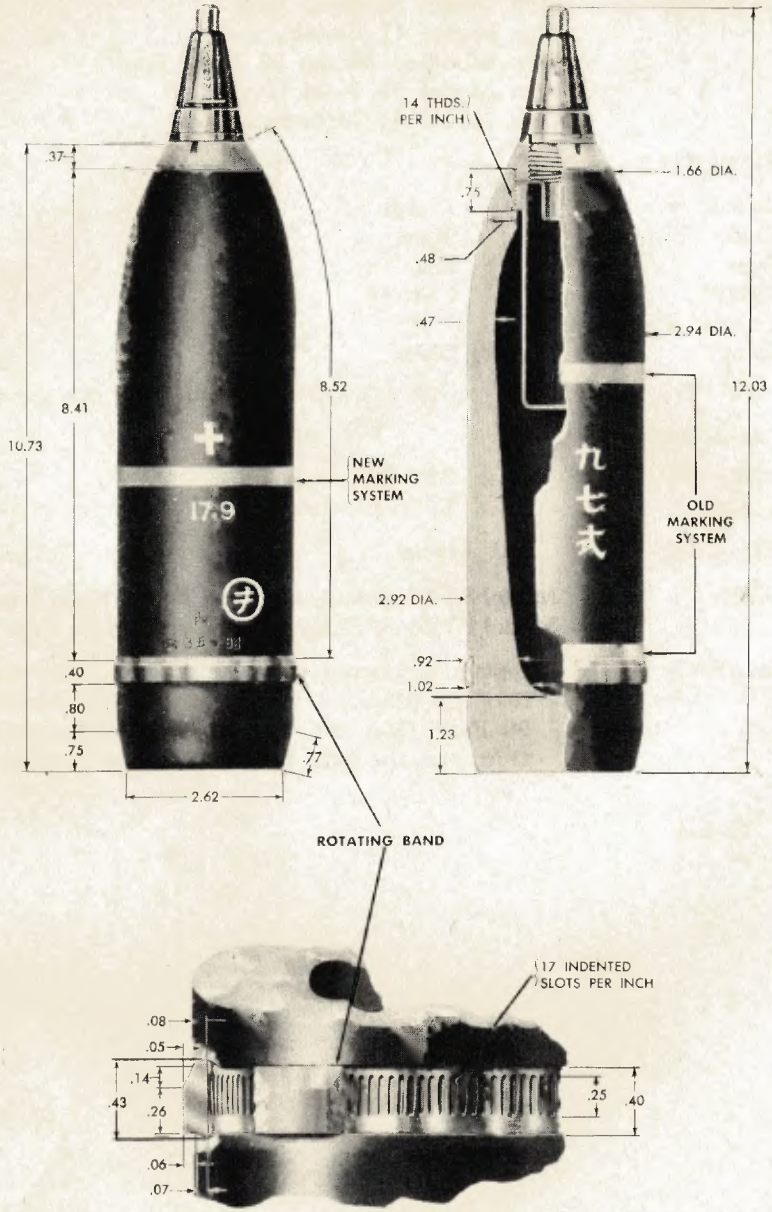
Weight	:	1.78 lbs.
Kind	:	Mixture of Ammonium Nitrate, Guanidine Nitrate, Cyclonite, or TNT
TRACER	:	None

FUZES: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS:

75-A-5

7CM (75MM) MODEL 97 HE SEMI-STEEL



ALL DIMENSIONS IN INCHES

RA PD 103467

75-A-6

PROJECTILE: 7cm (75mm) MODEL 97 HE SEMI-STEEL

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 41 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	13.4 lbs.
Color	:	Black
BANDS	:	One green or one yellow and one green

CHARGE:

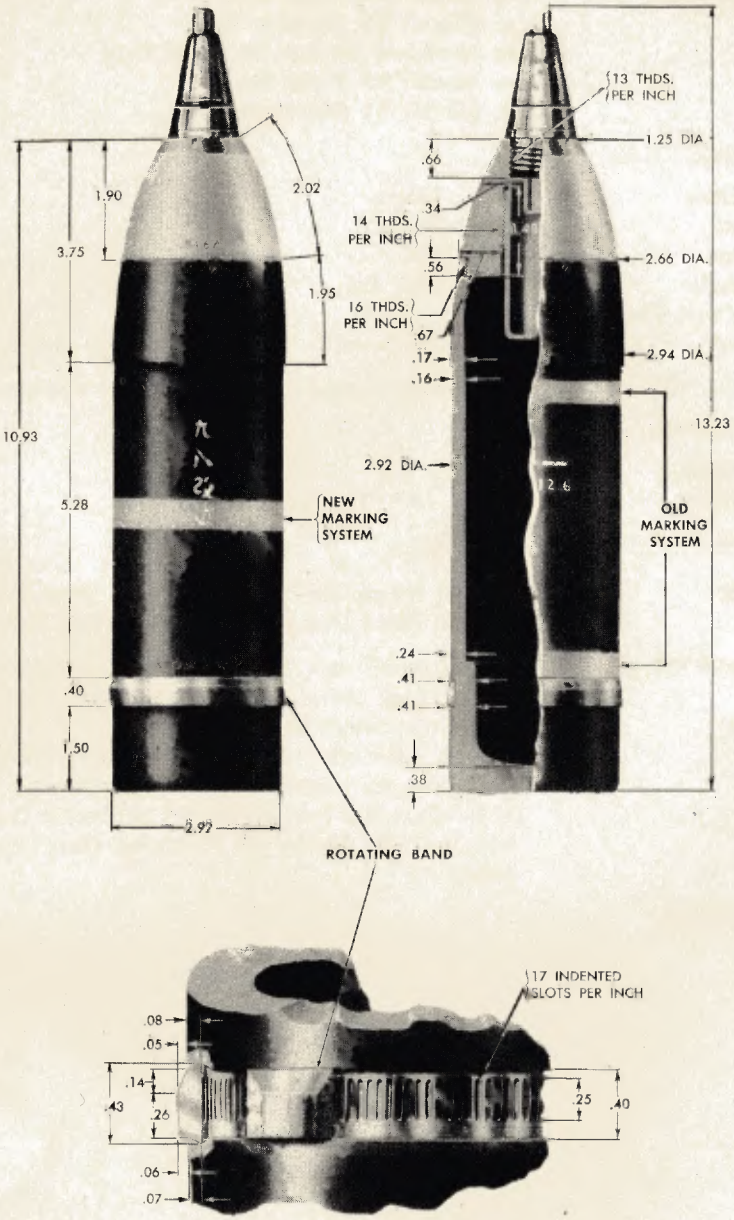
Weight	:	0.86 lb.
Kind	:	TNT has been found
TRACER	:	None

FUZES: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: Although suspected it is not known definitely that this projectile is used in the 7cm Model 90 Field Gun, the 7cm Model 94 Mountain Gun, and the 7cm Model 88 Field AA Gun (Special).

75-A-6

7CM (75 MM) MODEL 98 MODIFIED



ALL DIMENSIONS IN INCHES

RA PD 103468

75-A-7

PROJECTILE: 7cm (75mm) MODEL 98 Modified HE

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 41 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	10.1 lbs.
Color	:	Black with the nose painted white
BANDS	:	One yellow or one yellow and one white

CHARGE:

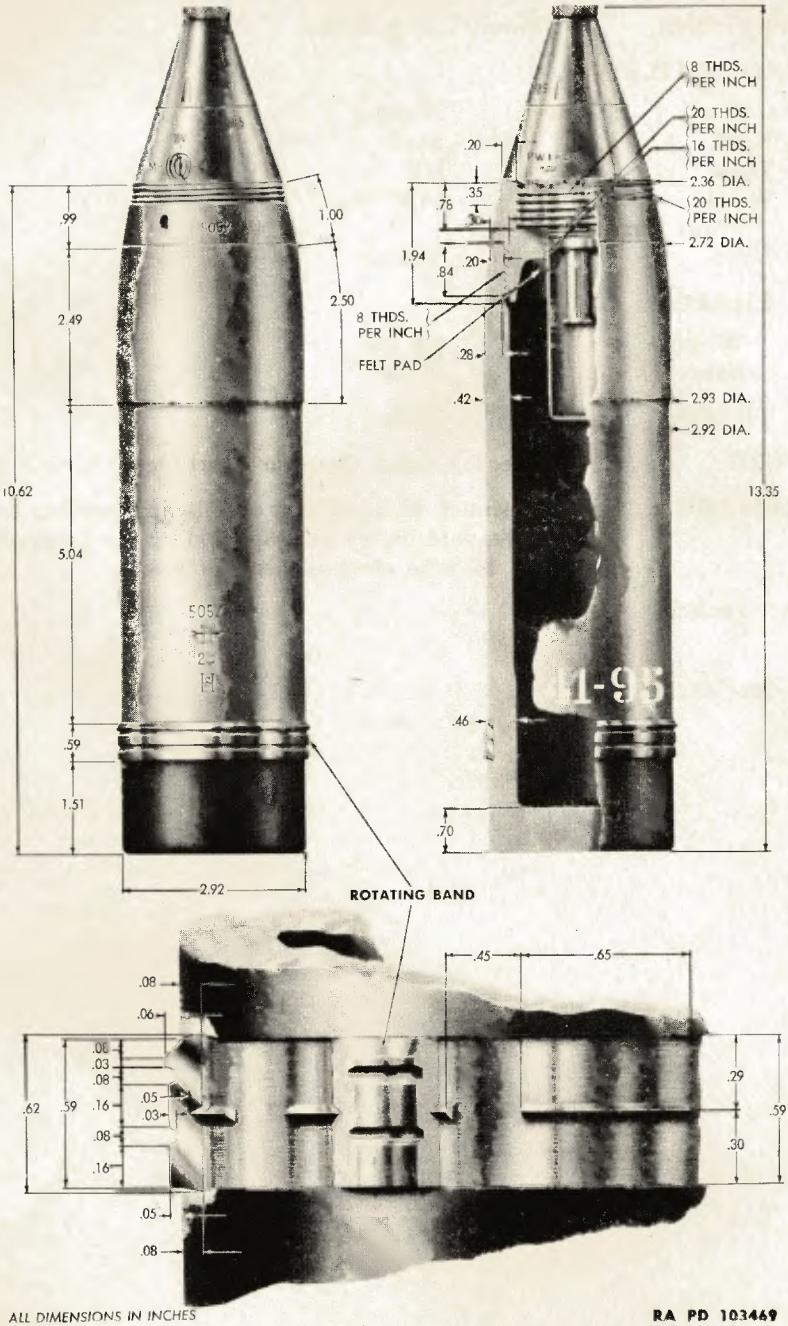
Weight	:	2 lbs.
Kind	:	TNT has been found
TRACER	:	None

FUZES: Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS: The shell body for this projectile has been converted from shrapnel to HE by the addition of a heavy steel nose.

Although suspected, it is not known definitely that projectile is used in the 7cm Model 90 Field Gun, the 7cm Model 94 Mountain Gun, and the 7cm Model 88 Field AA Gun (Special).

75 MM HE [DUTCH]



ALL DIMENSIONS IN INCHES

RA PD 103469

75-A-8

PROJECTILE: 75mm HE [DUTCH]

WEAPONS: 75mm Dutch Bofors

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	HE
Weight (with Fuze)	:	14.67 lbs.
Color	:	Yellow

CHARGE:

Weight	:	1.4 lbs.
Kind	:	Picric

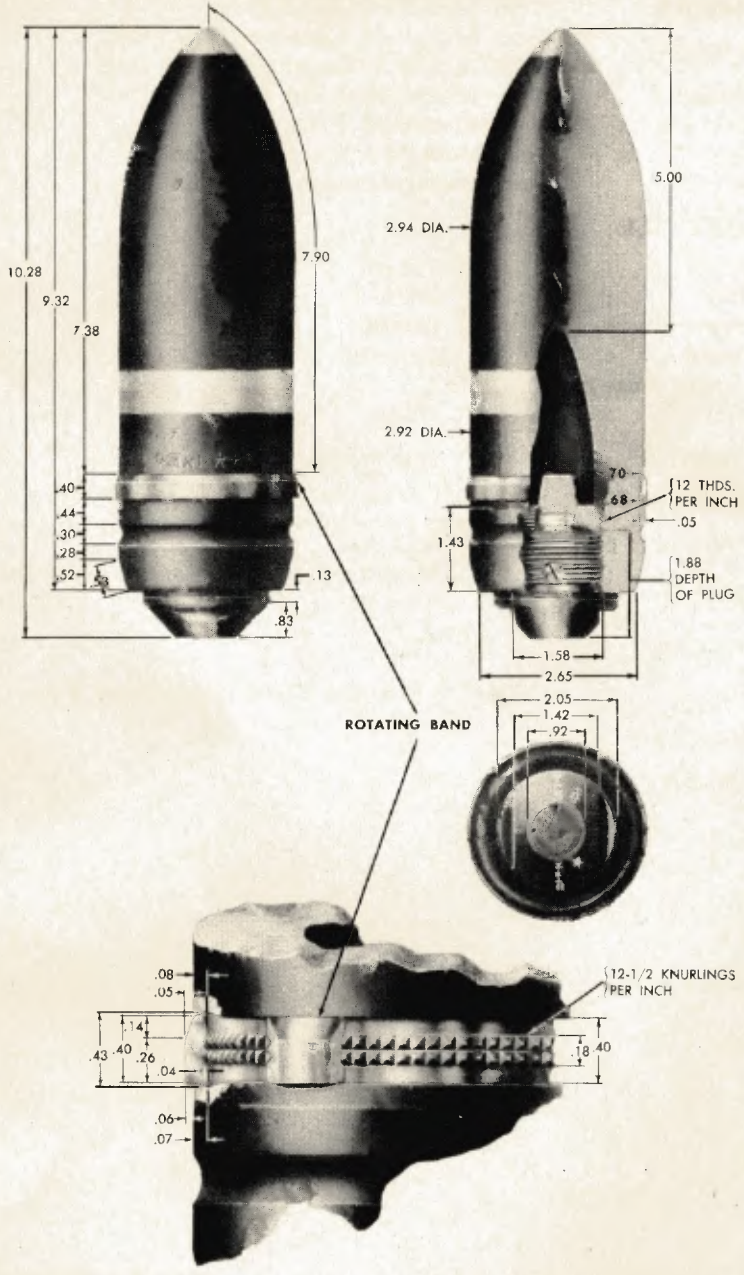
TRACER : None

FUZE: Selective Super Quick or Short Delay Nose Fuze

REMARKS: Inasmuch as quantities of this ammunition and weapons have been captured by the Japanese, it may be used against our troops.

75-A-8

7CM (75MM) MODEL 1 APHE



ALL DIMENSIONS IN INCHES

RA PD 103470

75-B-1

PROJECTILE: 7cm (75mm) MODEL 1 APHE

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 90 Field Gun
7cm Model 94 Mountain Gun
7cm Model 41 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	APHE
Weight (with Fuze)	:	14.6 lbs.
Color	:	Black
BANDS	:	One white

CHARGE:

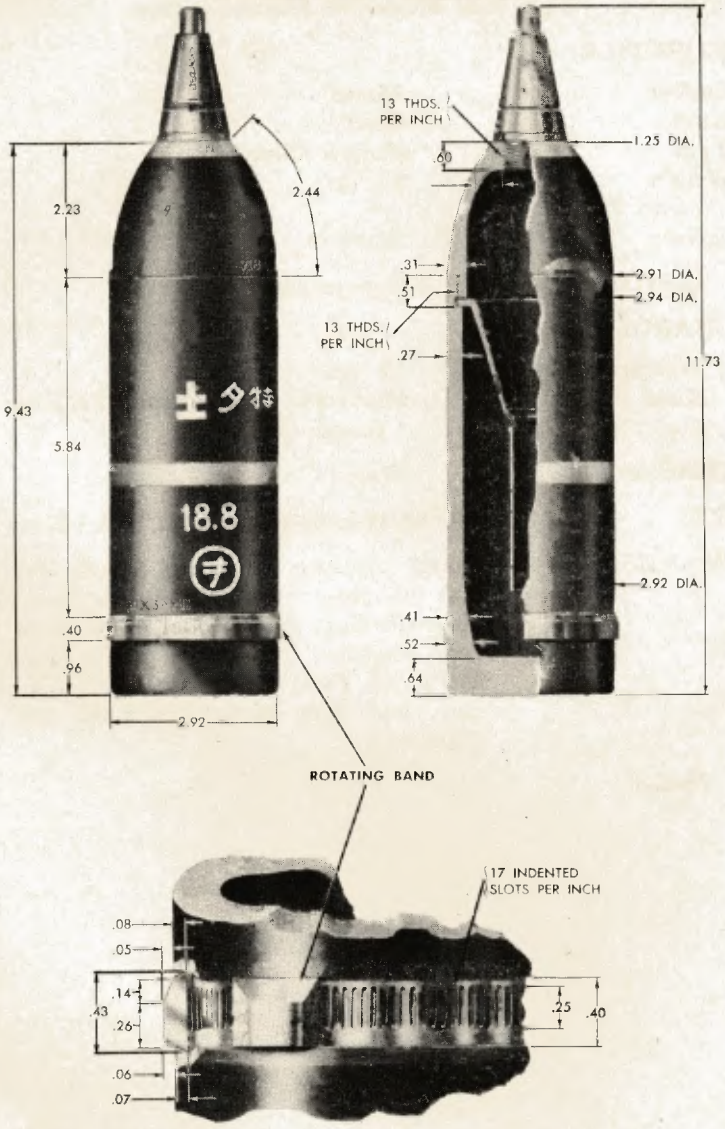
Weight	:	0.17 lbs.
Kind	:	Mixture of cyclonite and wax has been found
TRACER	:	Yes

FUZE: Model 1 Medium Short Delay Base Fuze

REMARKS:

75-B-1

7CM (75MM) MODEL 2 HOLLOW CHARGE



ALL DIMENSIONS IN INCHES

RA PD 103471

75-C-1

PROJECTILE: 7cm (75mm) MODEL 2 HOLLOW CHARGE

WEAPONS: 7cm Model 41 Mountain Gun
7cm Model 94 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	Hollow Charge
Weight (with Fuze)	:	8.2 lbs.
Color	:	Black
BANDS	:	One yellow

CHARGE:

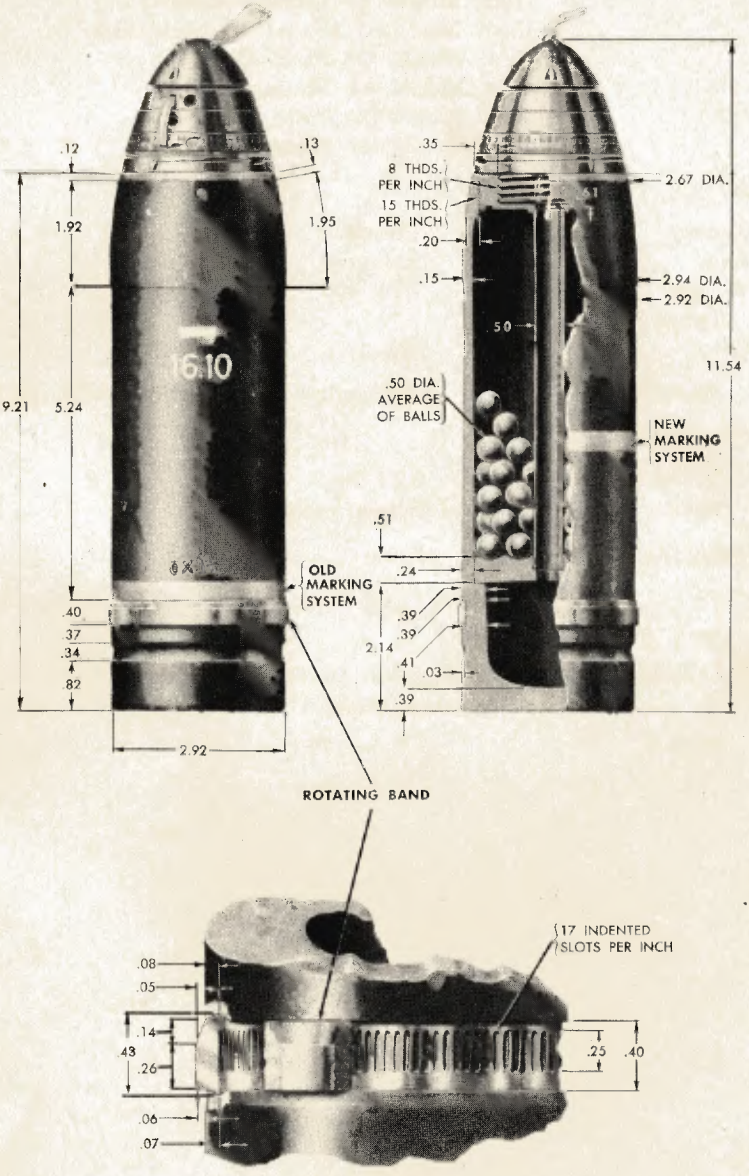
Weight	:	1.2 lbs.
Kind	:	Mixture of Cyclonite and TNT has been found
TRACER	:	None

FUZE: Model 88 Instantaneous (Gun Type) Nose Fuze

REMARKS: Although suspected, it is not known definitely that this projectile is used in the 7cm Model 38 Field Gun, 7cm Model 41 Cavalry Gun, 7cm Modified Model 38 Field Gun, 7cm Model 95 Field Gun, 7cm Model 90 Field Gun, and 7cm Model 88 Field AA Gun (Special).

75-C-1

7CM (75MM) MODEL 90 SHRAPNEL



RA PD 103472

75-D-1

ALL DIMENSIONS IN INCHES

PROJECTILE: 7cm (75mm) MODEL 90 SHRAPNEL

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 41 Mountain Gun
7cm Model 90 Field Gun
7cm Model 94 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shrapnel
Weight (with Fuze)	:	15.4 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

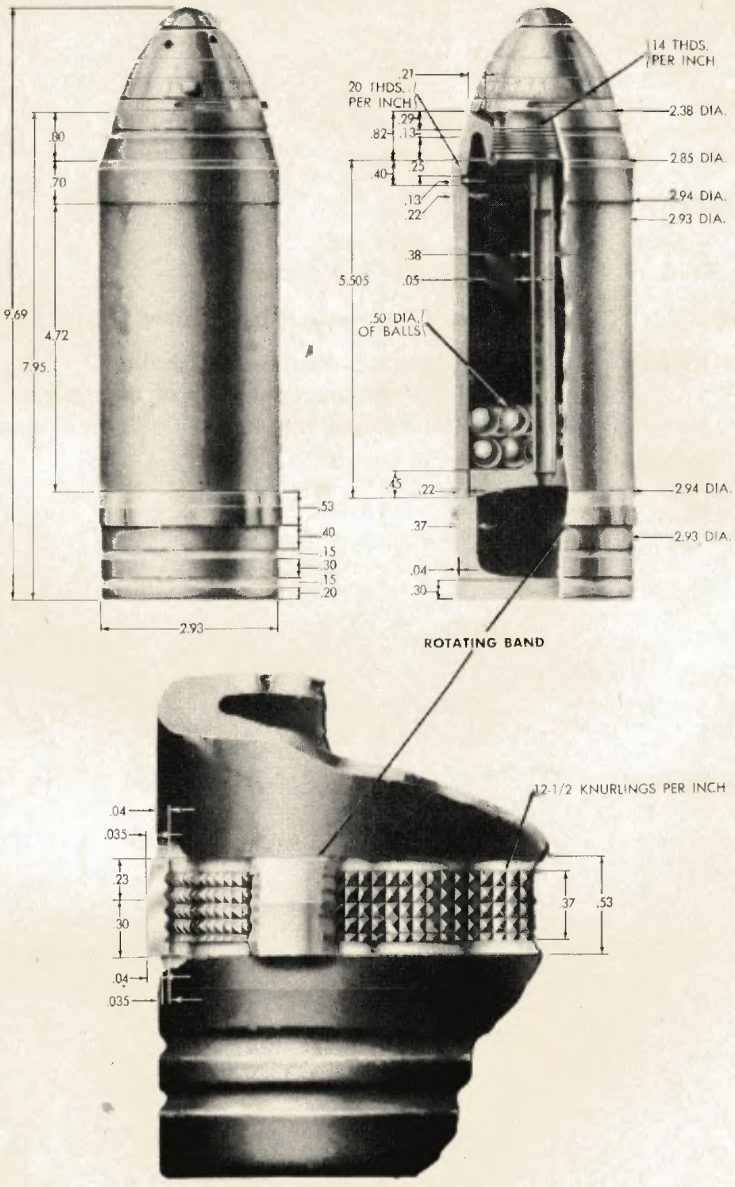
Weight	:	0.22 lb.
Kind	:	Black powder
TRACER	:	None

FUZE: Model 5 Combination Time and Percussion Nose Fuze

REMARKS: This projectile contains 268 (Approximately 5.5 lbs.) lead balls.

75-D-1

2.95 INCH SHRAPNEL (U.S.)



ALL DIMENSIONS IN INCHES

RA PD 103473

75-D-2

PROJECTILE: 2.95 inch SHRAPNEL [U.S.]

WEAPONS: 2.95 inch Mountain Gun [U.S.]

PROJECTILE:

Caliber	:	2.95 inches (75mm)
Kind	:	Shrapnel
Weight	:	12.50 lbs.
Color	:	Maroon

CHARGE:

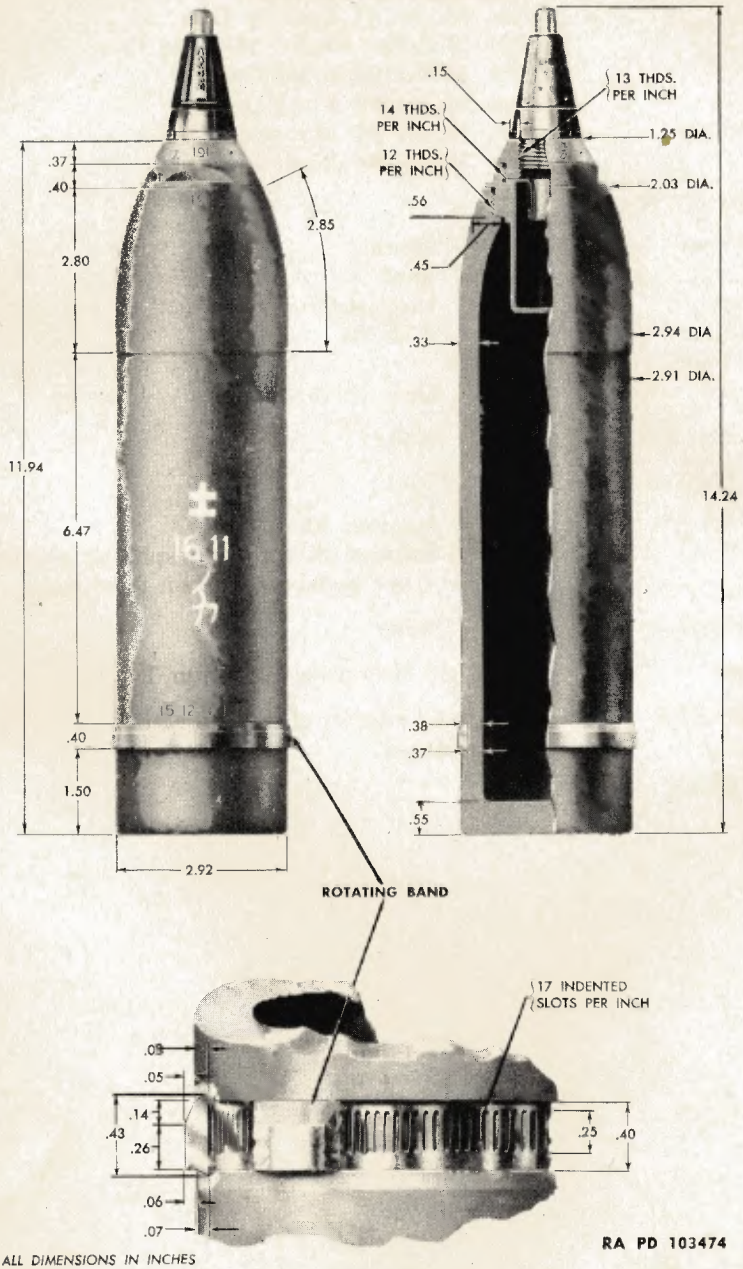
Weight	:	2.75 oz.
Kind	:	Black Powder

FUZES: 21 Sec Combination Nose Fuze Model 07

REMARKS: This projectile contains 212 balls.
The Japanese captured some of this ammunition in the Philippines.

75-D-2

7CM (75MM) INCENDIARY



ALL DIMENSIONS IN INCHES

RA PD 103474

75-E-1

PROJECTILE: 7cm (75mm) INCENDIARY

WEAPONS:
- 7cm Model 38 Field Gun
- 7cm Model 41 Cavalry Gun
- 7cm Modified Model 38 Field Gun
- 7cm Model 95 Field Gun
- 7cm Model 90 Field Gun
- 7cm Model 41 Mountain Gun
- 7cm Model 94 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	Incendiary
Weight (with Fuze)	:	12.1 lbs.
Color	:	Gray
BANDS	:	None

CHARGE:

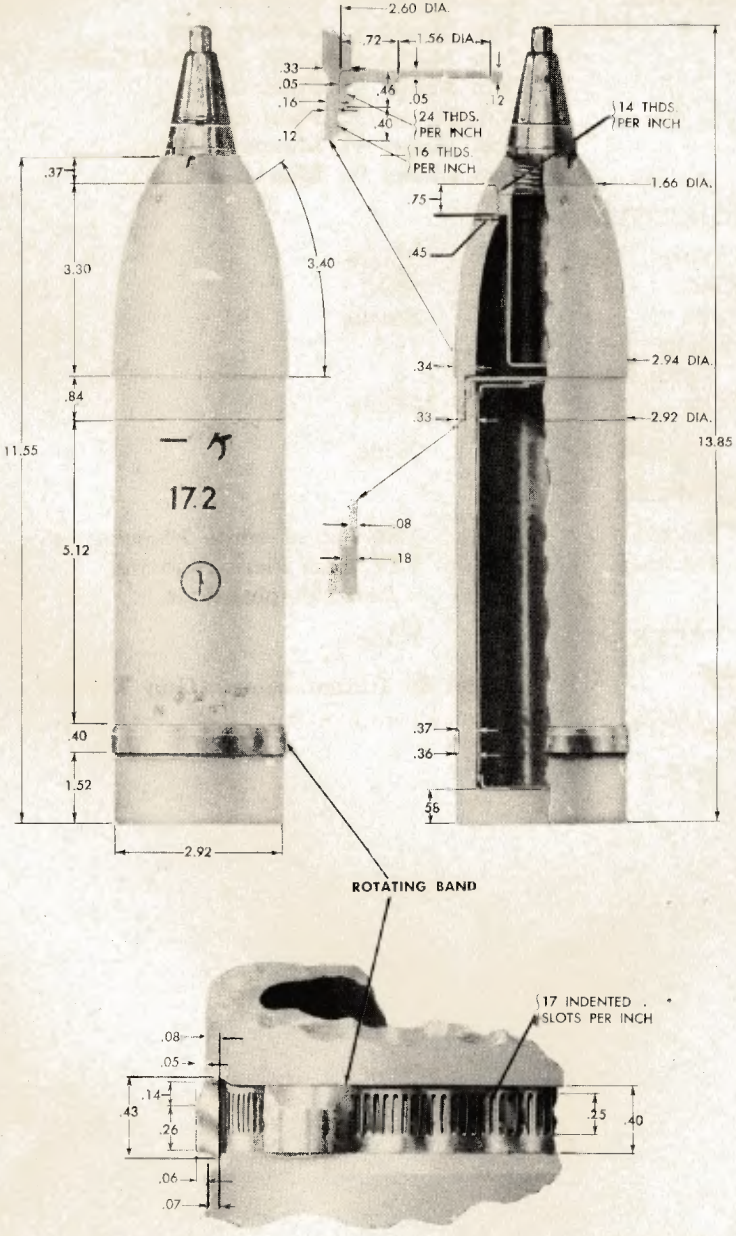
Weight	:	Approx. 1.5 lbs.
Kind	:	Solution of white phosphorus and rubber pellets in carbon disulphide
TRACER	:	None

FUZE: Model 88 Instantaneous (Gun Type)

REMARKS: The model number of this projectile has not been determined.

75-E-1

7CM (75 MM) MODEL 90 SMOKE (WP)



ALL DIMENSIONS IN INCHES

RA PD 103475

75-F-1

PROJECTILE: 7cm (75mm) MODEL 90 SMOKE (WP)

WEAPONS:
7cm Model 38 Field Gun
7cm Model 41 Cavalry Gun
7cm Modified Model 38 Field Gun
7cm Model 95 Field Gun
7cm Model 90 Field Gun
7cm Model 41 Mountain Gun
7cm Model 94 Mountain Gun

PROJECTILE:

Caliber	:	75mm
Kind	:	Shell
Type	:	Smoke
Weight (with Fuze)	:	12.6
Color	:	White
BANDS	:	None

CHARGE:

Smoke	1.54 lbs. of white Phosphorus
Bursting	0.22 lb. of Picric Acid and Dinitronaphthalene

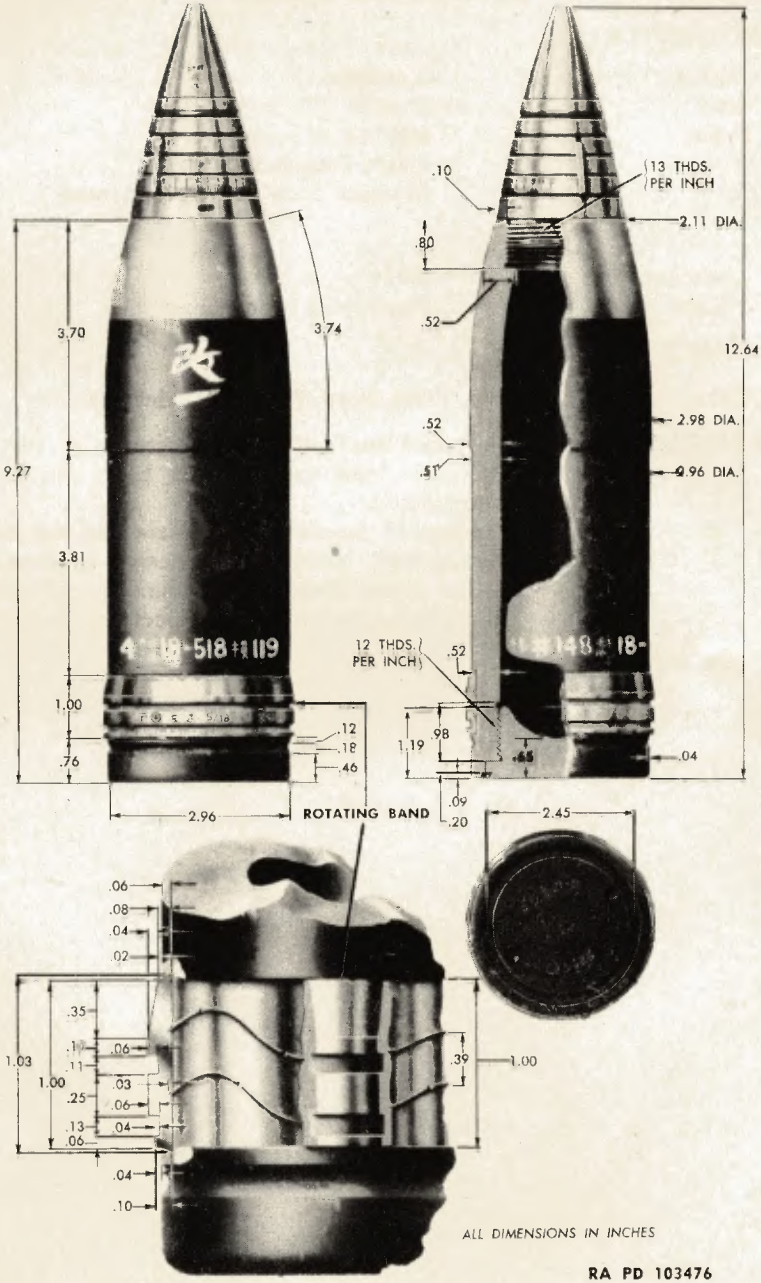
TRACER : None

FUZE: Model 88 Instantaneous (Gun Type)

REMARKS:

75-F-1

8CM (3 INCH) HE AA [NAVAL]



RA PD 103476

76-A-1

PROJECTILE: 8 cm (3 inch) HE AA [Naval]

WEAPONS: 8 cm AA Gun [Naval]

PROJECTILE:

Caliber	:	3 inches
Kind	:	Shell
Type	:	HE
Weight	:	(with Fuze) 13.5 lbs.
Color	:	Maroon body with green nose

CHARGE:

Weight	:	0.97 lb.
Kind	:	Picric has been found

TRACER : None

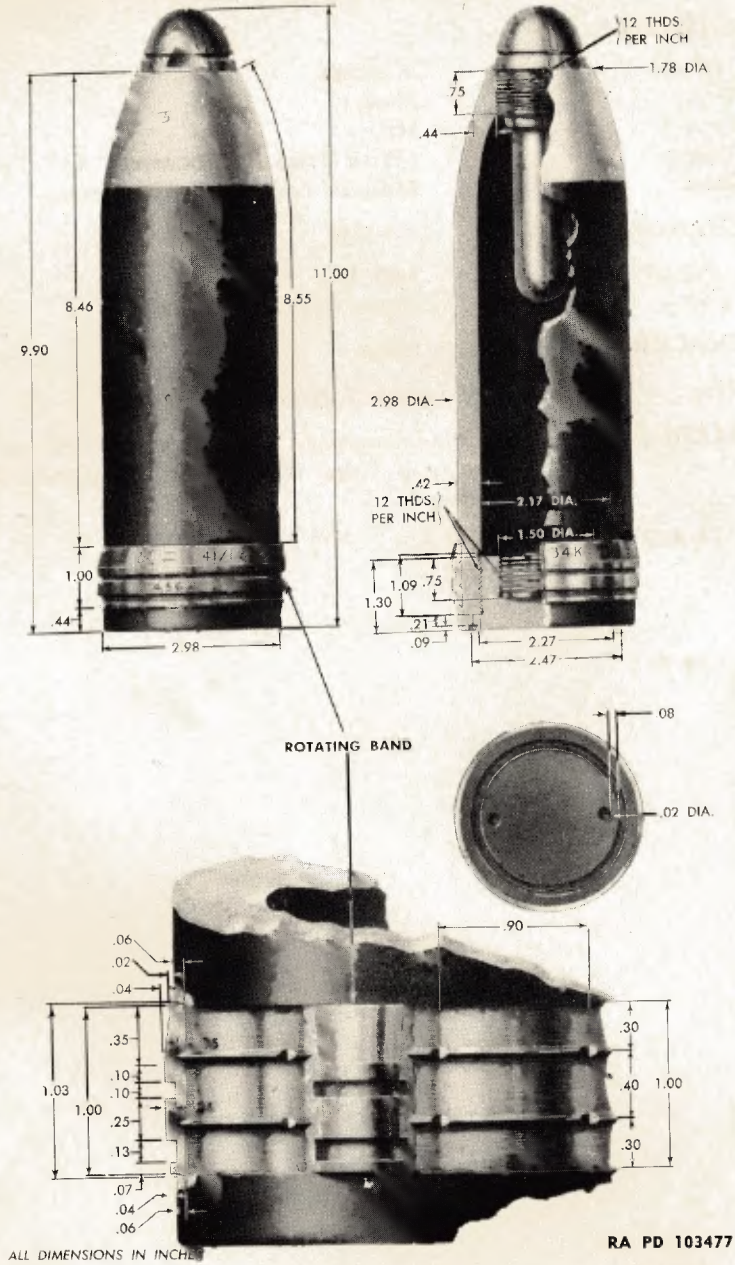
FUZE: Navy Time Nose Fuze (Powder train)*

REMARKS: The model number of the projectile or that of the gun from which fired have not been determined.

*The model number of the fuze has not been determined, however, the design is identical to the Army Type 89 fuze, the only difference being this fuze has Navy inspection stampings.

76-A-1

8CM (3 INCH) HE [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103477

76-A-2

PROJECTILE: 8 cm (3 inch) HE [Naval]

WEAPONS: 8 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	3 inches
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze and booster) 13.8 lbs.
Color	:	Maroon body with green nose

CHARGE:

Weight	:	1.38 lbs.
Kind	:	Picric has been found

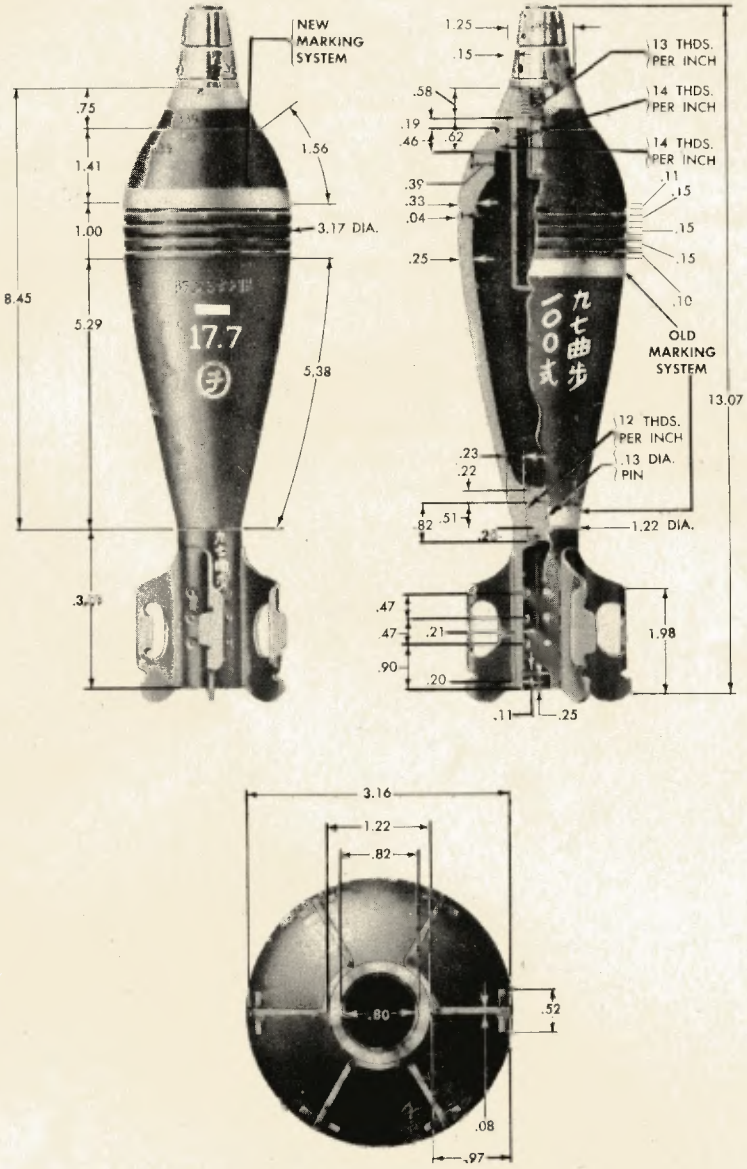
TRACER : None

FUZE: Navy model 5 Nose Fuze

REMARKS: The model number of the projectile or that of the gun from which fired have not been determined.

76-A-2

8CM (81 MM) MODEL 100 HE MORTAR SHELL



ALL DIMENSIONS IN INCHES

RA PD 103478

81-M-1

PROJECTILE: 8 cm (81mm) Model 100 HE Mortar

WEAPONS: 8 cm Model 97 Mortar

PROJECTILE:

Caliber	:	81mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	(Without Fuze and propelling charge) 6.75 lbs.
Color	:	Black
BANDS	:	One yellow

CHARGE:

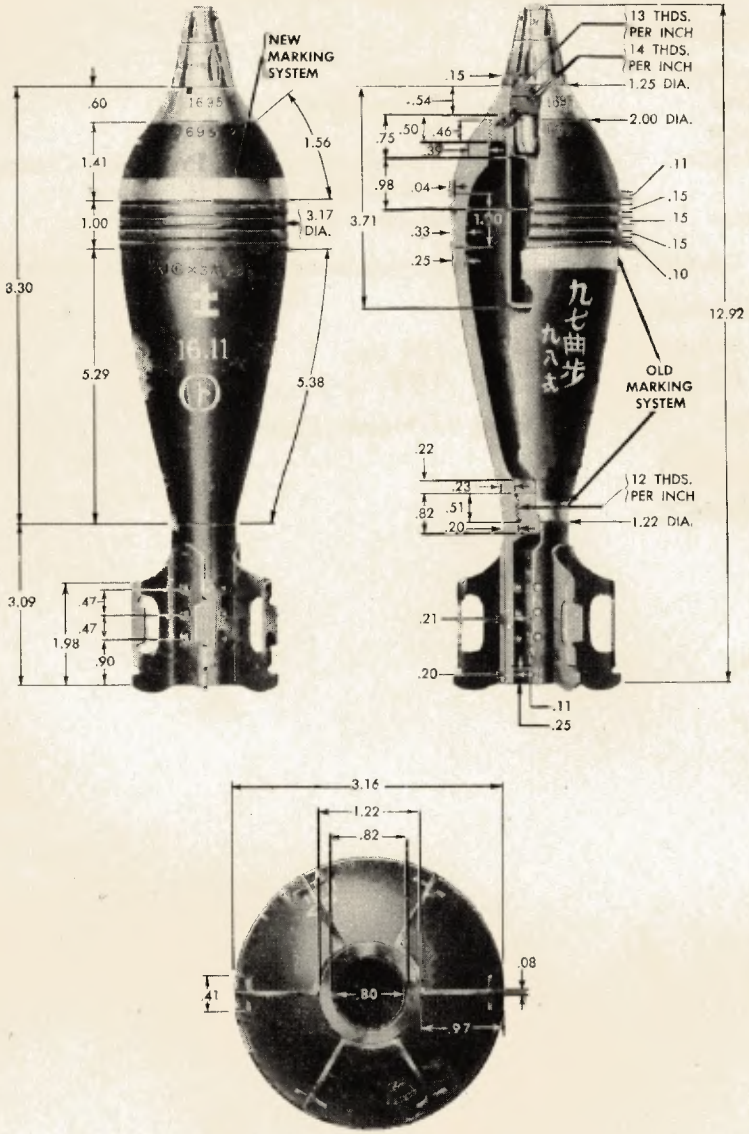
Weight	:	1.18 lbs.
Kind	:	TNT has been found

FUZE: Model 100 Mortar Fuze

REMARKS:

81-M-1

8CM (81MM) MODEL 98 HE MORTAR SHELL



ALL DIMENSIONS IN INCHES

RA PD 103479

81-M-2

PROJECTILE: 8 cm (81mm) Model 98 HE Mortar

WEAPONS: 8 cm Model 97 Mortar

PROJECTILE:

Caliber	:	81mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	(Without Fuze and Propelling Charge) 6.84 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

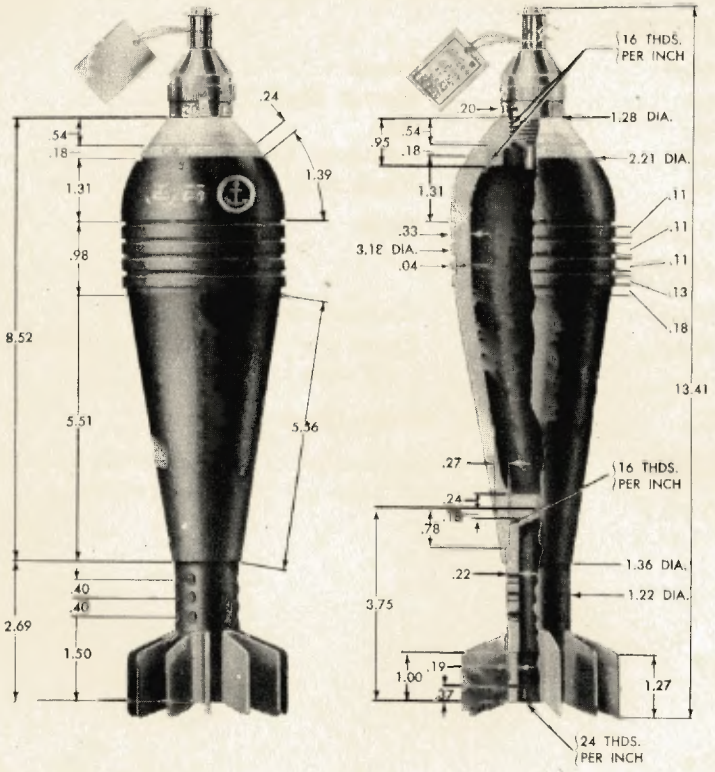
Weight	:	1.09 lbs.
Kind	:	TNT

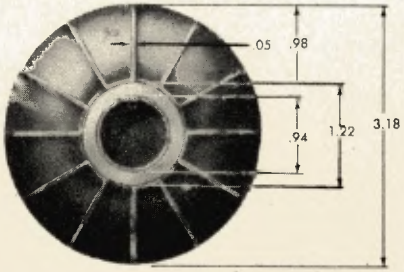
FUZE: Model 93 Mortar Fuze

REMARKS:

81-M-2

8CM (81 MM) HE MORTAR SHELL [NAVAL]





ALL DIMENSIONS IN INCHES

RA PD 103480

81-M-3

PROJECTILE: 8 cm (81mm) HE Mortar [Naval]

WEAPONS: 8 cm Model 3 Mortar [Naval]

PROJECTILE:

Caliber	:	81mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	(Without Fuze) 6.99 lbs.
Color	:	Black with red and green nose
BANDS	:	None

CHARGE:

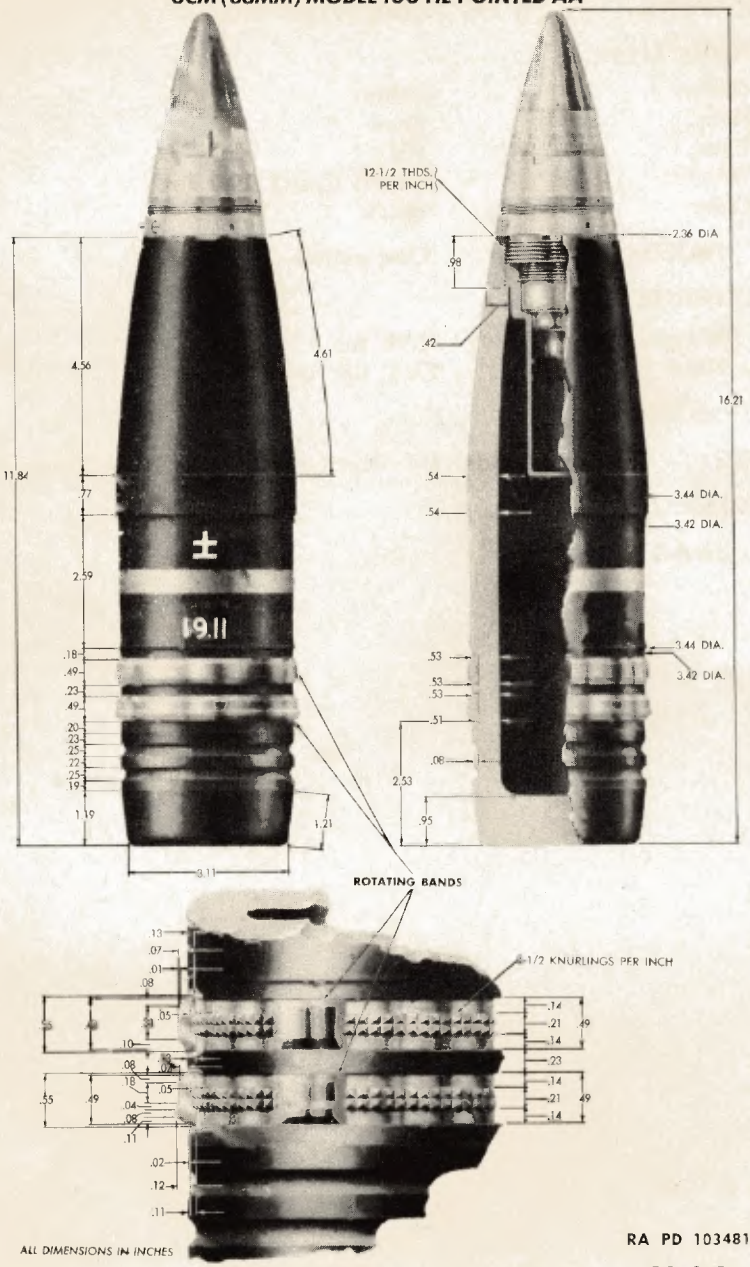
Weight	:	Approximately 1.12 lbs.
Kind	:	Picric acid and Dinitronaphthalene (Tridite)

FUZE: Naval Mortar Fuze

REMARKS: The model number of this projectile and that of the fuze have not been determined.

81-M-3

8CM (88MM) MODEL 100 HE POINTED AA



ALL DIMENSIONS IN INCHES

RA PD 103481

88-A-1

PROJECTILE: 8 cm (88mm) Model 100 HE Pointed AA

WEAPONS: 8 cm Model 99 AA Gun

PROJECTILE:

Caliber	:	88mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 19.9 lbs.
Color	:	Black
BANDS	:	One yellow

CHARGE:

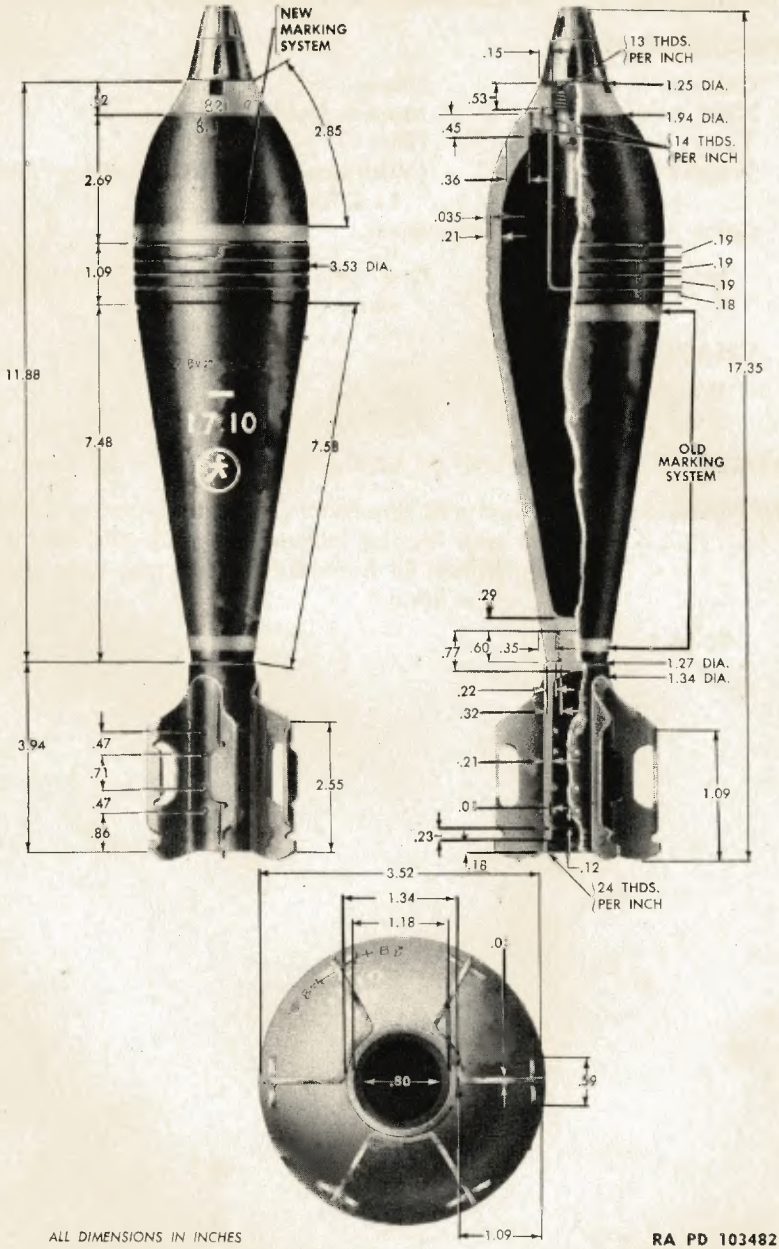
Weight	:	1.98 lbs.
Kind	:	TNT has been found
TRACER	:	None

FUZE: Model 100 Mechanical Time Nose Fuze

REMARKS:

88-A-1

9CM (90 MM) MODEL 94 HE MORTAR SHELL



ALL DIMENSIONS IN INCHES

RA PD 103482

90-M-1

PROJECTILE: 9 cm (90mm) Model 94 HE Mortar

WEAPONS: 9 cm Model 94 Light Infantry Mortar

PROJECTILE:

Caliber	:	90mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	(With fuze—without propelling charge) 11.6 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

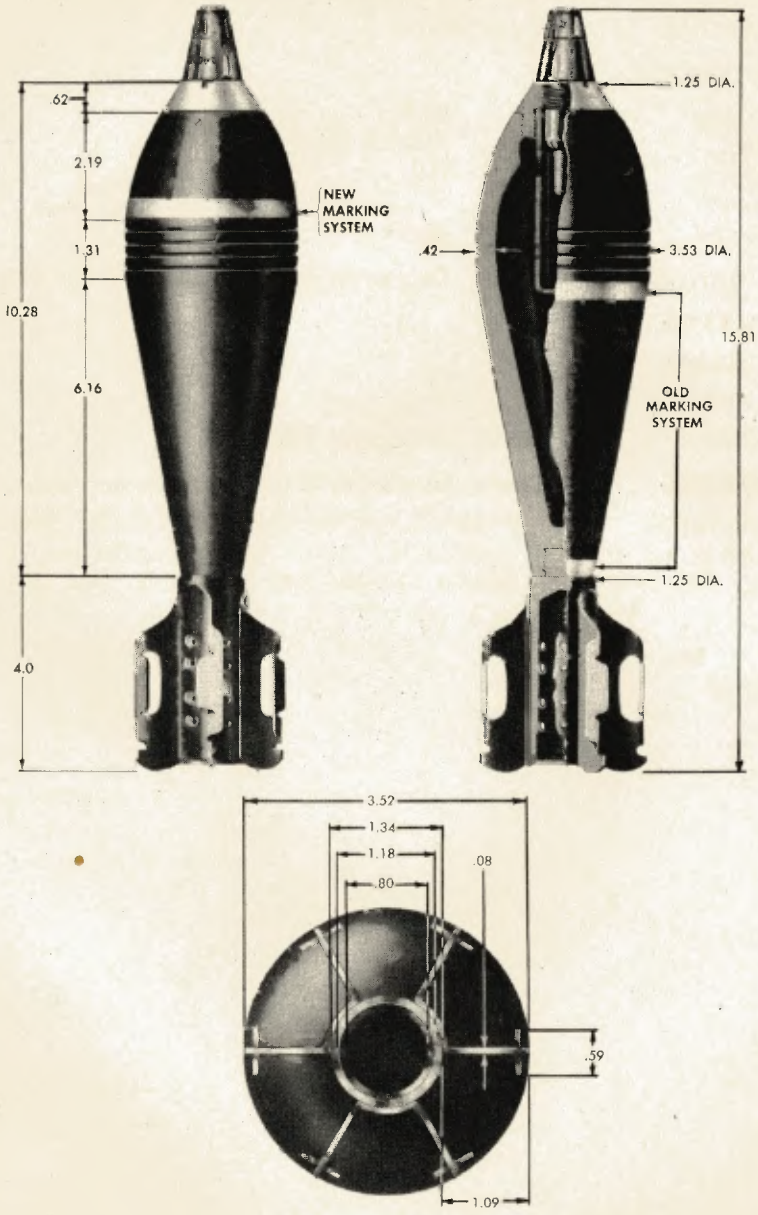
Weight	:	2.36 lbs.
Kind	:	TNT has been found

FUZE Model 93 Mortar Fuze

REMARKS: Captured documents indicate Japanese designation for the mortar this projectile fires in is Model 94 Light Infantry Mortar even though it is 90mm.

90-M-1

9CM (90 MM) HE MORTAR SHELL SEMI-STEEL



ALL DIMENSIONS IN INCHES

RA PD 103483

90-M-2

PROJECTILE: 9 cm (90mm) HE Mortar Semi-steel

WEAPONS: 9 cm Mortar

PROJECTILE:

Caliber	:	90mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	
Color	:	Black
BANDS	:	One green or one yellow and one green

CHARGE:

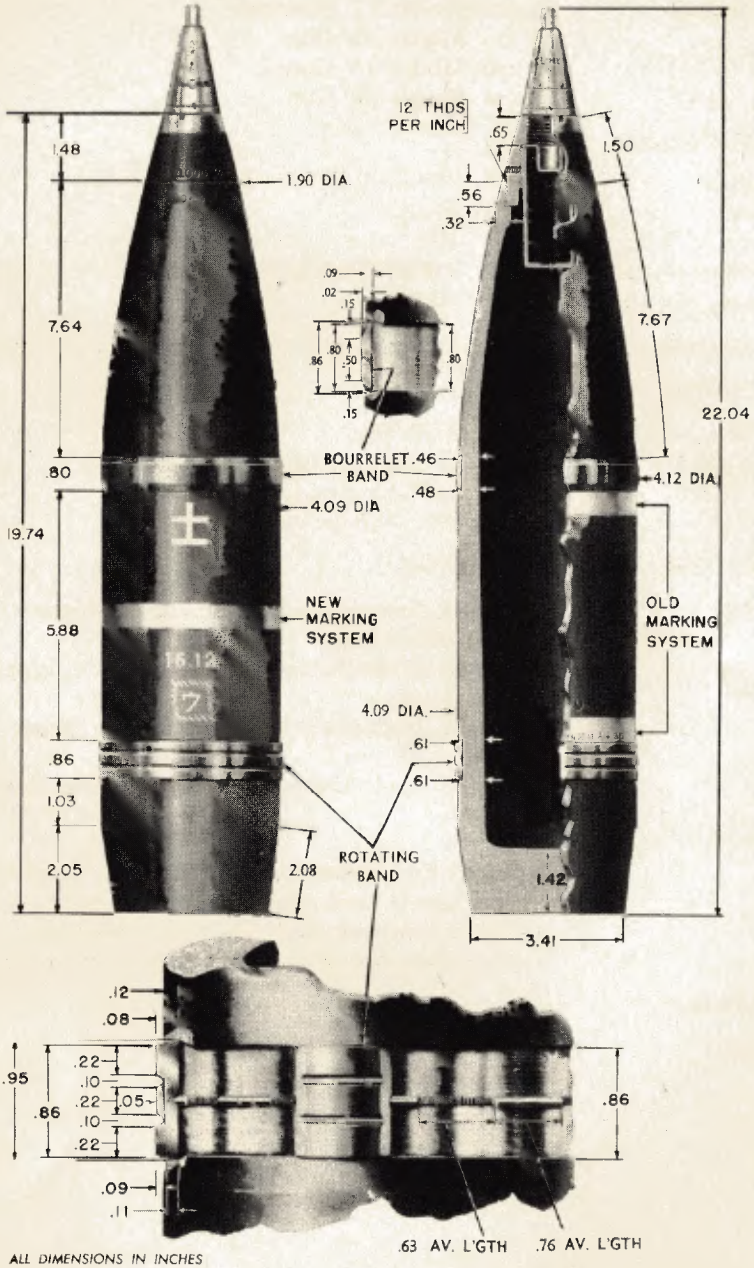
Weight	:	
Kind	:	

FUZES: Model 93 Mortar Fuze

REMARKS: The model number of the mortar from which this projectile is fired has not been determined.

90-M-2

10CM (105MM) MODEL 91 HE POINTED



ALL DIMENSIONS IN INCHES

RA PD 103484

105-A-1

PROJECTILE: 10 cm (105mm) Model 91 HE Pointed

WEAPONS:
10 cm Model 91 Howitzer
10 cm Model 92 Gun
10 cm Model 14 Gun
10 cm Model 38 Gun

PROJECTILE:

Caliber	:	105mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 34.65 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

Weight	:	5.55 lbs.
Kind	:	Mixture of Ammonium Nitrate, Guanidine Nitrate, Cyclonite, or TNT
TRACER	:	None

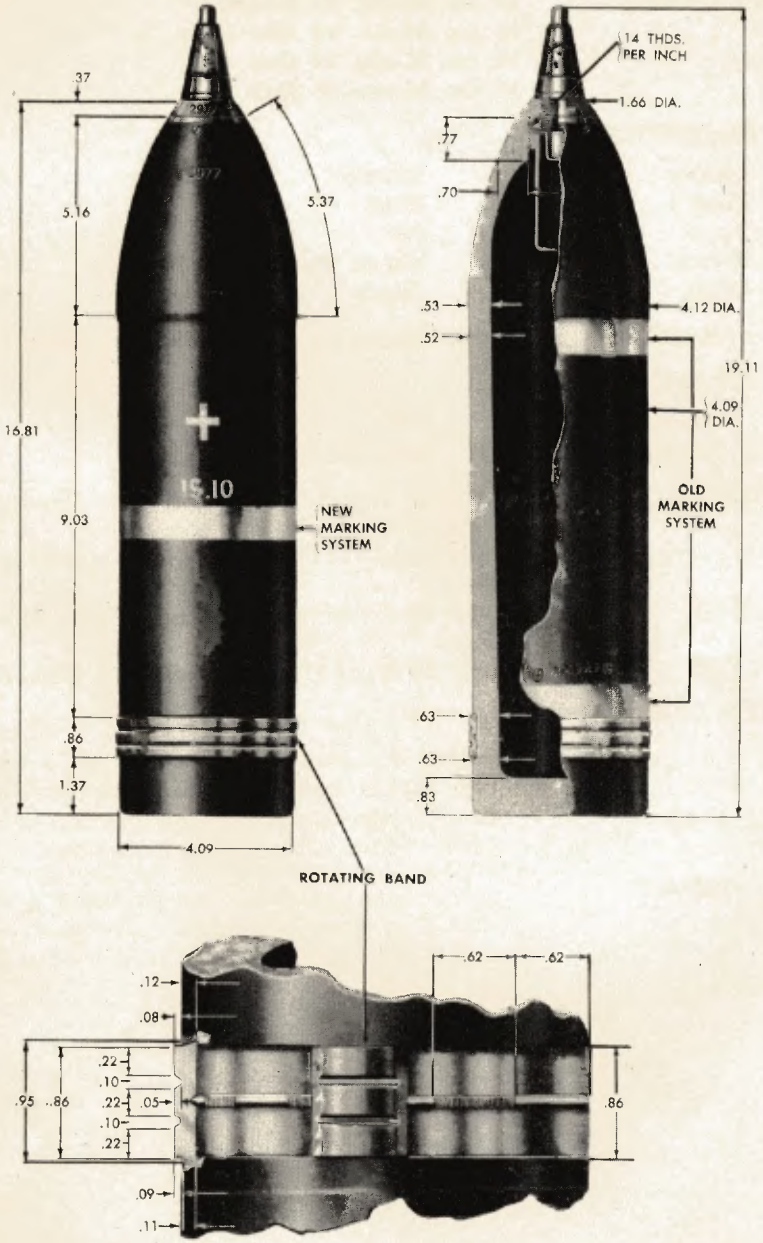
FUZES:
Model 88 Instantaneous (Howitzer-Mortar type) Nose Fuze
Model 88 Short Delay (Howitzer-Mortar type) Nose Fuze
Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS:

Captured documents indicate that the howitzer type fuze is used when this projectile is fired from a howitzer and that a gun type fuze is used when this projectile is fired from a gun.

105-A-1

10CM (105 MM) MODEL 91 HE



ALL DIMENSIONS IN INCHES

RA PD 103485

105-A-2

PROJECTILE: 10 cm (105mm) Model 91 HE

WEAPONS:
10 cm Model 91 Howitzer
10 cm Model 92 Gun
10 cm Model 14 Gun
10 cm Model 38 Gun

PROJECTILE:

Caliber	:	105mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 35.3 lbs.
Color	:	Black

BANDS : One yellow or one yellow and one white

CHARGE:

Weight	:	5 lbs.
Kind	:	TNT has been found

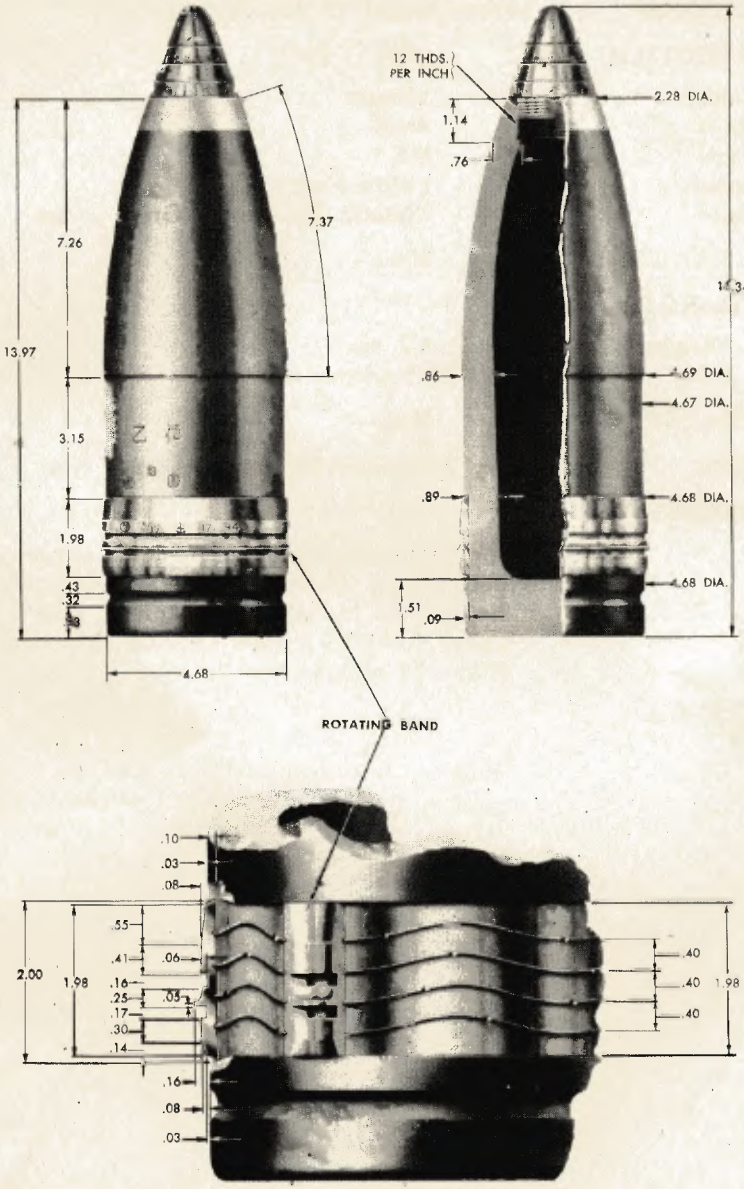
FUZES:
Model 88 Instantaneous (Howitzer-Mortar type) Nose Fuze
Model 88 Short Delay (Howitzer-Mortar type) Nose Fuze
Model 88 Instantaneous (Gun Type) Nose Fuze
Model 88 Short Delay (Gun Type) Nose Fuze

REMARKS:

Captured documents indicate that the howitzer type fuze is used when this projectile is fired from howitzer and that a gun type fuze is used when this projectile is fired from a gun.

105-A-2

12CM (120MM) HE AA [NAVAL]



RA PD 103486

ALL DIMENSIONS IN INCHES

120-A-1

PROJECTILE: 12 cm (120mm) HE AA [Naval]

WEAPONS: 12 cm Model 11 AA Gun [Naval]

PROJECTILE:

Caliber	:	120mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 45.5 lbs.
Color	:	Maroon Body with Green Nose
BANDS	:	None

CHARGE:

Weight	:	3.7 lbs.
Kind	:	Trinitroanisole
TRACER	:	None

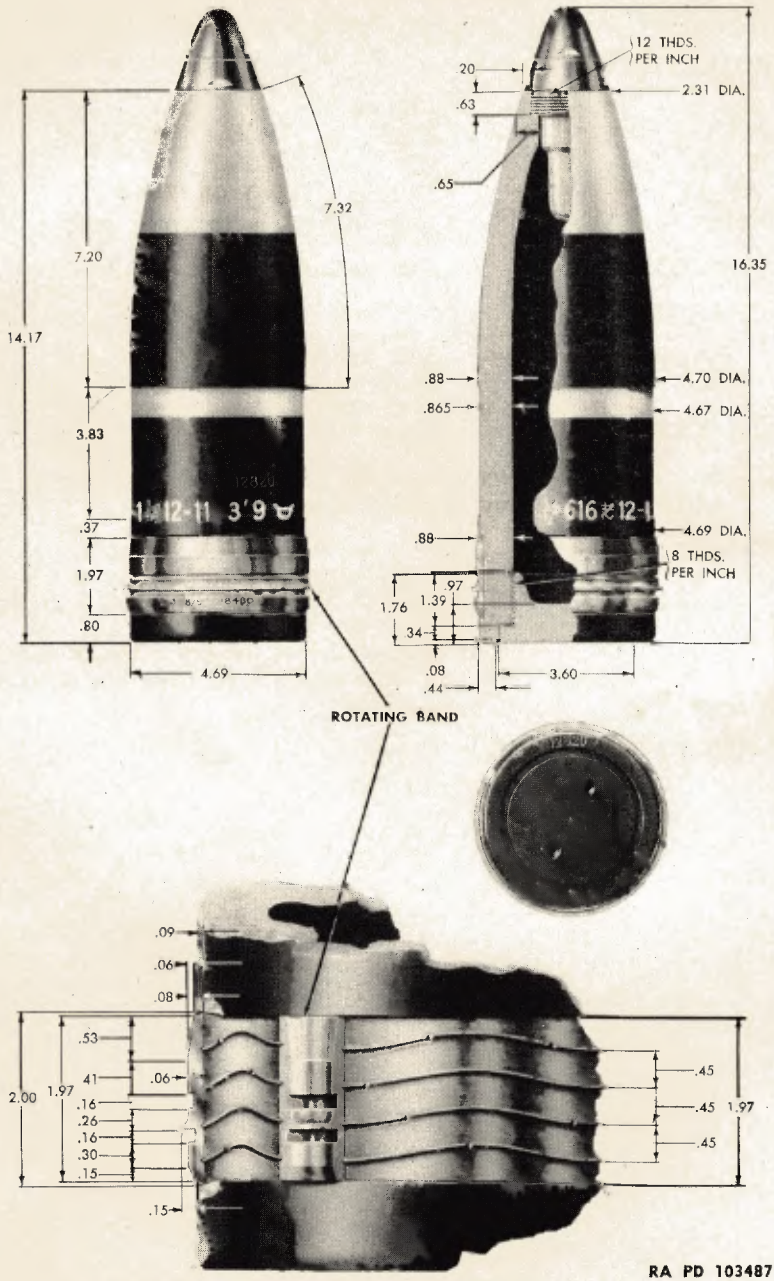
FUZE: Navy Model 91 Mechanical Time Nose Fuze

REMARKS:

The model number of the projectile has not been determined. There are three known modifications of the Model 91 Fuze, giving four fuzes, called Model 91, each varying only slightly from the others.

120-A-1

12CM (120 MM) HE [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103487

120-A-2

PROJECTILE: 12 cm (120mm) HE [Naval]

WEAPONS: 12 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	120mm
Kind	:	Shell
Type	:	HE
Weight	:	(Without Fuze) 45.37 lbs.
Color	:	Maroon body with green nose
BANDS	:	One yellow

CHARGE:

Weight	:	3.92 lbs.
Kind	:	Picric acid has been found
TRACER	:	None

FUZES: Navy Model 88 Nose Fuze
Navy Model 5 Nose Fuze

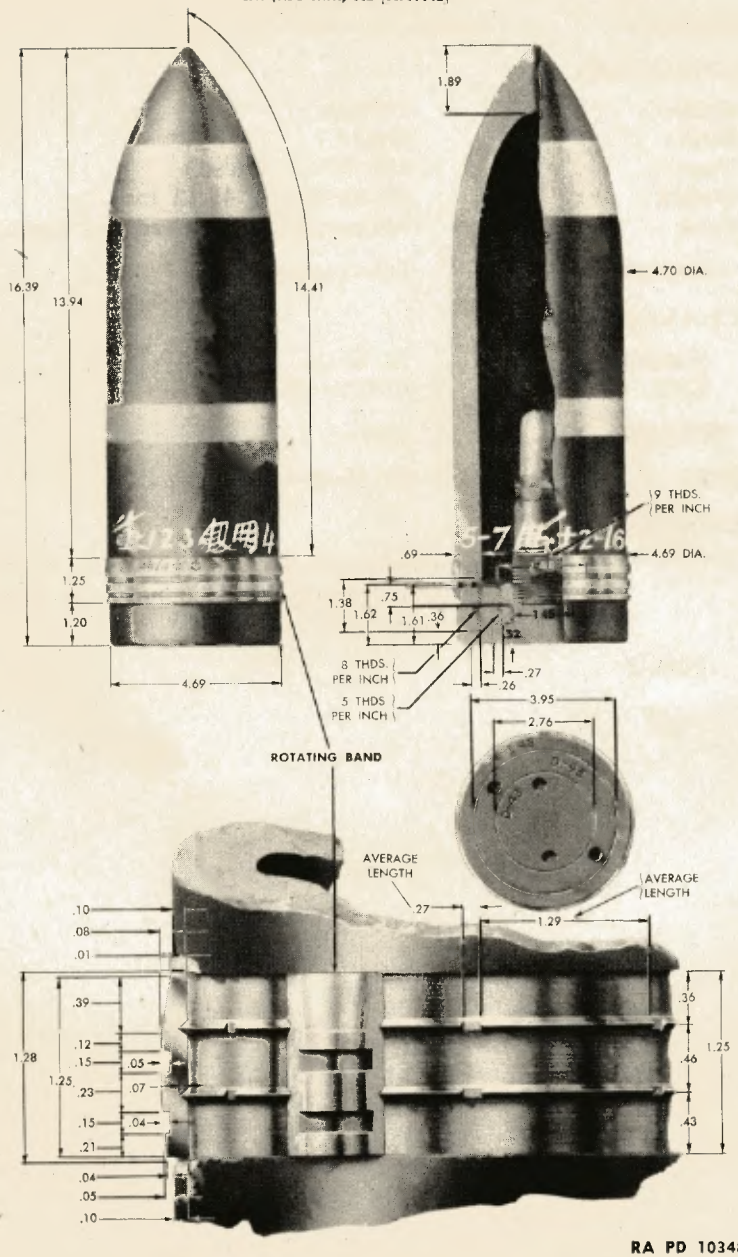
REMARKS:

When the Navy Model 5 Nose Fuze is used an adapter (brass) is necessary.

The Model number of the projectile or that of the gun from which fired have not been determined.

120-A-2

12CM (120 MM) HE [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103488

120-A-3

PROJECTILE: 12 cm (120mm) HE [Naval]

WEAPONS: 12 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	120mm
Kind	:	Shell
Type	:	HE (Base Fuzed)
Weight	:	(With Fuze) 45.12 lbs.
Color	:	Maroon body with red and green nose
BANDS	:	One yellow

CHARGE:

Weight	:	4.6 lbs.
Kind	:	Picric acid
TRACER	:	None

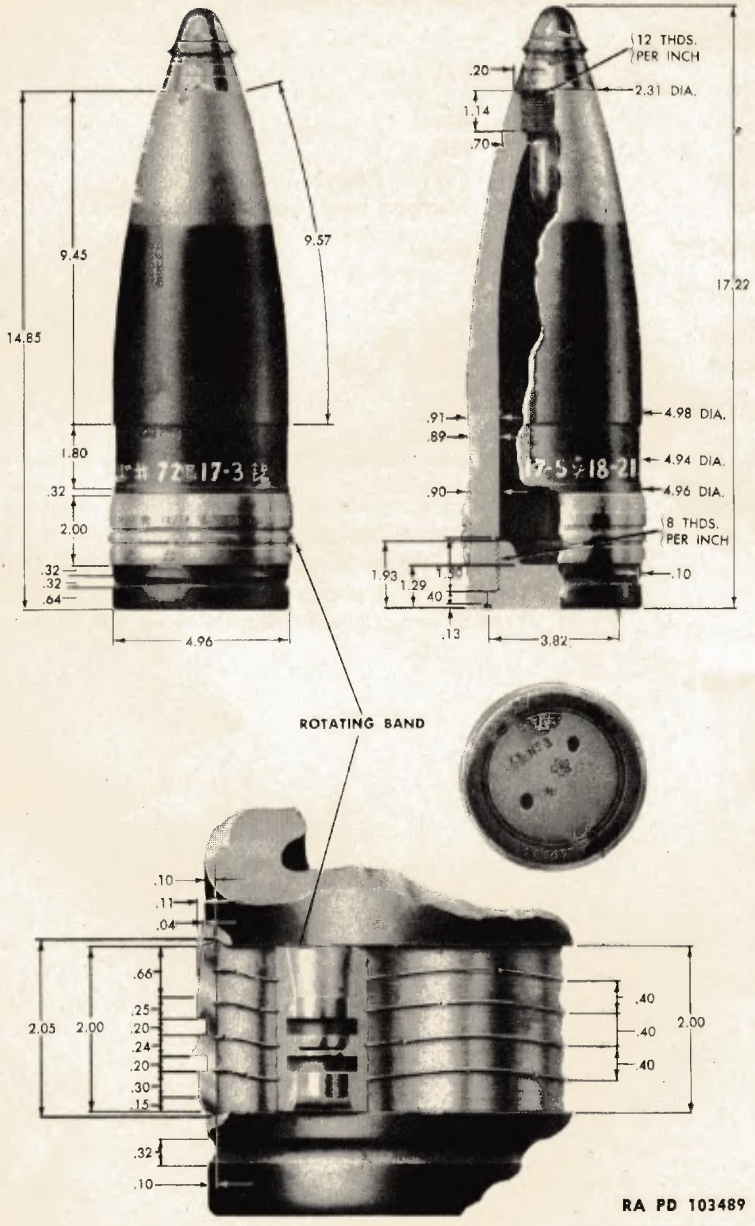
FUZE: Model 3rd Year Base Fuze.

REMARKS:

The model number of the projectile or that of the gun from which fired have not been determined

120-A-3

127 MM HE AA [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103489

127-A-1

PROJECTILE: 127mm (127mm) HE AA [Naval]

WEAPONS: 127mm AA Gun [Naval]

PROJECTILE:

Caliber	:	127mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 50.8 lbs.
Color	:	Maroon body with green nose
BANDS	:	None

CHARGE:

Weight	:	4.15 lbs.
Kind	:	Picric acid
TRACER	:	None

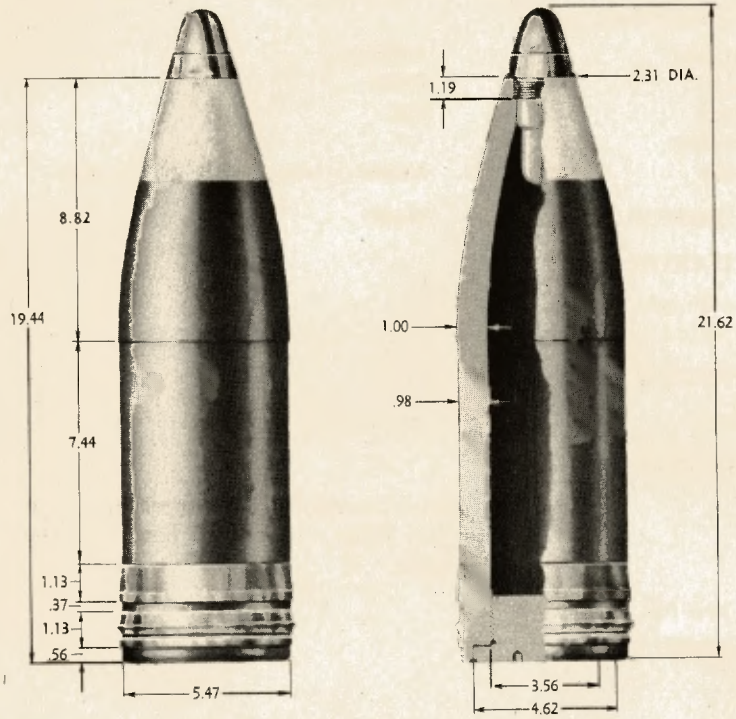
FUZE: Navy Model 91 Mechanical Time Nose Fuze

REMARKS: The model number of the projectile or that of the gun have not been determined.

There are three known modifications of the Model 91 fuze giving four fuzes called Model 91, each varying only slightly from the others.

127-A-1

14CM (140MM) HE [NAVAL]



RA PD 103490

140-A-1

ALL DIMENSIONS IN INCHES

PROJECTILE: 14 cm (140mm) HE [Naval]

WEAPONS: 14 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	140mm
Kind	:	Shell
Type	:	HE
Weight	:	
Color	:	Maroon body with green nose
BANDS	:	None

CHARGE:

Weight	:	
Kind	:	
TRACER	:	None

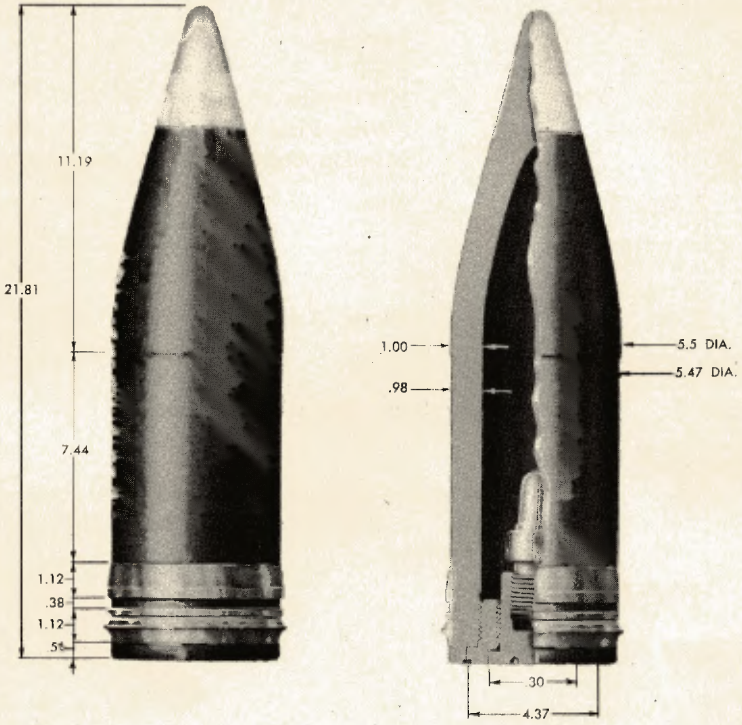
FUZE: Navy Model 88 Nose Fuze

REMARKS:

The model number of the projectile and that of the gun from which fired have not been determined.

140-A-1

14CM (140MM) HE [NAVAL]



DIMENSIONS IN INCHES

RA PD 103491

140-A-2

PROJECTILE: 14 cm (140mm) HE [Naval]

WEAPONS: 14 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	140mm
Kind	:	Shell
Type	:	HE (Base Fuzed)
Weight	:	(With Fuze) 84 lbs.
Color	:	Maroon body with red and green nose
BANDS	:	None

CHARGE:

Weight	:	
Kind	:	Picric Acid
TRACER	:	None

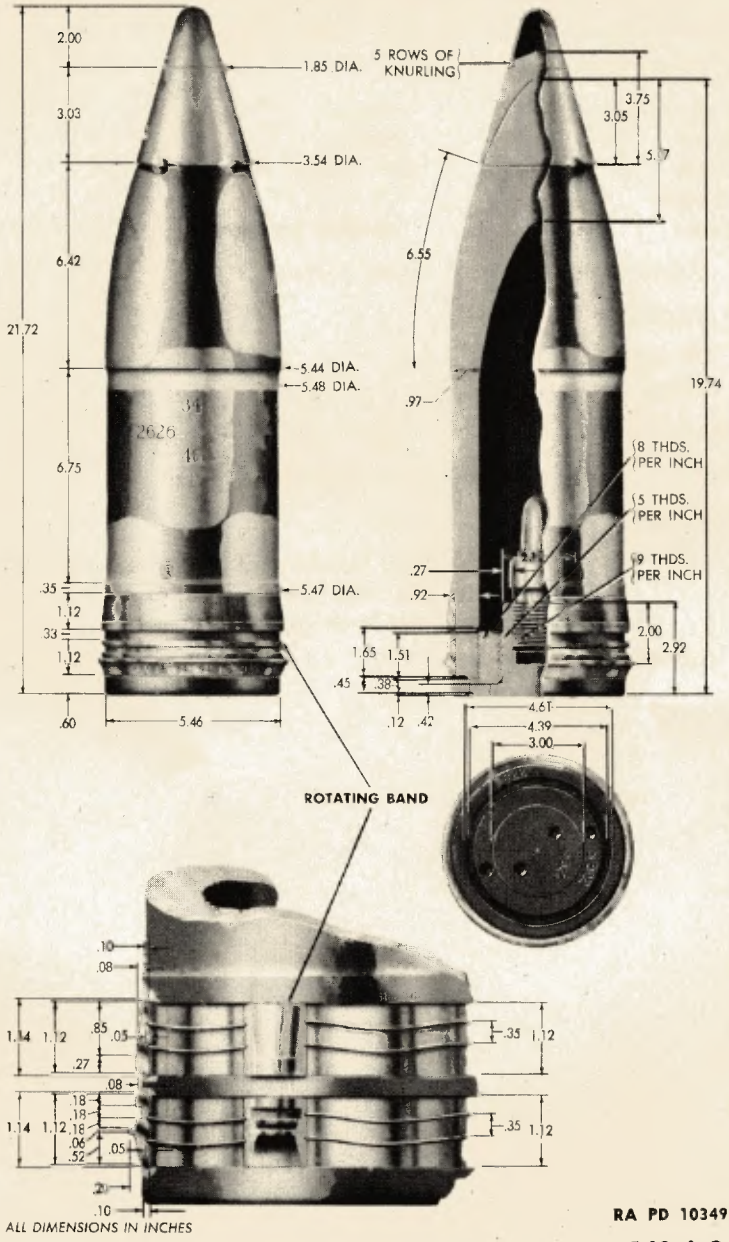
FUZES: Navy Base Detonating Fuze

REMARKS:

The model number of the projectile, that of the gun, or that of the fuze have not been determined.

140-A-2

14CM (140 MM) HE CAPPED [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103492

140-A-3

PROJECTILE: 14 cm (140mm) HE-Capped [Naval]

WEAPONS: 14 cm Low Angle Gun [Naval]

PROJECTILE:

Caliber	:	140mm
Kind	:	Shell
Type	:	HE (Base Fuzed)
Weight	:	
Color	:	Maroon and green
BANDS	:	One yellow

CHARGE:

Weight	:	
Kind	:	
TRACER	:	None

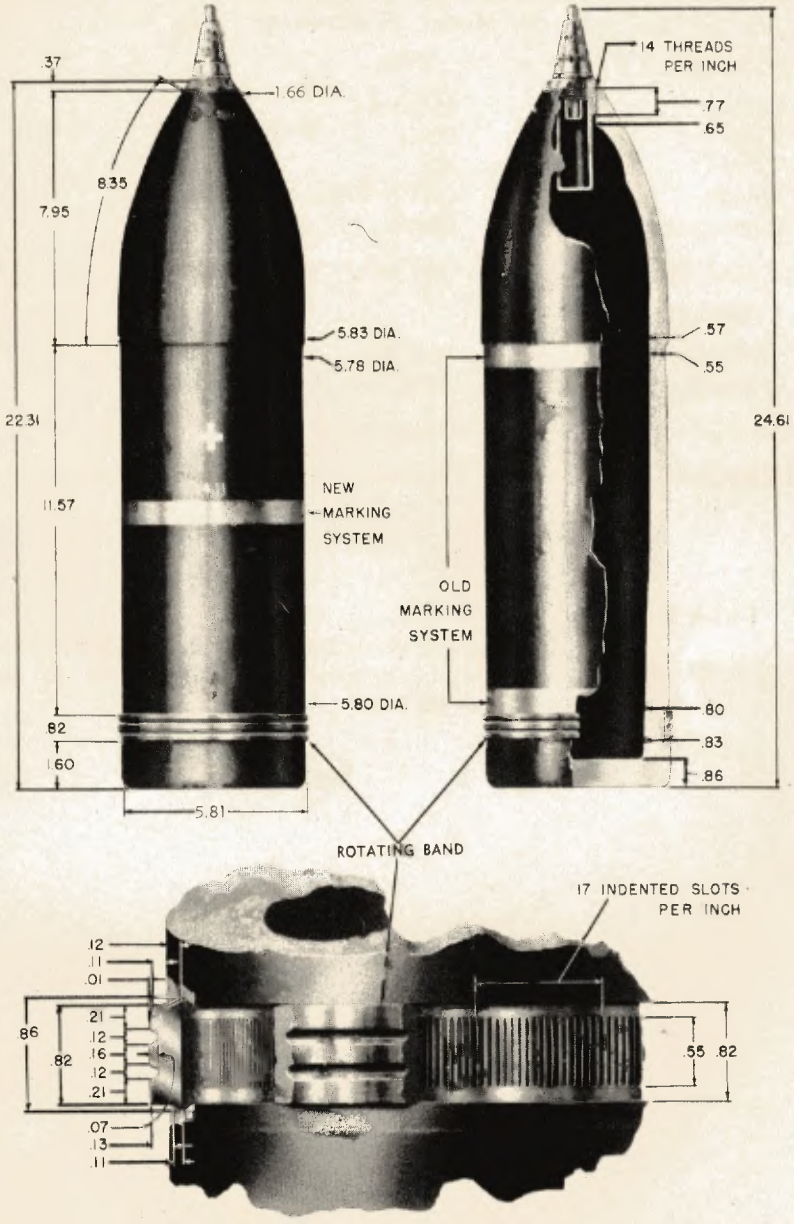
FUZES: Navy Base Detonating Fuze

REMARKS:

The model number of the projectile, that of the gun from which fired, or that of the fuze have not been determined.

140-A-3

15CM (150 MM) MODEL 92 HE



RA PD 103493

ALL DIMENSIONS IN INCHES

150-A-1

PROJECTILE: 15 cm (150mm) Model 92 HE

WEAPONS: 15 cm Model 4 Howitzer
15 cm Model 38 Howitzer

PROJECTILE:

Caliber	:	150mm
Kind	:	Shell
Type	:	HE
Weight	:	(With Fuze) 79.5 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

Weight	:	16.9 lbs.
Kind	:	TNT has been found
TRACER	:	None

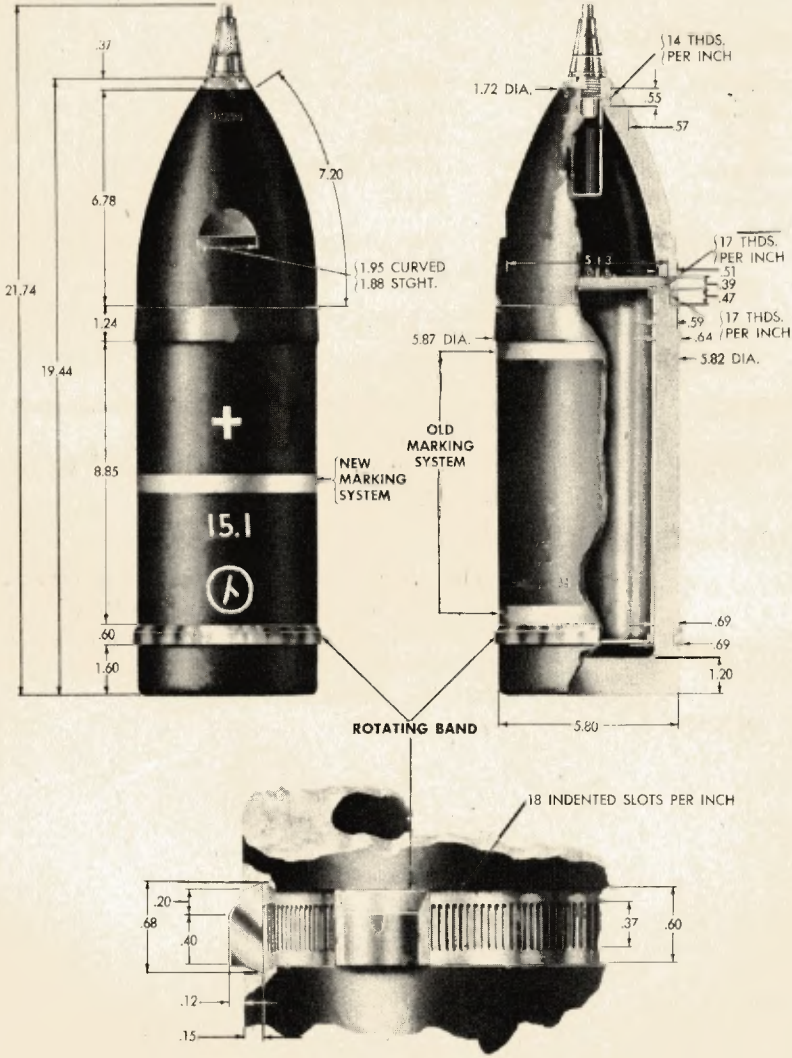
FUZES: Model 88 Instantaneous (Howitzer-Mortar type) Nose Fuze
Model 88 Short Delay (Howitzer-Mortar type) Nose Fuze

REMARKS:

It is not known definitely but it is expected that this projectile can be fired from the 15 cm Model 96 Howitzer.

150-A-1

15CM (150 MM) MODEL 13 SMOKE (WP)



RA PD 103494

150-F-1

ALL DIMENSIONS IN INCHES

PROJECTILE: 15 cm (150mm) Model 13 Smoke (WP)

WEAPONS: 15 cm Model 4 Howitzer
15 cm Model 38 Howitzer

PROJECTILE:

Caliber	:	150mm
Kind	:	Shell
Type	:	Smoke
Weight	:	(With Fuze) 73.9 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white
CHARGE:		9.9 lbs. of white phosphorus 2.4 lbs. of Picric acid
TRACER	:	None

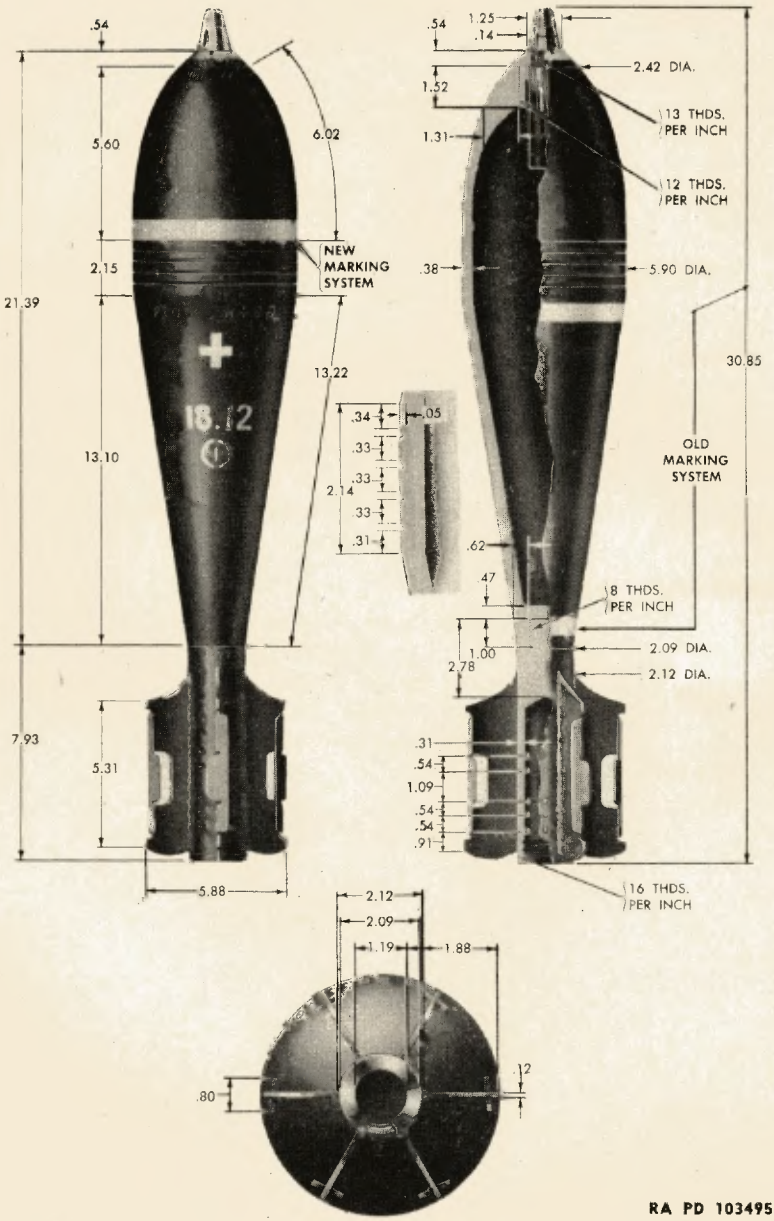
FUZES: Model 88 Instantaneous (Howitzer-Mortar type) Nose Fuze
Model 88 Short Delay (Howitzer-Mortar type) Nose Fuze

REMARKS:

The white phosphorus is inclosed in a brass can. The picric acid burster is in the nose.
It is not known definitely but it is expected that this projectile can be fired from the 15 cm Model 96 Howitzer.

150-F-1

15CM (150 MM) MODEL 96 HE MORTAR SHELL



RA PD 103495

150-M-1

ALL DIMENSIONS IN INCHES

PROJECTILE: 15 cm (150mm) Model 96 HE Mortar

WEAPONS: 15 cm Model 96 Medium Mortar

PROJECTILE:

Caliber	:	150mm
Kind	:	Mortar Shell
Type	:	HE
Weight	:	(With Fuze) 56.6 lbs.
Color	:	Black
BANDS	:	One yellow or one yellow and one white

CHARGE:

Weight	:	13 lbs.
Kind	:	TNT has been found

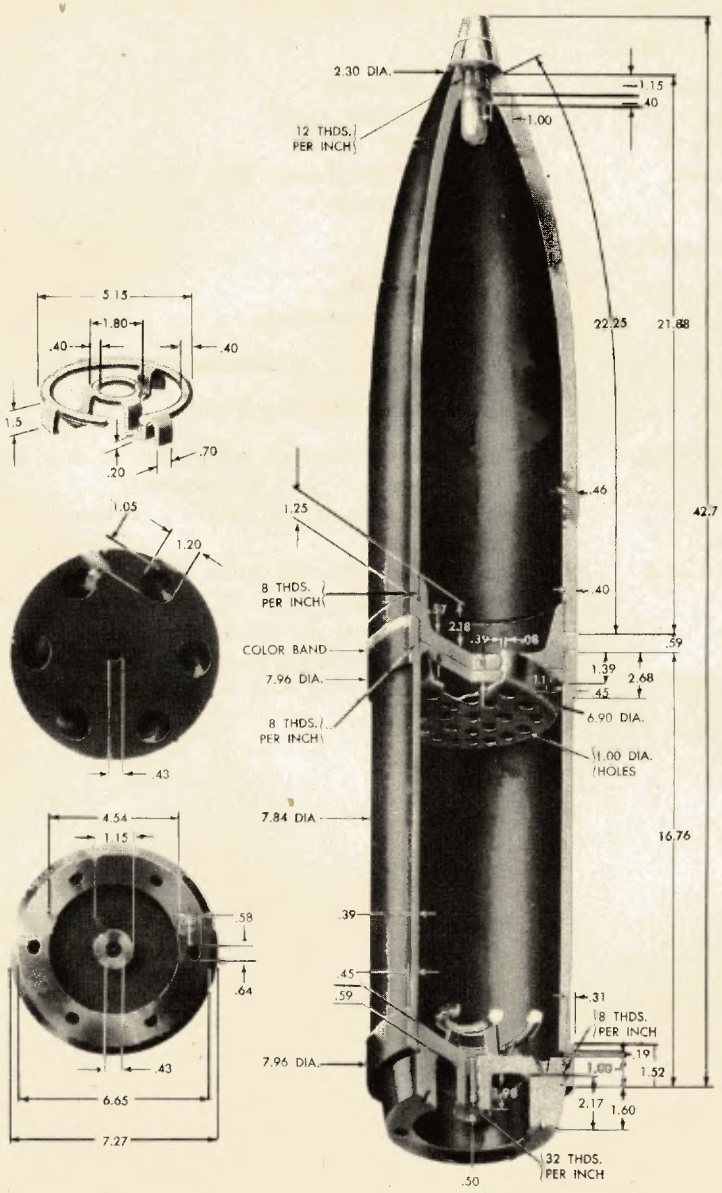
FUZE: Model 93 Mortar Fuze

REMARKS:

The Model 96 is called a Medium mortar although it is 150mm.

150-M-1

20CM (203.2 MM) HE ROCKET [NAVAL]



ALL DIMENSIONS IN INCHES

RA PD 103496

200-R-1

PROJECTILE: 20 cm (203.2mm) Rocket [Naval]

WEAPONS: Trough Type Launcher [Naval]

PROJECTILE:

Caliber	:	203.2mm
Kind	:	Rocket
Type	:	HE
Weight	:	(With Fuze) 195 lbs.
Color	:	Maroon

CHARGE:

Weight	:	34.4 lbs.
Kind	:	Trinitroanisole
Propellent	:	18.6 lbs. of Double base powder

FUZE: Point Detonating Nose Fuze

REMARKS: The model number of the rocket or that of the fuze have not been determined.

The rocket is spin stabilized by inclined nozzles in the base.

The case for the HE head is the same as the projectile body on a 20 cm Naval HE Shell and may have a rotating band seat although there is no rotating band. Rockets have been found both with and without the seat.

200-R-1

APPENDIX I

CONVERSIONS
Millimeters to Inches

MM	IN	MM	IN	MM	IN
1	.03937	39	1.54	77	3.03
2	.0787	40	1.58	78	3.07
3	.1181	41	1.61	79	3.11
4	.1575	42	1.65	80	3.15
5	.1969	43	1.69	81	3.19
6	.2363	44	1.73	82	3.23
6.4	.250	44.5	1.75	82.6	3.25
7	.2756	45	1.77	83	3.27
8	.315	46	1.81	84	3.31
9	.354	47	1.85	85	3.35
10	.3937	48	1.89	86	3.39
11	.433	49	1.93	87	3.43
12	.473	50	1.97	88	3.47
12.7	.500	50.8	2.00	88.9	3.50
13	.512	51	2.01	89	3.50
14	.551	52	2.05	90	3.54
15	.591	53	2.09	91	3.58
16	.63	54	2.13	92	3.62
17	.67	55	2.17	93	3.66
18	.709	56	2.20	94	3.70
19	.748	57	2.24	95	3.74
19.1	.750	57.2	2.25	95.4	3.75
20	.788	58	2.28	96	3.78
21	.826	59	2.32	97	3.82
22	.866	60	2.36	98	3.86
23	.906	61	2.40	99	3.90
24	.945	62	2.44	100	3.937
25	.985	63	2.48	101	3.98
25.4	1.00	63.5	2.50	101.6	4.00
26	1.02	64	2.52	102	4.02
27	1.06	65	2.56	103	4.06
28	1.10	66	2.60	104	4.10
29	1.14	67	2.64	105	4.14
30	1.18	68	2.68		
31	1.22	69	2.72		
31.8	1.25	69.8	2.75		
32	1.26	70	2.76	200	7.874
33	1.30	71	2.80	300	11.811
34	1.34	72	2.84	400	15.748
35	1.38	73	2.88	500	19.685
36	1.42	74	2.91	600	23.622
37	1.46	75	2.95	700	27.559
38	1.49	76	2.99	800	31.496
38.1	1.50	76.2	3.00	900	35.433

APPENDIX II

CONVERSIONS

Decimals to Fractions in Inches

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

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