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SMALL SCALE GAP TEST (SSGT) DATA COMPILATION: 1959-1972. VOLUME I. UNCLASSIFIED EXPLOSIVES

James N. Ayres, et al

Naval Ordnance Laboratory
White Oak, Maryland

26 October 1973

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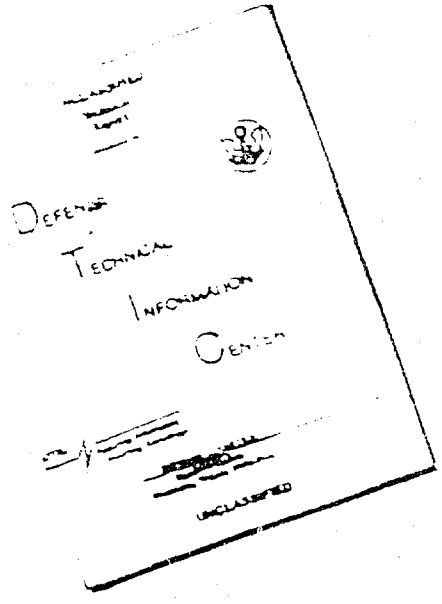

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Over forty different explosives and types of explosives compositions have been fired in the Small Scale Gap Test (SSGT) by the Initiation Research Group at the Naval Ordnance Laboratory (NOL) during the period 1959 to 1972. Many times there have been: replicate firing, firing at high and low temperatures, batch-to-batch variational studies, tests of influence of composition on sensitivity, etc.

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Secondary Explosives
Heat Resistant Explosives
Plastic-Bonded Explosives
Booster Explosive
Varicomp Explosives

Block No. 20

These data -- over 500 data points derived from over 12,000 shots have been compiled into the present document in a manner designed to make the data readily available to the reader. Test methods have been described. A minimal amount of discussion of the data has been included to demonstrate some of the ways the data can be used. This report is in two volumes of which this is Volume I.

NOLTR 73-132

SMALL SCALE GAP TEST (SSGT) DATA COMPILATION; 1959-1972

Volume I Unclassified Explosives

Prepared by:
J. N. Ayres
L. J. Montesi
R. J. Bauer

ABSTRACT: Over forty different explosives and types of explosives compositions have been fired in the Small Scale Gap Test (SSGT) by the Initiation Research Group at the Naval Ordnance Laboratory (NOL) during the period 1959 to 1972. Many times there have been: replicate firing, firing at high and low temperatures, batch-to-batch variational studies, tests of influence of composition on sensitivity, etc. These data -- over 500 data points derived from over 12,000 shots have been compiled into the present document in a manner designed to make the data readily available to the reader. Test methods have been described. A minimal amount of discussion of the data has been included to demonstrate some of the ways the data can be used. This report is in two volumes of which this is Volume I.

EXPLOSIONS DYNAMICS DIVISION
EXPLOSIONS RESEARCH DEPARTMENT
NAVAL ORDNANCE LABORATORY
WHITE OAK, MARYLAND

NOLTR 73-132 26 October 1973

Small Scale Gap Test (SSGT) Data Compilation; 1959-1972
Volume I: Unclassified Explosive Data

The present report is a data compilation of the results of many Small-Scale Gap Tests, and should be of use in designing explosive trains of many types and of providing basic data for the assessment of the safety and reliability of such trains or components thereof. The compilation is far from complete, and for that reason has been published in a side-stiched prepunched format. At the option of the user, this document can be unstapled and put into standard three ring binders (four and one-quarter inches on centers) to aid in using (by keeping the document open at the point of use) and to aid in updating and augmenting by the replacement by or insertion of pages that will from time to time be sent to the holder of this document.

The work reported herein was supported by many projects, however the majority was done under:

(1) "Explosion Initiation and Safety", ORD-332-004-092-1-UF-354-314, and

(2) "The Investigation of High and Low Temperature Resistant Explosive Devices" (Work conducted for NASA, Manned Spacecraft Center, Houston, Texas) under Task NOL-787/NASA T-32602 (G)

The identification of commercial materials implies no criticism or endorsement of them by the Naval Ordnance Laboratory.

The total effort involved is a summation of many different activities involving the tedious, repetitious handling of inert structures and live explosives, countless operations of checking and rechecking, fastidious attention to manifold detail, development and refinement of procedures and techniques. It is impossible to quantify the importance and amount of effort of the contributors. Instead we will merely list in alphabetical order the scientists, technicians, and ordnancemen who have contributed directly and significantly to the work.

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Technicians	C. Goode, C. Randall

Ordnancemen L. Bilbo, B. Brooks, T. Brown, A. Cheswick, E. Coburn, D. Crump, C. Davis, J. Dorsey, J. Farr, W. Fleming, R. Funk, J. Gurick, B. Holland, J. Homiak, W. Johnson, L. Jones, P. Layne, J. Manning, E. Morgan, E. Murray, L. Murphy, E. Nacke, J. Oliphant, J. Pennypacker, B. Poole, J. Robinette, F. Rugieri, O. Sauser, S. Stackhouse, B. Swigert, G. Thomas, P. Thomas, W. Thornton, E. Tyree, O. Ware, F. Zapatocki.

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The two technicians: Goode and Randall, deserve special mention, for without their unremitting vigil and care on a day-by-day basis overseeing the vast number of detailed steps -- this work would not have been done.

This report is divided into two volumes of which this is Volume I.

ROBERT WILLIAMSON II
Captain, USN
Commander

C. J. ARONSON
By direction

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1. SCOPE OF REPORT

1.1 The purpose of this report is to make available, as a compendium, Small Scale Gap Test (SSGT) sensitivity data obtained by the Initiation Research Group at the Naval Ordnance Laboratory since the inception of the test. The test itself will be described, as also the significance of each of the types of information on the data sheets. Some minimal discussion of the data will be used (1) to illustrate the stability of the SSGT system over the period; (2) to show some of the ways that the data can be used, and (3) some of the frustrating manifestations that on occasion occur. The report is in loose-leaf form to permit updating, corrections and the incorporation of new data.

1.2 We point out that this is a compilation of over a decade of work by nearly three dozen engineers, technicians and ordnancemen. The work was done for many different projects and for a variety of uses; much of the data have been reported in relatively inaccessible documents. We therefore have pulled the information into one place and have ignored, in general, any previous publications. However, should the reader encounter the same data in other sources and find, by comparison, that the two do not agree, the data in this report should be taken to supersede any published previously. This is because we have returned to the original "load orders", and loading and firing data and have applied the latest computational and statistical techniques for reducing the data.

1.3 There are several areas of information which are only partially complete at the date of first publication: (1) chemical source information, such as vendor, batch or lot identification, date of manufacture, chemical analysis, sieve analysis, etc.; (2) transformations of the data as aids in comprehension or use, e.g., plots of sensitivity versus density (or versus percent of theoretical maximum density), plots of density versus loading pressure, batch-to-batch variational studies, etc. In the future we hope, as time and money permit, to augment the present report by publishing supplementary pages of such data to be interleaved at appropriate points. It is for this reason that the report is published in a loose-leaf form.

2. BACKGROUND

2.1 THUMB-NAIL HISTORY. Standarization of the Small Scale Gap Test began in June 1959. The test as it was reported[1] in 1961 has been changed in a few minor details which will be described later in this report. Data obtained at any time throughout this period are held to be of equal validity since we believe that no essential detail of the test has been altered. Through the years we have applied certain advanced statistical techniques which in turn have permitted refinements which should reduce certain types of experimental error (paragraphs 2.3 to 2.10). The SSGT or some variant of it has been called out in specifications for a number of military explosives to assure explosive sensitivity and output performance. Experience at NOL and other laboratories has shown certain difficulties in meeting some of the requirements originally established for the SSGT. Therefore, we have decided to establish more realistic requirements. Also, cost reductions can be realized by changing the detonator and the donor-loading method. The new detonator is also much less susceptible than the old one to unintentional initiation by electrostatic discharge in the leads-to-case mode.

2.2 The new version of the SSGT, incorporating the above-mentioned changes, is designated SSGT(A); its detailed description is given in Section 4. Figure 1 compares the SSGT and SSGT(A) arrangements. The specific changes which go into the SSGT(A) are:

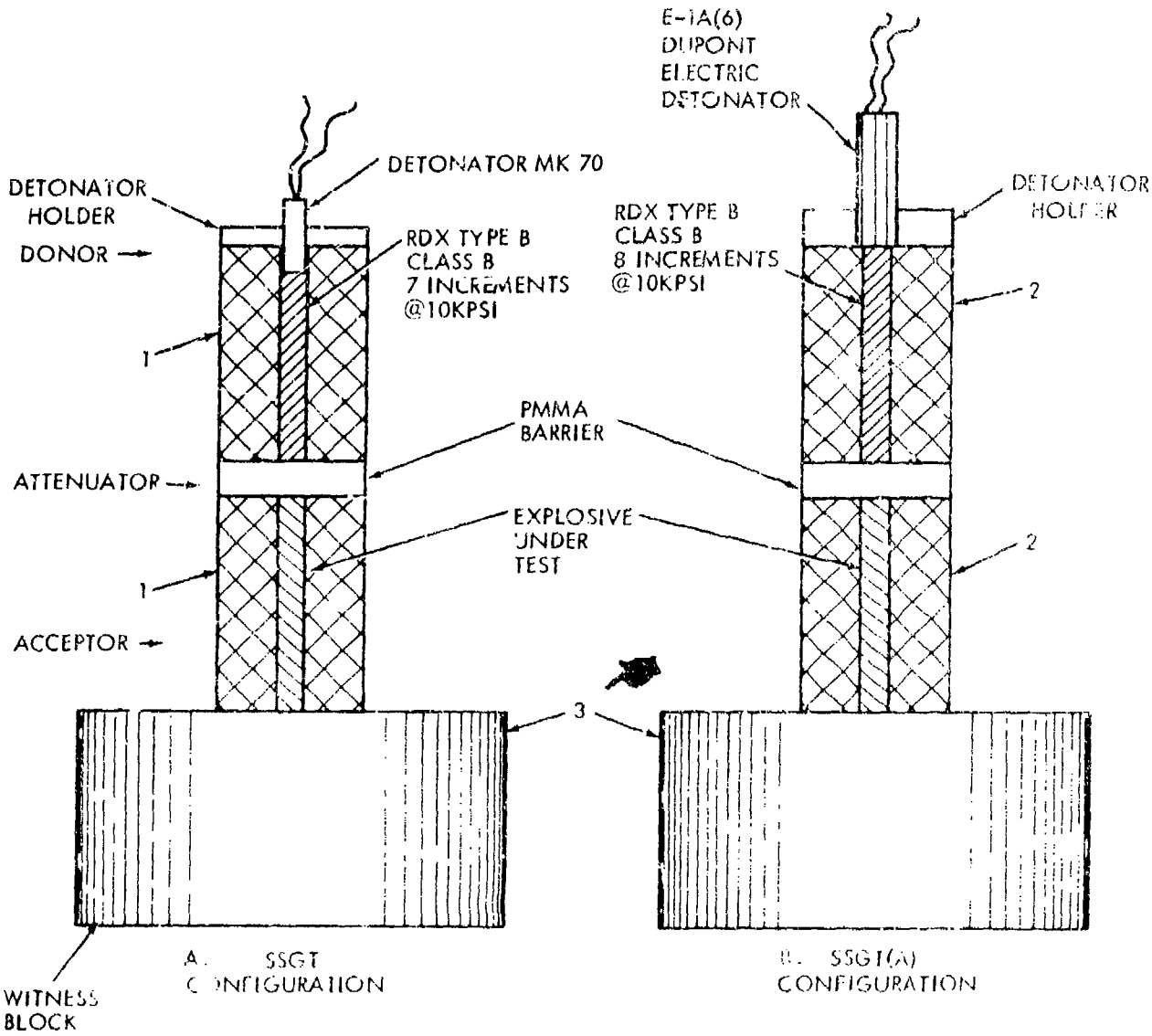
a. Specifies easier-to-get brass for the test bodies;

b. Opens up the steel-dent output limits for the loaded donors, and at the same time eliminates hardness corrections on output readings of the donors;

c. Calls for flush loading of donors; and

d. Uses E-1A(6) DuPont Electric Detonator in lieu of Detonator Mk 70.

1. References are listed on page 40.



1 SSGT BODY (BRASS: QQ-B-626, COMP 11)
2 SSGT BODY (BRASS: QQ-B-626, COMP 11 OR COMP 22)
3 STEEL DENT BLOCK 3.00"O.D. X 1.50"; NAVORD DRAWING NO. 2426916 (PC.1)

FIG. 1 COMPARISON OF THE SSGT AND SSGT (A) CONFIGURATION

2.3 Statistical techniques for treatment of the data have gone through considerable evolution. At first, the Bruceton[2,3] "stair-step" test and analytical procedures were used. There are three features of the above procedures which have been modified during the time span of this report; initially they were:

a. The probability of functioning was assumed to be a normally distributed (Gaussian) function of the shock intensity.*

b. The test levels had to be equally spaced in the shock-stimulus domain.

c. The "criterion of fire" in the go/no-go testing has been taken to be one half of the zero-gap steel dent output (corrected for block hardness) during the particular Bruceton firing test.

2.4 DISTRIBUTION FUNCTION. For a number of reasons the Gaussian distribution function has been replaced by the Logistic distribution function.[4] Section 5 of reference 5 gives a detailed description and comparison of the two distributions and an in-depth discussion of the use of GO/NO-GO statistics in explosives testing, but no discussion of why we have chosen the Logistic distribution function. References 6, 7, and 8 deal with the estimation of high and low probability firing levels... one of the major uses of SSGT data. Although these three reports deal specifically with examples from the field of Electro-Explosive Device (EED) sensitivity, the concepts are fully valid when dealing with shock sensitivity determinations. In particular, (1) the problems with small sample size Brucetons (anything under 100 shots is considered "Small Sample Size"), and (2) the extra conservatism inherent in using the logistic distribution, are discussed. In addition to giving more conservatism in safety and reliability estimates, and also being probably more representative of real-life explosive systems than the Gaussian distribution, the logistic distribution is more readily adaptable to high-speed computer programming.

2.5 THE HANDLING OF SCATTERED GO/NO-GO DATA. The inherent assumption of the Bruceton analytical method -- that all the tests at a given level were actually at that level -- is an unavoidable source of imprecision. The PMMA** gap spacers, being molded or machined to practical tolerances, can have a variability in thickness which is appreciable compared to the step size. Following the original work of Golub and Grubbs,[9] which assumed the Gaussian probability domain, we have developed a method for treating scattered data in the logistic probability domain.[10]

2.6 Not only are we able to use the Logistic probability distribution function, but no longer are we constrained to testing at discrete levels. We use the exact measured barrier thicknesses rather than their nominal values. For instance in Figure 2a, at the 5-1/8 DBG

*The Gap Decibang is the shock intensity unit, X, which is related to the barrier thickness, GT, (in mils), by X = 30 - 10 log GT.
**PMMA, polymethylmethacrylate, is a generic name.

level (which corresponds to a thickness of 307.3 mils) we used barriers measuring 306.1 mils minimum to 307.9 mils maximum, whose corresponding shock intensity values range between 5.141 to 5.116 DBg. The nine individual values were the ones used in the maximum likelihood analysis rather than the single 5.125 value, nine times. There is another advantage to this procedure. The Bruceton analysis requires that the data be acquired in a very specific stair-step pattern. Shot 21 and 22 in Figure 2a, and Shots 3, 4, and 5 in Figure 2b, could not have been used in a Bruceton analysis but are valid data for the maximum likelihood analysis. Thus no shots were wasted -- a valuable attribute in these times of tight money.

2.7 In passing, we point out that the stair-step method of collecting data is still highly preferred because it masses the data around the 50% response point. While it is true that the maximum-likelihood method takes into account data which may be far away from the 50% point, such data have little relative weight and cannot, therefore, be used efficiently.

2.8 SSGT OUTPUT DETERMINATION BY STEEL DENT MEASUREMENT. It had been hoped that by making the SSGT acceptor explosive column long (its length is 7 1/2 diameters) that the explosive would be decoupled from the initiating shock. This would have made possible a measure of the characteristic explosive vigor of the acceptor explosive for each Go observed. For some explosives this hope was nearly realized. For others this is far from true.

2.9 Figure 3 illustrates the marked difference in this report between two explosives: DIPAM and RDX. DIPAM gives a clear cut differentiation in output between a Go and a No-Go. The output is very nearly at the maximum or else it is virtually nil. On the other hand the output of RDX near the 50% response point shows a gradation of responses from a few mils dent to relatively large values which are, however, less than would be observed if the acceptor column were initiated with no attenuation between the donor and the acceptor. Other work, not covered in this report shows that as the shock strength is increased above that for the 50% response level, the output asymptotically increases to the zero gap value.

2.10 THE CRITERION OF FIRE. At the inception of the SSGT (as described in reference 1) it was decided to set the criterion for a Fire (or Go) as being one half of the zero-gap dent output* of the acceptor. Therefore two of the acceptors were first fired with no barrier and the Go/No-Go criterion was set at 1/2 of the average of the dents from these shots. More recently it has been decided that two measurements of the zero-gap output were really too few. The procedure now used is exemplified in Figure 2. Twenty-five pieces are loaded. They are assigned to the test in random order.

*A firing at zero-gap (no PMMA barrier between the donor and acceptor) has been dubbed by our ordnancemen as a "barefoot shot" or "barefoot dent".

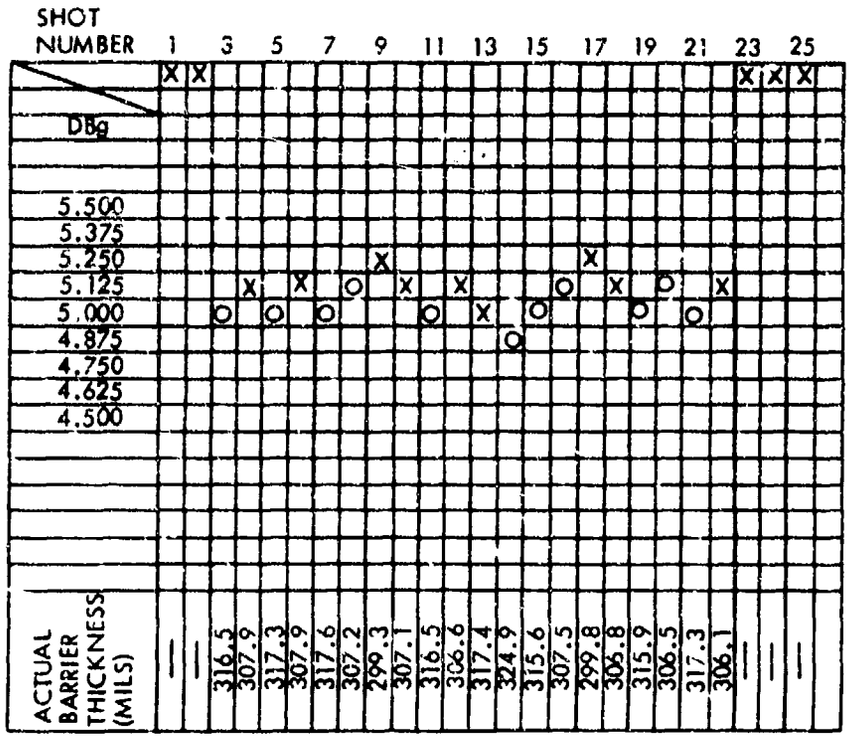


FIG. 2a
RDX/STEARIC ACID
(96.7/3.3)
@16KPSI

BRUCETON ANALYSIS	MAXIMUM LIKELIHOOD ANALYSIS
$\bar{X}$=5.090	$\bar{X}$=5.091
s=0.1981	g=0.0496
s_m=0.063	s_m=0.029
n=19	n=20

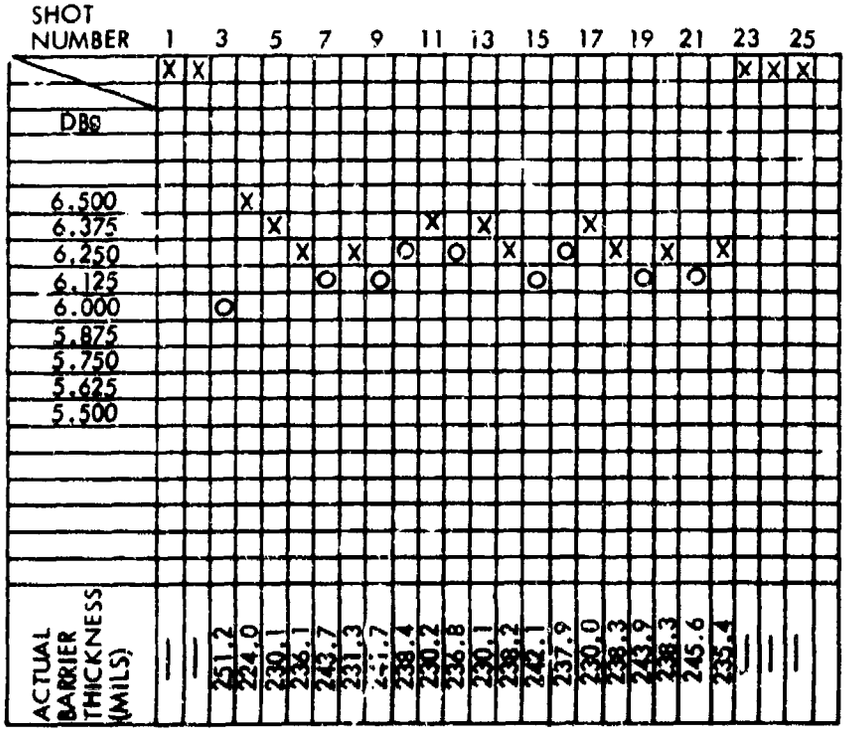


FIG. 2b
RDX/STEARIC ACID
(96.7/3.3)
@ 32KPSI

BRUCETON ANALYSIS	MAXIMUM LIKELIHOOD ANALYSIS
$\bar{X}$=6.234	$\bar{X}$=6.228
s=0.0443	g=0.0212
s_m=0.0193	s_m=0.0158
n=17	n=20

FIG. 2 TYPICAL DATA RECORDS, COMPARING THE BRUCETON WITH THE MAXIMUM LIKELIHOOD LOGIT ANALYSIS

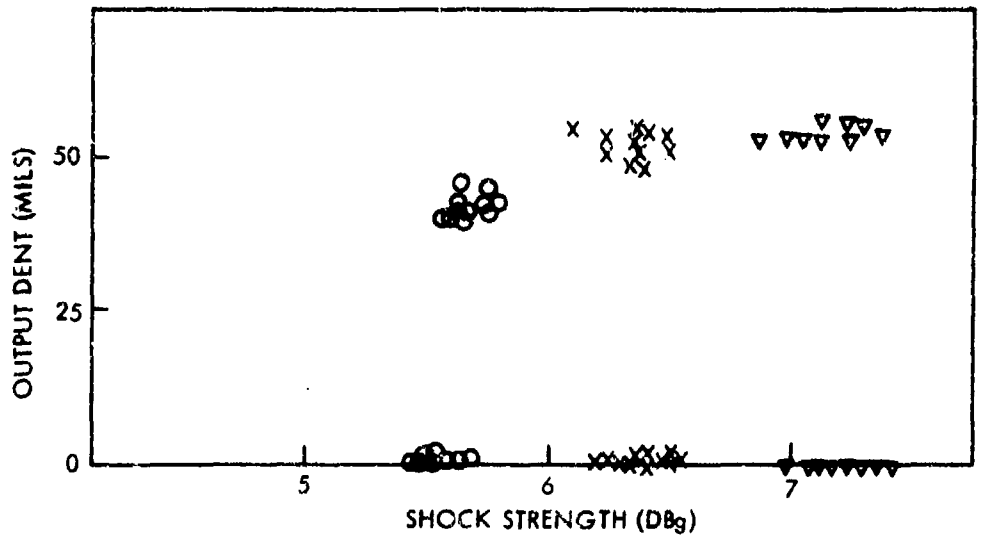


FIG. 3a
DIPAM

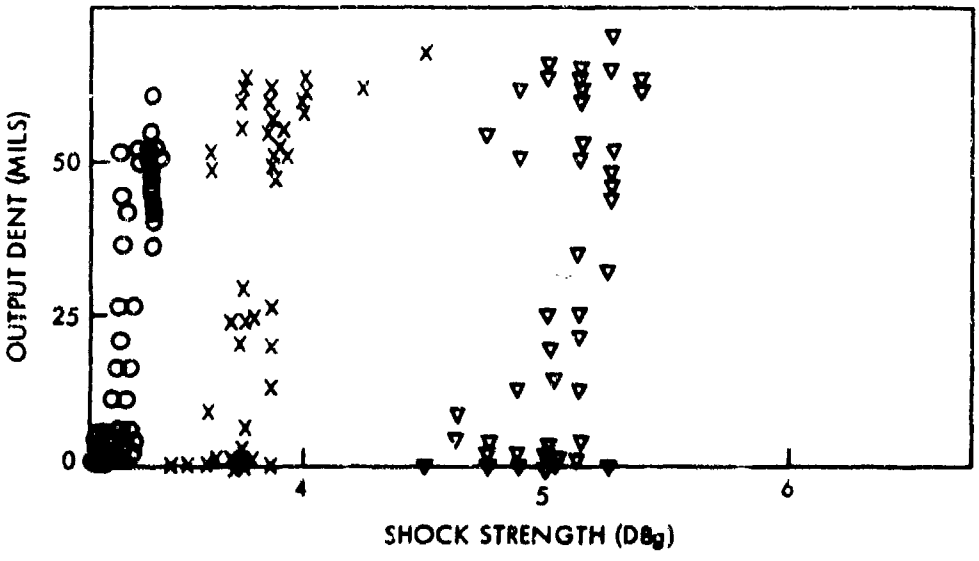


FIG. 3b
RDX

O LOADED AT 8 KPSI
x LOADED AT 32 KPSI
▽ LOADED AT 64 KPSI

FIG. 3 EFFECT OF SHOCK STRENGTH FROM DONOR ON ACCEPTOR OUTPUT (SSGT CONFIGURATION)

The first two are fired barefoot, thus giving us a provisional value for the criterion-of-fire. We then fire the next 20 pieces in a Bruceton stair-step firing plan. The remaining three pieces have been held as a reserve against any misfortune during the 20-shot run. If the contingency does not arise, then the remaining three shots are also fired barefoot. The description of the data reduction is given in the next paragraph.

2.11 DATA REDUCTION, GENERAL DESCRIPTION. A computer program is used to reduce the data by the maximum likelihood method referred to in paragraphs 2.5 and 2.6 above. The output dent readings are paired with the individual barrier thicknesses which had been measured with a micrometer. The barefoot shots (being identified by the fact that the barrier thickness is zero) are first used to compute the criterion by averaging the dents and then dividing by two. The computer then tests each shot for fire or fail on the basis of the dent for that shot. Also the barrier thickness is converted to the corresponding DBg value. With this information the program can then compute the sensitivity parameters.

2.12 DENT BLOCK/HARDNESS CORRECTION. From the outset of the SSGT it has been obvious that the magnitude of the dent in steel by a donor (or acceptor) will be influenced by the strength of the steel -- the stronger the steel the less the dent produced by a standard explosive charge such as the donor. One of the measures of steel strength is the indentation produced by a hardness test such as the Brinell, Rockwell, Knoop, or DPH (Diamond-Pyramid Hardness). Our original work was done with the Rockwell B scale, but its range is too limited. The DPH scale, on the other hand covers a broad range of steel hardnesses. Figure 4 has been prepared to show how the Rockwell B and C scales relate to the DPH values. Also, on this curve, we have placed an arrow labeled 1018-1020 which shows the nominal hardness for the dent blocks called out for the SSGT.

2.13 In the early 1960's a large number of donors was fired against blocks ranging in hardness from Rockwell B-60 to B-96. An empirical correction equation was developed from the data over this limited hardness range. A simple straight line fit was made between the Rockwell B hardness reading and the observed dent No attempt was made to tie in the equation with theoretical relationships involving strength of steel. The correction equation is

$$\delta_c = \delta_o + \frac{2}{3}(H - 83),$$

where δ_c and δ_o are the corrected and observed dents, and H is the hardness in Rockwell B units. More recently blocks of various hardnesses, including ELASTUFF 44 -- a high-strength pre-hardened tool steel -- were fired with recently-made explosive donors. In Figure 5 the observed dents for these shots plus a smooth line plot of the correction equation show that the recently observed firings fall very

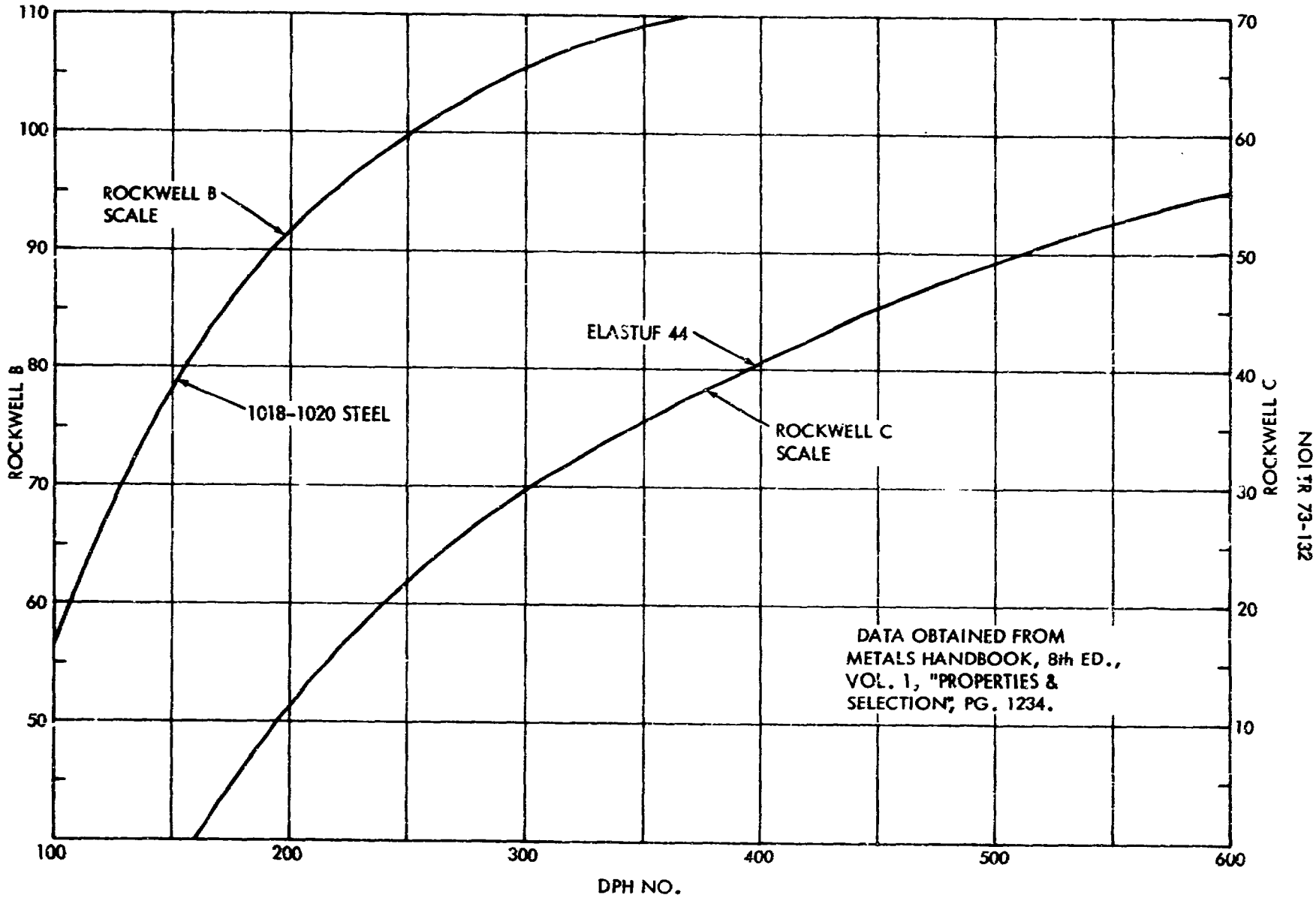


FIG. 4 INTERCONVERSIONS BETWEEN DPH NUMBER (DIAMOND PYRAMID HARDNESS) AND ROCKWELL HARDNESS.

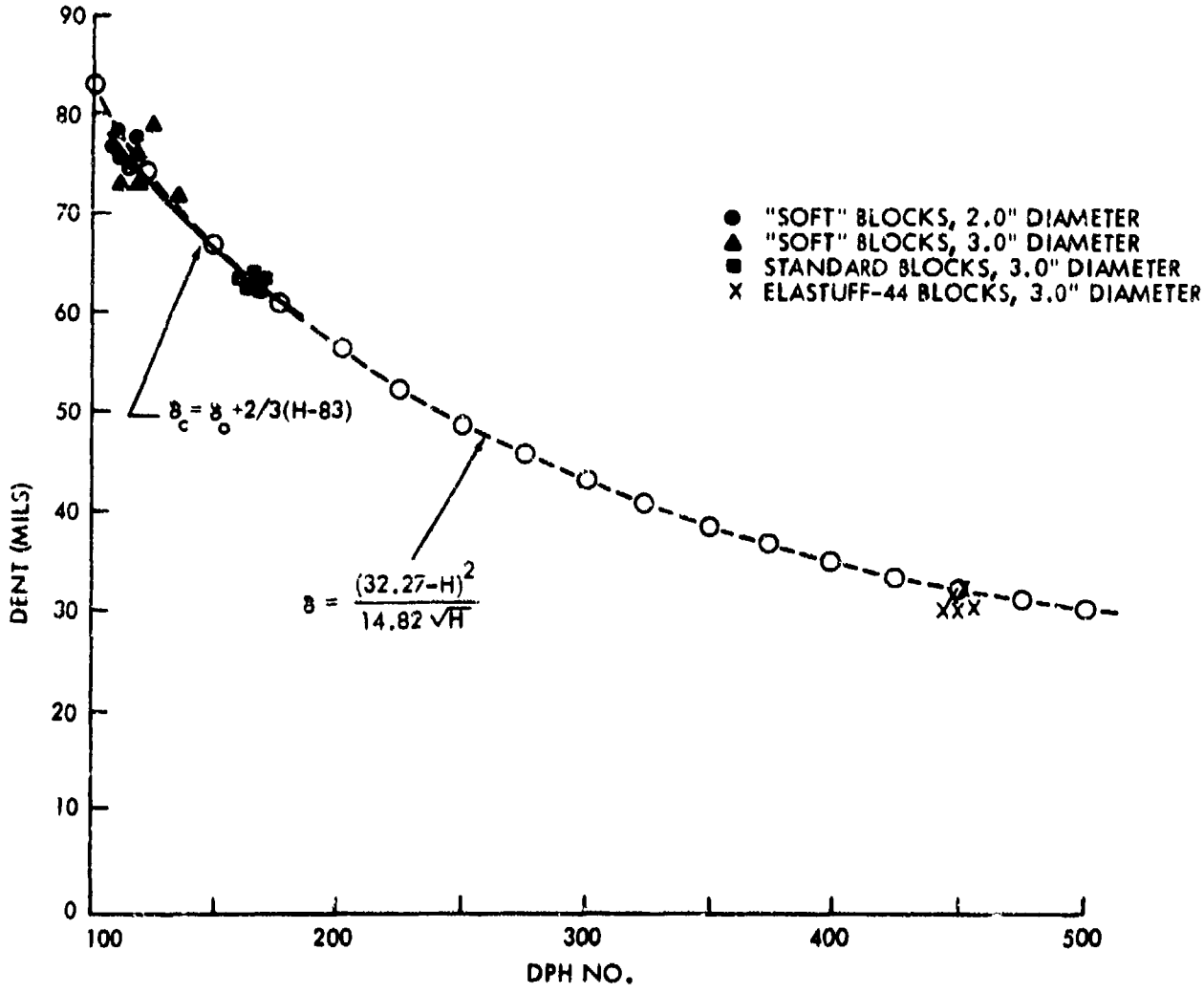


FIG. 5 DENT VS HARDNESS, COMPARISON OF RECENT DATA WITH ORIGINAL EMPIRICAL CORRECTION EQUATION

nicely on the previously established curve. It should be noted that the smooth-line plot of the empirical correction equation is no longer a straight line. This is because the conversion between the Rockwell B scale and the DPH No. is non-linear. Also on Figure 5 is a curve which extends from the "softest" to the "hardest" blocks. This latter curve is a first try at relating the impulsive pressure causing the dent and the dynamic elastic limit of the witness block to the pressure pulse generated by the explosive charge. While some of the terms of the equation are empirical, there are terms which permit manipulation of the curve to take into account different charge output strengths and different block materials. It should also be noted that, while the two curves do not superimpose, their differences are not significant over the hardness range over which the original equation was applied.

2.14 Although the initial contention is justified that the dent will be affected by block hardness, it has not been clearly demonstrated that application of the dent correction reduces data scatter or increases precision over a limited range of block hardnesses. It ought to improve matters and its use usually can be justified on that basis, but the reason that the improvement generally is not readily detectable is that there are so many other variabilities inherent in the test. An in-depth study of such variabilities has been made by Montesi[11] and another aspect of the problem is discussed in paragraph 4.5 of this report.

2.15 PROCESSING OF SSGT DATA.

NOTE: All data obtained in the SSGT configuration have been computed using the dent correction equation quoted above.

It is assumed that the use of the observed dent rather than corrected dent will in most cases make no difference in the sensitivity data quoted in this report; in the remainder of cases the differences should be minimal. But this, it is hoped, will be the subject of future study and should be rather easy to accomplish since much of the necessary data are already in key-punched form and can be very simply reprocessed.

2.16 PROCESSING OF SSGT(A) DATA. At this date (1973) it is not possible to state whether SSGT(A) data will be processed using observed dent or corrected dent data for the acceptors; therefore it will be, of necessity, our practice to indicate which method has been used. The choice, which at present cannot be made simply, is governed by two competing factors:

a. dent is affected by block hardness -- a fact which should not be ignored; and

b. economy -- the use of observed dent will be less expensive since the taking of hardness measurements, and the attendant processing of numeric data can be eliminated.

3. DATA PRESENTATION

3.1 The primary objective of this report is to make a large body of data available, and at the same time intelligible and usable. Data, in pack form, for the various explosives are presented in Appendices B, C, D, E, F, and G where the explosives are grouped in general categories. Indexes for specific data are contained in Appendix A. The scheme for organizing and paginating a data pack is given in Table 1b, Table 1a being a list of the explosive categories.

3.2 PAGINATION SCHEME. Since many, if not most, of the data packs will be incomplete, the pagination scheme has been contrived to allow expansion by insertion. From Table 1b it can be seen that each page from a data pack will have a pagination code of four elements:

a. An upper-case letter designates which of the six appendices it belongs in.

b. An arabic numeral indicates the explosive to which the information pertains. An index of explosives by these numbers is given in Appendix A-2. Cross referencing by explosive name to find a specific explosive-appendix-and-number is to be found in Appendix A-1.

c. A lower case letter, in the third position, indicates the batch, lot, or sample of explosive to which the data of a data pack apply. Each time data for a new batch or new lot or sample of explosive is available, a new letter is assigned. The first three units of the designation, e.g., C2d, serve as a unique identification of a data pack. Appendix A-3 is an index of all explosive data packs.

d. An arabic numeral, in the fourth position, designates the specific type of information on that page. There will always be a page 1 but page 2 (the reverse side of page 1) will often be virtually blank either because there is insufficient unique information to be presented or because time and funding do not permit its inclusion. Any higher number pages, should there be no corresponding information prepared, will simply be omitted.

A complete data pack is illustrated in Figure 6. The group, pages D1c1 through D1c6, is an example of a fairly complete data pack.

Table 1a. CATEGORY ASSIGNMENTS

APPENDIX	EXPLOSIVE CATEGORY
B	Initiator
C	Booster/Warhead
D	Thermally Stable
E	Plastic Bonded
F	Miscellaneous Secondaries
G	Variable Composition Series

Table 1b. EXPLANATION OF PAGINATION CODE FOR APPENDICES B THROUGH G

	Appendix Location, As Above
	Explosive Number, (Note 1)
	Batch, Lot, X No., Z No., or other grouping (Note 2)
	Data-Type Designator:
B.1.a.1	Basic Data, and DBg vs Loading Pressure Plot
B.1.a.2	Chemical Data
B.1.a.3	DBg vs Density Plot and Density vs Pressure Plot
B.1.a.4	Output vs Loading Pressure Plot
B.1.a.5	Dent vs DBg Plots
B.1.a.6	Dent vs DBg Plots
B.1.a.7	Dent vs DBg Plots
etc.	

Note 1 Explosive numbers are indexed in Appendix A-2
Note 2 For explanation of X and Z numbers see paragraph 3.10

TABLE 1. EXPLANATION OF ORGANIZATION AND PAGINATION OF APPENDICES B,C,D,E,F, AND G.

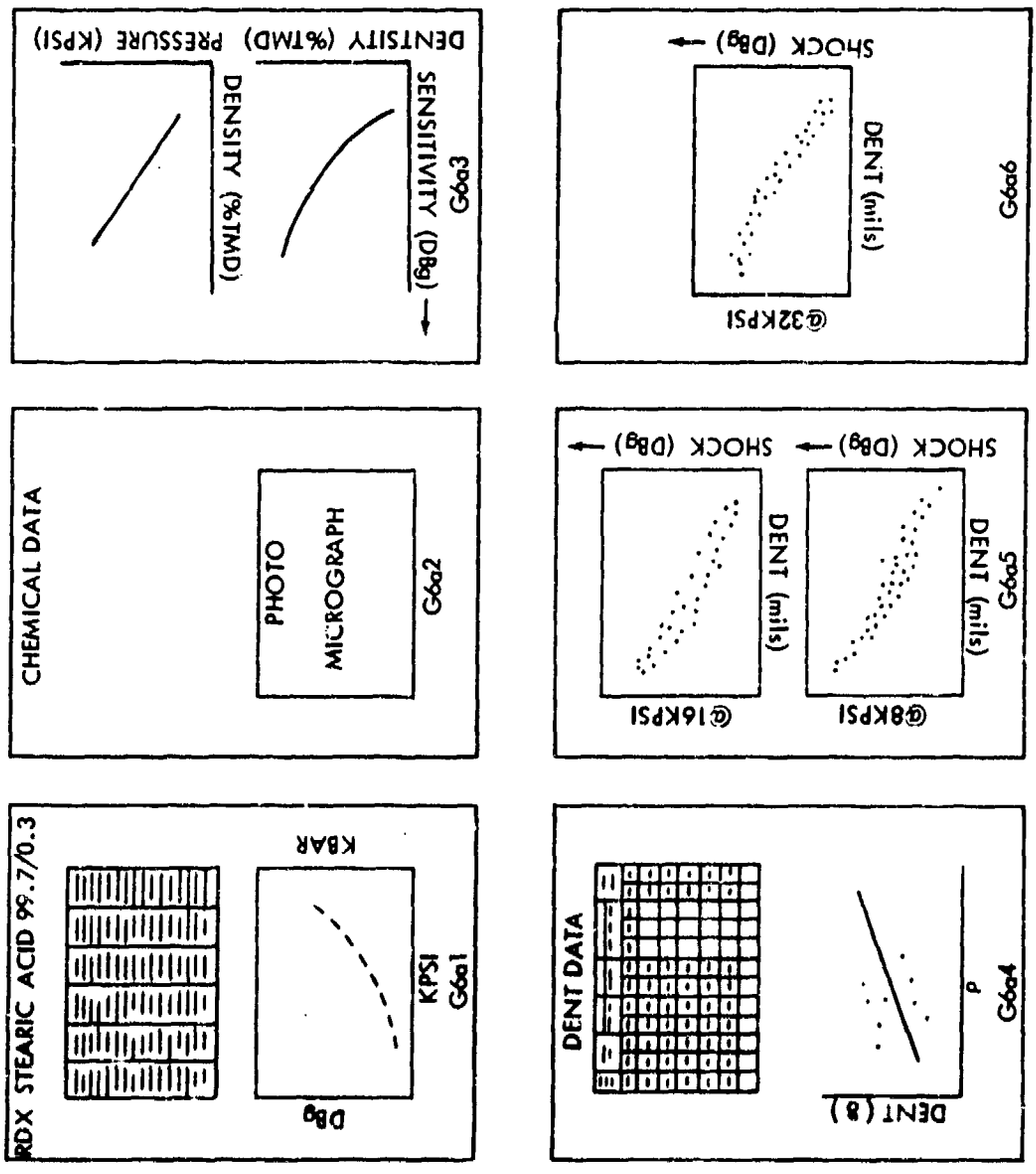


FIG. 6 THE ELEMENTS OF A COMPLETE DATA PACK

3.3 MODES OF EXPANSION. This open-ended format permits expansion in a number of different ways. Should information on a new explosive become available, it will be inserted after the last entry in the most appropriate appendix. It will be given the next sequential number (sub-paragraph b of the preceding paragraph). Indices A-1, A-2, and A-3 would all have to be revised. Should the new information be the addition of another batch of explosive of a kind already included in the collection, the data pack would be given the next sequential letter (sub-paragraph c of the preceding paragraph) and index A-3 revised. And finally, should it be an augmentation of a particular data pack, then page replacement and/or addition would be involved.

3.4 It is our intent to put a "print-date" on each page of information. The "print-date" may or may not be a publication date. It certainly will not be the date when the experiments were performed or when the data were processed. But it will become useful in later times to determine, by checking with the current listing in Appendix A-3, whether the latest page revisions are properly at hand.

3.5 DETAILS OF TYPE 1 DATA PAGE (BASIC DATA, AND DBg VS KPSI PLOT). While many of the features of this data page are self-evident, there are others which merit explanation. Figure 7 is a picture of a typical data page with symbols keyed to specific points which will be described in detail below. The data on this page are presented as being the closest to the measured parameters without going to the original data sheets. The independent variable is the loading pressure, expressed in thousands of pounds per square inch (KPSI). The dependent variables are the observed charge density, and the sensitivity. The loading pressure (1) is given in the first column of the tabulated data. The average (2) and the estimate of the standard deviation (3) of density are expressed in grams per cubic centimeter. The density is also shown (4) as percent of Theoretical Maximum Density* (TMD). The sensitivity (5) is expressed in units of the Gap Decibang (DBg). The computation of sensitivity parameters has been discussed in paragraphs 2.5 through 2.8, 2.11, 2.15 and 2.16.

3.6 The sensitivity parameters given are:

(6) AVG; the predicted 50% response level,

(7) g; the estimate of gamma, the logistic variability parameter,

(8) s_m; the estimate of the standard deviation of the 50% response level, and

(9) N; the number of data points contributing to the sensitivity estimate.

*The value of the TMD (10) is often subject to small errors of various kinds: difficulty of obtaining pure voidless samples, entrapment of solvent or "mother liquor", inaccuracies of analysis of mixtures, and unavoidable admixtures, e.g., HMX, up to eight percent, always to be found in Class B RDX.

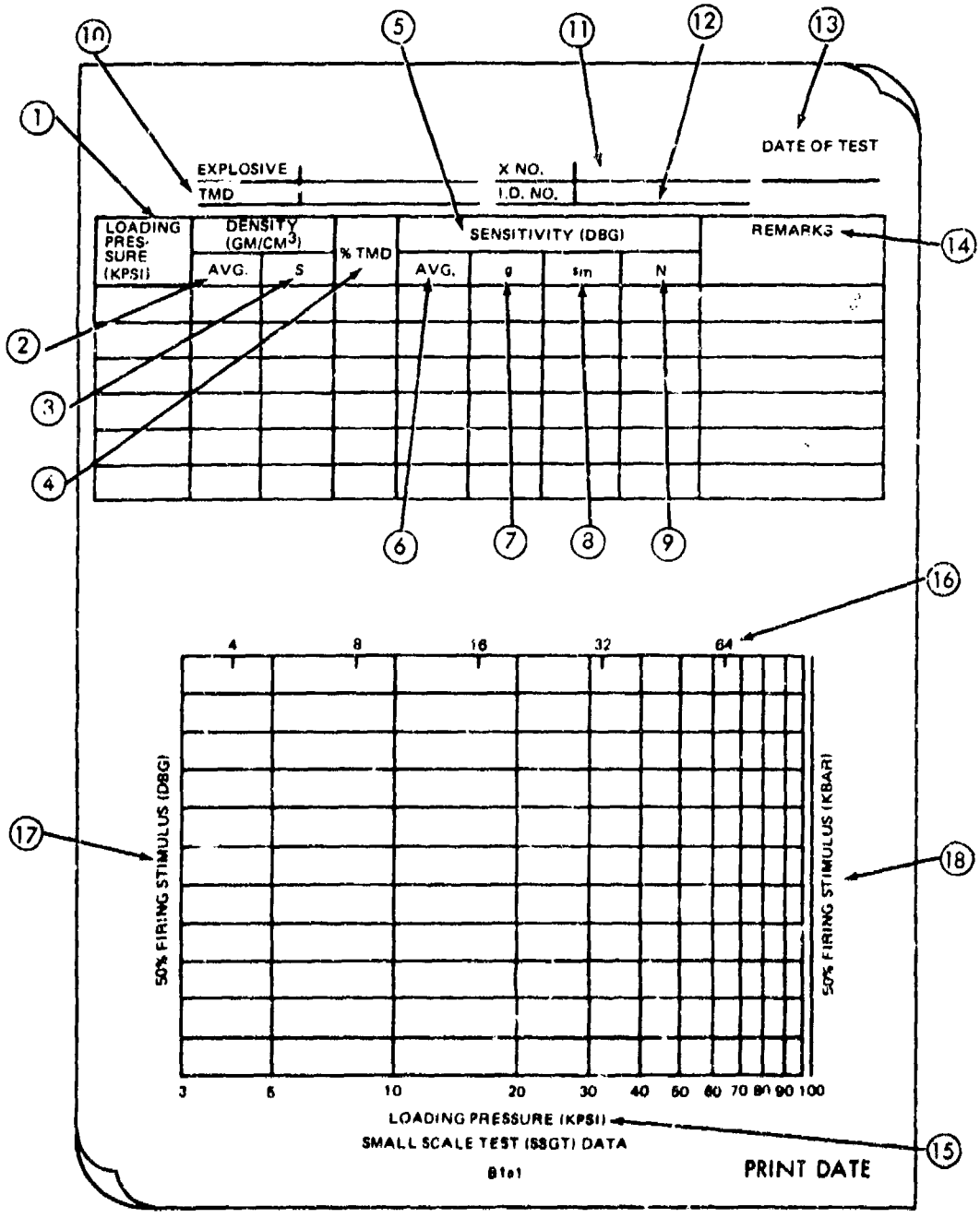


FIG. 7 REPRESENTATION OF AN INITIAL PAGE OF ANY DATA PACK

In some few instances it will be noted that the heading of the variability column (7) will be "s" not "g". This signifies that the sensitivity computations were done with a Bruceton Analysis, and that the Normal (Gaussian) distribution was taken as the descriptive distribution function. In such cases "s" is the estimate of σ, the standard deviation.

3.7 EXPLANATION OF APPENDIX H. Tables H1 through H5 have been included as ancillary information. Table H1 aids in making quick estimates of high or low functioning probabilities from the variability parameter ("g" or "s") and the 50% point. Table H5 is a detailed table giving probabilities corresponding to the L variate where L is the number of logits in an interval, in the logistic probability space.

3.8 As a convenience for those who wish to think or convert from DBg units to physical thickness dimensions of the barrier the Tables H2, H3, and H4 have been provided. These are similar to logarithm tables in layout; the DBg is entered along the left edge and top and the corresponding barrier thickness is to be found in the body of the table. Table H4 covers the range of -4.9 to +14.9, in 0.1 DBg steps. Tables H2 and H3 cover from 1.00 to 10.99, in 0.01 DBg steps and can be interpolated for the next significant figure. Finally, it is pointed out the Tables H2, H3, and H4 aid in translating data back to the original controlled experimental parameter -- barrier thickness.

3.9 ADMONITORY NOTE. We point out that statistical computations using the 50% point and "g" or "s" are valid only when they are expressed in units of DBG. Translating the parameters into barrier thicknesses, followed by the use of these parameters in firing probability estimates, cannot be a statistically proper procedure

3.10 X NUMBERS, ID NUMBERS, Z NUMBERS. The Naval Ordnance Laboratory has a system for logging in explosives received by the Laboratory. An "X Number" (11) is assigned; and box labelling, procurement information, date, manufacturer's batch or lot number, etc., is recorded where possible. The X-Number system can also be invoked when a batch of explosive is synthesized or so processed within the Laboratory that it can properly be thought of as having taken on a new identity. There are occasions when explosives are used and tested which do not have an X Number. Meanwhile an independent logging system, assigning "Z-Numbers", was in use by the Initiation Research Group whose collective efforts are the basis for the present report. In the early 1960's it became evident that this logging system did not give adequate traceability of materials used by the Group. A computerized continuous-inventory system was developed. As part of this system, all explosives, pyrotechnics, components, trains -- explosives in whatever form -- were assigned an ID Number (12). This applied to all explosives on hand and to all explosives since received by the Initiation Research group. The ID Number can be thought of in much the same way as a library accession number.

3.11 In a number of cases there will be data for the same explosive composition, but different X Numbers [e.g., CH-6: X329, X344, X439, X440, X441, X442, X445]. Each X Number is considered a separate material, in the sense of being a different production or processing lot or batch. From such replicate data we can obtain batch-to-batch variability statistics which permit prediction of future production variability (assuming the production process will be unchanged in the future).

3.12 When we have worked with the same explosive and the same X Number, we still have assigned new I.D. Numbers to portions whenever some chemical or physical operation such as sifting, temperature conditioning, etc., has been done on it. Since "numbers are cheap" we have often assigned a new I.D. as a consequence of minor operations, which probably would not alter the explosive -- but just might. Consequently there are numerous instances where there are data on a particular X-Number of an explosive, but of different I.D. Numbers. The data may or may not be combinable. Care must be exercised. The fact that there are different I.D. Numbers serves as a warning flag.

3.13 STANDARD LOADING AND TESTING CONDITIONS. The "Date of Test" (13) entry must be recognized as an approximate indicator of time. The time span, from the writing of the "load" order to the final shot of a Small Scale Gap Test, is rarely less than two weeks and sometimes can take a few months. The "Remarks" (14) column will signal special considerations.

> Ordinarily, explosives are pressed into the SSGT test bodies and fired at: Temperature = 75± 3°F; Relative Humidity = 4%± 2%; and at the ambient pressure of 350 feet above sea level.

Deviations from this, such as vacuum loading, firing at high or low temperatures, etc., will either be indicated in the title block or more likely in the Remarks column. Elevated temperature firing was done at first by wrapping the SSGT acceptor body with insulated Nichrome wire to be used as an individual disposable heating unit. The temperature was followed by means of a thermocouple inserted into a hole drilled in the SSGT body. A better method, which can be used for firing at temperatures either hotter or colder than ambient was developed by Kilmer, of this Laboratory and is described below and shown in Figure 8. (See also NOLTR 67-133.)

3.14 SSGT FIRING AT NON-AMBIENT TEMPERATURES. A method was needed for firing SSGT acceptors at temperatures far from ambient temperatures. But it was desirable not to change the temperature of the witness block or the donor. The acceptor is conditioned in a separate chamber. The donor-and-detonator assembly, with the attenuator attached to the

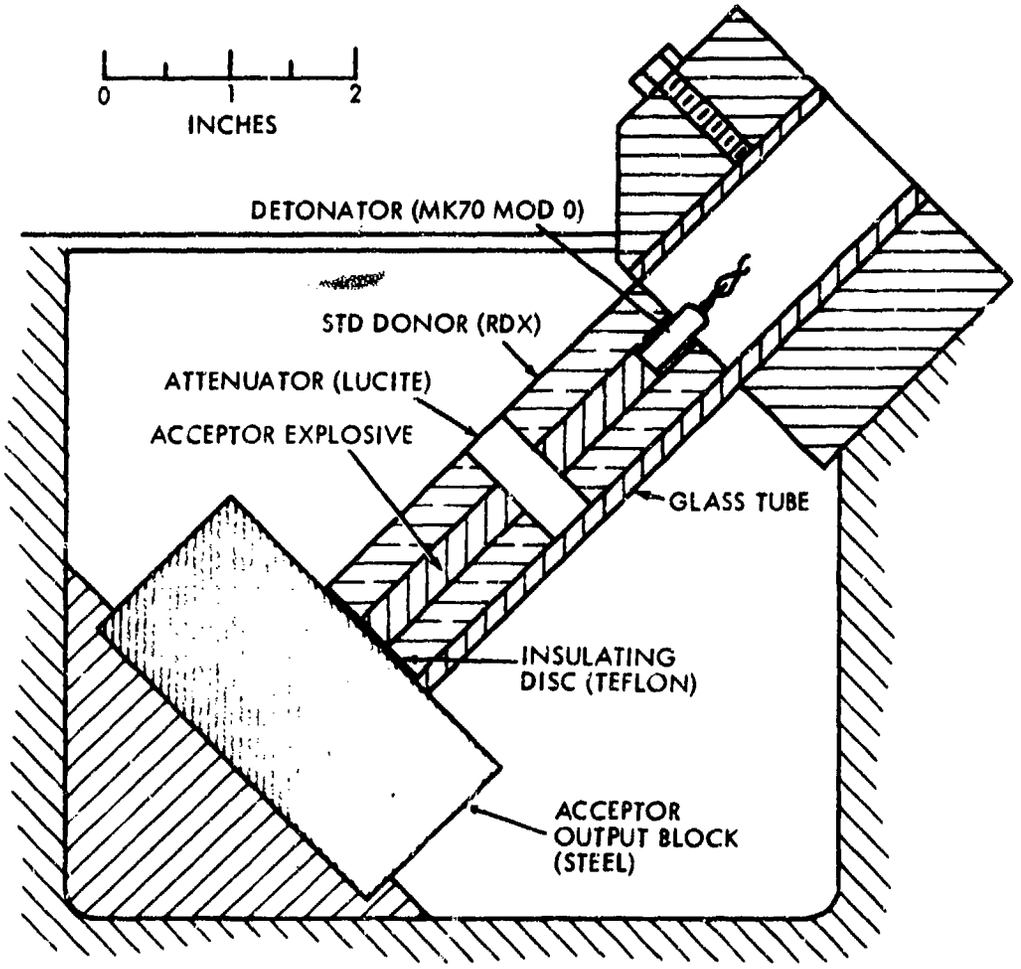


FIG. 8 EXPERIMENTAL ARRANGEMENT FOR THE DETERMINATION OF THE SENSITIVITY OF EXPLOSIVES AT VARIOUS TEMPERATURES

bottom end of the donor is held in the upper end of the slotted glass tube. A 20-mil thick Teflon disc rests on the steel block and serves to give thermal isolation of the bottom end of the acceptor.. Modification of the output reading by the Teflon disc is barely detectable. The conditioned acceptor is taken quickly from the conditioning box and slipped into place. The detonator-donor-attenuator is dropped into place and fired. If the firing is done within 30 seconds of removal of the acceptor from the conditioning chamber, the acceptor will have changed no more than 10 or 15 degrees from the "soak" temperature.

3.15 PLOT OF DBg VS KPSI. This data plot, placed at the bottom of the first page of each data pack, is provided to aid visualization of the data in a mode close to the observed experimental parameters. The loading pressure (15), (16) which is the independent variable (expressed in KPSI) is arranged in a logarithmic scale. The tick marks 16 at 4, 8, 16, 32, and 64 KPSI are included simply because this is the usual, although not immutable, choice of loading pressures. The dependent variable, sensitivity or 50% response point, (17) is plotted in units of DBg. As a conceptual aid in shock hydrodynamic terms, a scale is appended along the right edge (18) which shows the peak shock pressure expressed in kilobars. It must be remembered, however that this is a derived scale based on physical measurements and calibrations[12] which even now (1973) are subject to refinements.

3.16 PLOTS OF DBg VS ρ AND ρ VS KPSI. The third page (if any) of a data pack will contain two more data plots. The first of these -- sensitivity (in DBg) vs charge density -- depicts a relationship which is more fundamental than sensitivity vs consolidating pressure. On the other hand a parametric relation of practical interest in the manufacturing of explosive components is the charge density as a function of consolidating pressure (colloquially referred to as the "squsb modulus"). As was pointed out in reference 11, the density usually turns out to be linear with the logarithm of the loading pressure. This fact underlies the choice of semilogarithmic coordinates for the three plots described in this paragraph and the preceding one.

3.17 PLOT OF "BAREFOOT DENT" VS KPSI. The fourth page (if any) of a data pack will display the acceptor output vs the consolidating pressure. A typical plot of this type of information occurs on Data Page D1c4.

3.18 PLOTS OF DENT OUTPUT VS DBg. A presentation of all of the Dent Output Data obtained during a Small Scale Gap Test (such as in Figure 2) gives a valuable insight as to the build-up to detonation of the explosive under these particular conditions. Examples of these graphs are given for HNS-R (See Data Package D6a, page D6a4

and D6a5) and for the RDX/Stearic Acid Series (see the pages 4 and 5 of each of the Data Packages G6a to G6f, inclusive). Those explosives which do not show a clear-cut output response, but which give a spectrum of outputs when initiated at the 50% point or even with stronger inputs should be used cautiously in small-scale systems. It is pointed out that the SSGT acceptor is highly confined (in a 0.4-thick brass wall) and is very long (7-1/2 column diameters in length). A practical explosive component will usually be shorter and probably smaller in diameter, compared to the SSGT configuration, and will be less highly confined; a practical explosive component loaded with an explosive which shows gradual build-up properties may be more variable in its output and also may have its output more strongly affected by any variation of the input vigor.

3.19 A REASON TO WORRY. The significance of all this, in the eyes of the designer of explosive trains, is that he must make sure that an explosive component using such a material must be so strongly initiated that it gives a uniform output. If this constraint on the design is not satisfied there is all too much likelihood that a small variation or degradation of the quality of the initiating component will cause a major degradation or outright failure of the component loaded with the explosive in question.

4. PRELIMINARY VALIDATION OF SSGT(A)

4.1 The original intent of the designers of the SSGT test was to develop a carefully controlled laboratory test which would have stability of performance over the years in spite of inevitable changes in manpower and materials. It was an outright assault on Murphy's Law.* But it can be seen by careful study of the data -- replicates, batch similarities, etc., -- that the test does give good repeatibility.

4.2 COST OF SSGT & SSGT(A). The cost of running the SSGT was originally priced at about 11 dollars per shot. With 20 shots, each at five different densities, it took about $1100 to make one complete characterization of sensitivity, output, and compressibility. This price was somewhat unrealistically low since the detonators had been drawn from stock as preexpended material. In 1973, inert materials, labor, overhead, and the detonators have raised the price per shot to about $30. At 25 shots at each of five levels the cost of a characterization is now $3750. Savings, however are possible. Going from SSGT to SSGT(A) (that is, going from a $5 to a 60¢ detonator) will help. The NIF funding system, which tends to force us to buy small-quantity amounts -- only as much as is needed for the particular job -- makes piece-part costs much higher than would be the case for volume production. But we are looking into procedures for volume purchases, as a supply function, with costs to be reimbursed by user projects.

> At this point we recount as warning that the one item that has caused the most grief in the SSGT is procurement of the brass gap-test bodies. The design and the drawing are deceptively simple. Time and again we have had cost over-runs, high spoilage, and much unacceptable material. Apparently, because the piece looks simple to make, the tendency is to put apprentice machinists on the job with inadequate supervision. The troubles have been varied and manifold:

*"If anything can go wrong, it will; and if a number of factors can go awry, that factor which will harm the project the most will be the first to do it." etc., etc.

Scratches, grooves, spirals in the holes;
Hour-glass, or barrel-shaped, or bent holes;
Holes too large;
Straight holes but not perpendicular to the ends;
Burrs;
End-flatness requirements not met.

4.3 A STUDY OF DONOR OUTPUT. One of the many procedures adopted at the outset to assure continued quality of the SSGT was to specify the steel dent output of the donors. Actually there was a suspicion of over-specification. There were strong opinions that (1) if the donor explosive (RDX Type B Class B) quantity, density, and column length, were held to better than 1% accuracy, (2) if the EED were a quality detonator with control of output, (3) and if the donor body were heavy walled and precisely made, then the output just had to be uniform. We measured the output anyhow, on 5 to 10% of each batch of donors that was made. Table 2 shows data obtained throughout the decade that this test has been run. It is by no means an exhaustive compilation. There have been at least 50 and sometimes as many as 100 shots in each of the 11 groups. Groups a, b, c and d were obtained in the first year and a half or two years (1959, 1960). Group e was loaded about 1965 and the remaining groups at various times up to the writing of the present report (1971-1972). On the basis of the first four groups of data a tentative set of specification limits was established for steel dent output of the donor (in mils) at D min = 62".5, to D max = 65".0; and s max = 2.0.

4.4 It became apparent that we were at times unable to meet our own specification limits on a newly loaded group of donors. When such an occasion arose some previously f'red, (and therefore calibrated) explosive was loaded as an acceptor and fired in the SSGT. The results indicating no significant shift in the SSGT system, we accepted the batch of donors as being all right, making a mental note that the output specification on the donors was probably unrealistically restrictive. If block hardness variation can be expected to add to the error of output measurements, then correcting for hardness ought to reduce measurement error. This should show up as a reduction of, 2, the estimate of the standard deviation. Referring to the appropriate data for groups e through k of Table 2 it can be seen that, if anything, the opposite is true. The donor output problem became even more severe when the SSGT configuration was incorporated into the specifications for DIPAM and HNS. Manufacturers and other explosives laboratories were also on occasion having trouble meeting the donor output requirements. It has by now become evident that the requirements are unrealistic and that something has to be done.

4.5 CHANGING THE DETONATOR. For reasons of economy, and at the same time to permit the use of an EED which is relatively insensitive,

Table 2

A SELECTION OF STEEL DENT OUTPUT DATA

FOR SSGT DONORS

Group	Load Order	Steel Dent Output (MILS)			
		Observed		Corrected	
		$\bar{D}$	s	$\bar{D}$	s
a	-	62.4	2.25	-	-
b	-	63.4	2.03	-	-
c	-	63.0	1.76	-	-
d	-	64.4	1.79	-	-
e	1078	67.6	4.80	69.6	5.74
f	1118	64.9	2.43	67.0	4.43
g	1150	67.3	4.75	69.5	3.84
h	1167	66.1	1.20	68.5	1.47
i	1258	64.1	1.72	64.1	1.99
j	1284	63.1	3.04	65.4	2.96
k	1375	65.9	2.85	64.9	2.93

both in the normal through-the-bridge firing mode and the lead(s)-to-case mode,* it was decided to replace the Mk 70 Detonator with an insensitive commercial blasting cap (E-1A(6) Detonator). From Figure 1 it can be seen that the Mk 70 Detonator slips into a recess in the top of the donor. But since blasting caps (of the type we wished to use) are bigger in diameter than the 0".2005 diameter hole of the donor, we judged that it would not be desirable to initiate the donor over a gap. Therefore we decided to load the donor flush, to 0".005 shallow, at the detonator (fill) end.

4.6 Arbitrarily the blasting cap we have chosen to use is the E-1A(6) DuPont Electric Detonator.** Table 3 shows two studies run a few years apart measuring the steel dent output of flush-loaded SSGT donors fired by the E-1A(6) as compared with the standard recess-loaded donors fired by a Mk 70 Detonator. There really is no difference demonstrated between the SSGT and SSGT(A) donors. But there is another, and rather sensitive test method available which has come as a spin-off of the Tetryl Substitutes Program currently underway at NOL. Part of the work is a finalizing of the SSGT type of sensitivity test called out in OD448111[13]. This version of the SSGT(A) establishes a specific shock strength (by appropriate barrier choice) so that the explosive under test (loaded in the acceptor) shall not yield an observed steel dent output any greater than 2.0 mils in twenty trials. If the explosive is just a shade more sensitive than it ought to be, then it will at least begin to give a more vigorous dent, though not necessarily a full scale output, when tested at the critical level.

4.7 We wished to obtain a comparison of the shock strengths (the output) of the two donors -- SSGT and SSGT(A) by a test more directly relevant to the Small Scale Gap Test than the above dent block experiment. Table 4 shows the results of an experimental comparison of the two donor strengths using the response of SSGT acceptors, loaded with yellow tetryl at 10 KPSI, to detect possible donor shock output differences. Four arrangements were used:

*Under laboratory conditions, with properly trained personnel, and with the proper operating procedures we consider the Mk 70 Detonator as an adequately safe component of the SSGT. We often point out that it is more hazardous to ride the Washington Beltway, and public highways to get to work, than it is to work as directed, with the SSGT. And in the hands of an incompetent, a blasting cap may not be all that much safer than a Mk 70 Detonator.

**Undoubtedly any number of blasting caps would have been usable in this application. This work can in no way be taken as denigrating of any other designs or any other manufacturer's product. We specify the E-1A(6) DuPont Electric Detonator because "We had them on hand" and could expect to get them whenever needed.

Table 3

COMPARISON OF SSGT AND SSGT(A) DONORS

BY STEEL DENT OUTPUT READINGS

Detonator	No. of Shots	Dent Mils Observed $\bar{D}$	Observed s	Corrected $\bar{D}$	Corrected s	Donor Load Order
Mk 70	20	66.3	3.48	67.7	3.83	1159
E-1A(6)	20	65.3	3.34	68.0	3.55	1159
Mk 70	25	64.8	2.28	64.3	2.20	1375
E-1A(6)	25	66.0	2.85	65.0	2.93	1375

A. SSGT Donor attenuated with a 446.7 mil barrier,*
B. SSGT Donor attenuated with a 421.7 mil barrier,**
C. SSGT(A) Donor attenuated with a 446.7 mil barrier,* and
D. SSGT(A) Donor attenuated with a 421.7 mil barrier.**

There are three possible hypotheses:

1. the SSGT(A) donor is less powerful than the SSGT donor,
2. the SSGT(A) donor is more powerful than the SSGT donor, or
3. there is no demonstrable difference between the two outputs.

From Table 4, Block A we see that when the tetryl is subjected to an input shock of 10.50 kbar*** (the characteristic output of the SSGT donor attenuated with a 446.7-mil barrier) it gave no dents in excess of 2.0 mils and an average dent of 0.70 mils. From Block B we see that when the shock strength is increased to 11.39 kbar (the donor attenuated with a 421.7 mil barrier) we find that the tetryl responds with dents in excess of 2.0 mils. When initiated by the SSGT(A) donor (whose shock strength is unknown and under scrutiny) the same type of output performance is noted: Block C, no dents in excess of

*446.7 mil barrier is the one which gives a 3.5 DBg shock with a standard donor.
**421.7 mil barrier is the one which gives a 3.75 DBg shock with a standard donor.
***The shock strengths quoted can be found in reference 12.

Table 4

COMPARISON OF SSGT AND SSGT(A) DONORS BY RESPONSE OF YELLOW TETRYL ACCEPTORS LOADED AT 10 KPSI AT TWO SHOCK LEVELS

ATTENUATOR Rating (DBg)	3.50	3.75
ATTENUATOR Thickness (mils)	446.7	421.7
SSGT CONFIGURATION (See Fig. 1A)	[A] Not any readings of D > 2.0 $\bar{D}$ = 0.70 s = 0.22 n = 18	[B] D_1 = 3.75 D_2 = 3.83 $\bar{D}$ = 3.79 n = 2
SSGT(A) CONFIGURATION (See Fig. 1B)	[C] Not any readings of D > 2.0 $\bar{D}$ = 0.79 s = 0.37 n = 20	[D] D_1 = 2.88 D_2 = 3.13 D_3 = 8.1 $\bar{D}$ = 4.70 s = 2.95 n = 3

Note: all dent values, D, Given in mils

2.0 mils for 20 shots and an average dent of 0.79 mils when a 446.7-mil barrier was used; and Block D, dents in excess of 2.0 mils when a 421.7-mil barrier is used.

4.8 We can make an assumption that the difference between the barriers will make a 0.25 DBg, or 0.89 kbar difference in the shock output of the SSGT(A) donor what ever its absolute value may be. We propose the following logic chain:

1. Block C has been attenuated 0.25 DBg more than the donor of Block B. If the SSGT(A) is more powerful than the SSGT by 0.25 DBg or more than we should expect the dents in Block C (average 0.79) to be greater than the dents in Block B (average 3.79). The dents of the tetryl acceptor are not greater in that manner and therefore the SSGT(A) donor shock strength must be no greater than SSGT + 0.25 DBg.

2. Conversely the donor of Block D has been attenuated 0.25 DBg less than the donor of Block A. But if the SSGT(A) is less powerful than the SSGT by at least 0.25 DBg, then we should expect the dents in Block D to be less than the dents in Block A. Since they are not the SSGT(A) donor shock strength must be no less than the SSGT-0.25 DBg.

3. We conclude that the SSGT(A) donor strength equals the SSGT shock strength to within $\pm$ 0.25 DBg.

4.9 BRASS FOR SSGT BODIES. Originally a large stock of brass was obtained for making SSGT bodies. When it came time to reorder we found that brass according to Federal Specification QQ-B-626 Composition 11 was difficult to obtain. It turns out that Composition 22 is a material which is readily obtainable and, by the nature of the specification, can be considered a sub-set of Composition 11; that is, any brass qualified as Composition 22 is also qualified as Composition 11.

4.10 The SSGT, in varying detail has been described (or called out) in the following documents:

(1) NAVORD LD 549486B, Explosive Properties Assembly

(2) NAVWEPS Report 7342

(3) WS 4660 Purchase Description, DIPAM Explosive

(4) WS 5003D Purchase Description, HNS Explosive (11 Jan 1967)

(5) NOLS 1015 Material Specification for Explosive HNS/ Polytetrafluoroethylene (2 Mar 1973)

(6) NAVORD OD 44811 "Safety and Performance Tests for Qualification of Explosives (1 Jan 1973)

The SSGT(A), described in Revision C of NAVORD LD 54986, is specified in NAVORD OD 44811, which is presently being revised.

5. UTILITY OF DATA

5.1 It is beyond the intent of this document to go into a detailed discussion of the data. But there is some information, which has been published elsewhere, that shows some of the ways that we expect that the data will be used.

5.2 The sensitivity of an explosive is controlled by a legion of factors (particle size, density, confinement, etc.,) in addition to the obvious one of molecular make-up. In the practical problem of designing an explosive system that will be adequately safe and sufficiently reliable, the sensitivity of each explosive employed is a controlling design parameter. If we know that a certain explosive tends to have a wide batch-to-batch variability then we know that we must, for instance, design the next preceding element in the train with enough output to be able to initiate the least sensitive batch of the explosive that we expect will ever be used. We are not omniscient. We will not know what the least sensitive explosive will be but we can make some intelligent estimates (draw statistical inferences) if we have data on a number of representative production batches.

5.3 CH-6 STUDIES. Figure 9 is a plot of some early production lots of CH-6. It shows a large lot to lot variability. However there may be a hooker in the data. While certainly these are representative of production batches which were used in weapon development, and likely even in Fleet-fill items, we suspect that the transfer tests (which tested sensitivity and output of CH-6) may have been waived for these materials. If such be the case we cannot know that the material was or was not in complete accord with the specifications. We believe that the information, in addition to being representative of past production, will not be greatly different from current or future production. Besides, this is all that we have to go on.

5.4 DATB STUDIES. Figures 10, 11 and 12 have been derived from data packs D1a, D1b, D1c, D1d, D1e and D1f. Data scatter is due to at least the following factors:

a. inherent test error

b. differences between materials (we think D1a, D1b, and D1c are the same but are not sure), and

c. drift in the SSGT with time (1960 to 1967).

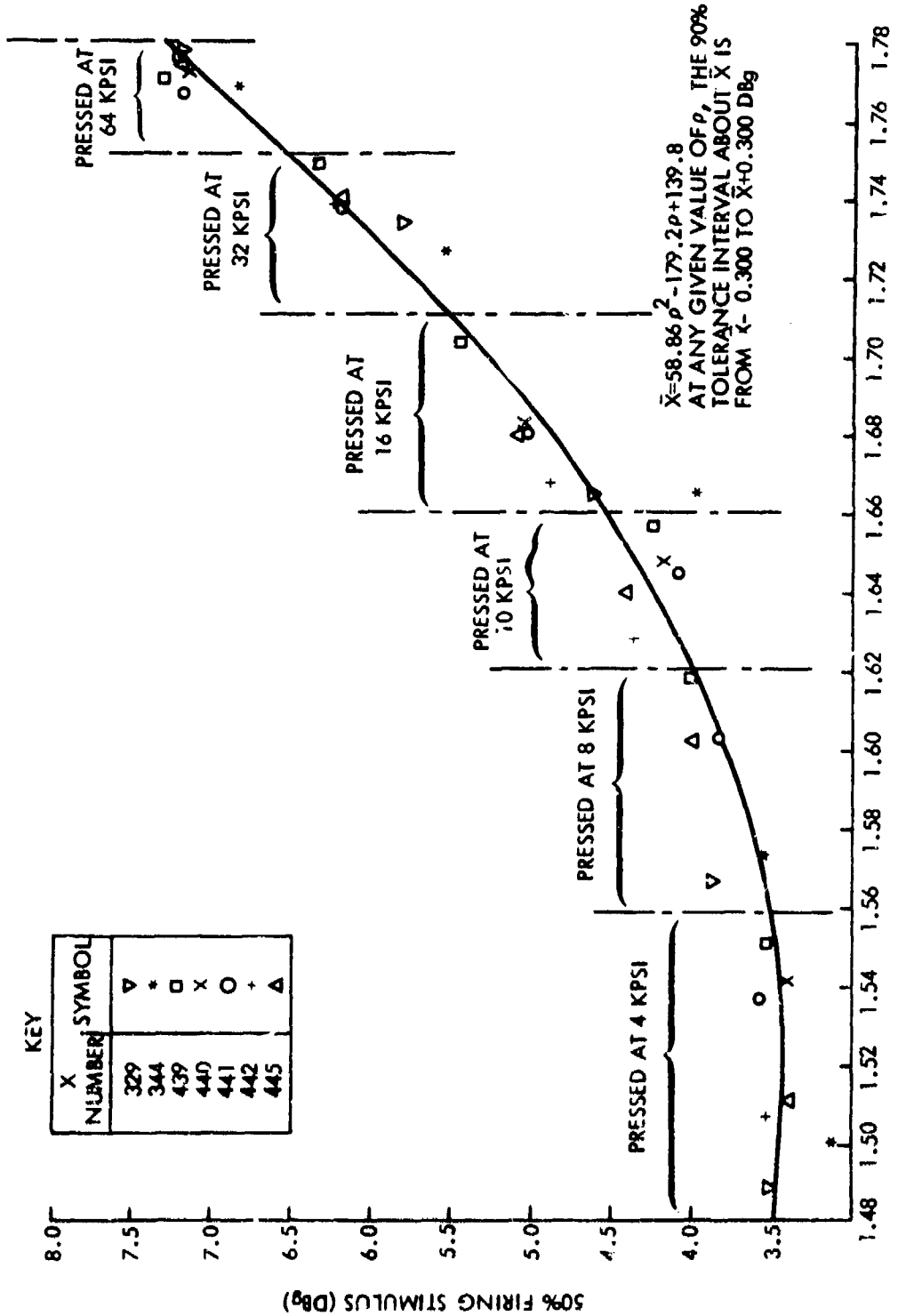


FIG. 9 SMALL-SCALE GAP TEST MEASUREMENT OF SENSITIVITIES OF VARIOUS CH-6's AS A FUNCTION OF CHARGE DENSITY

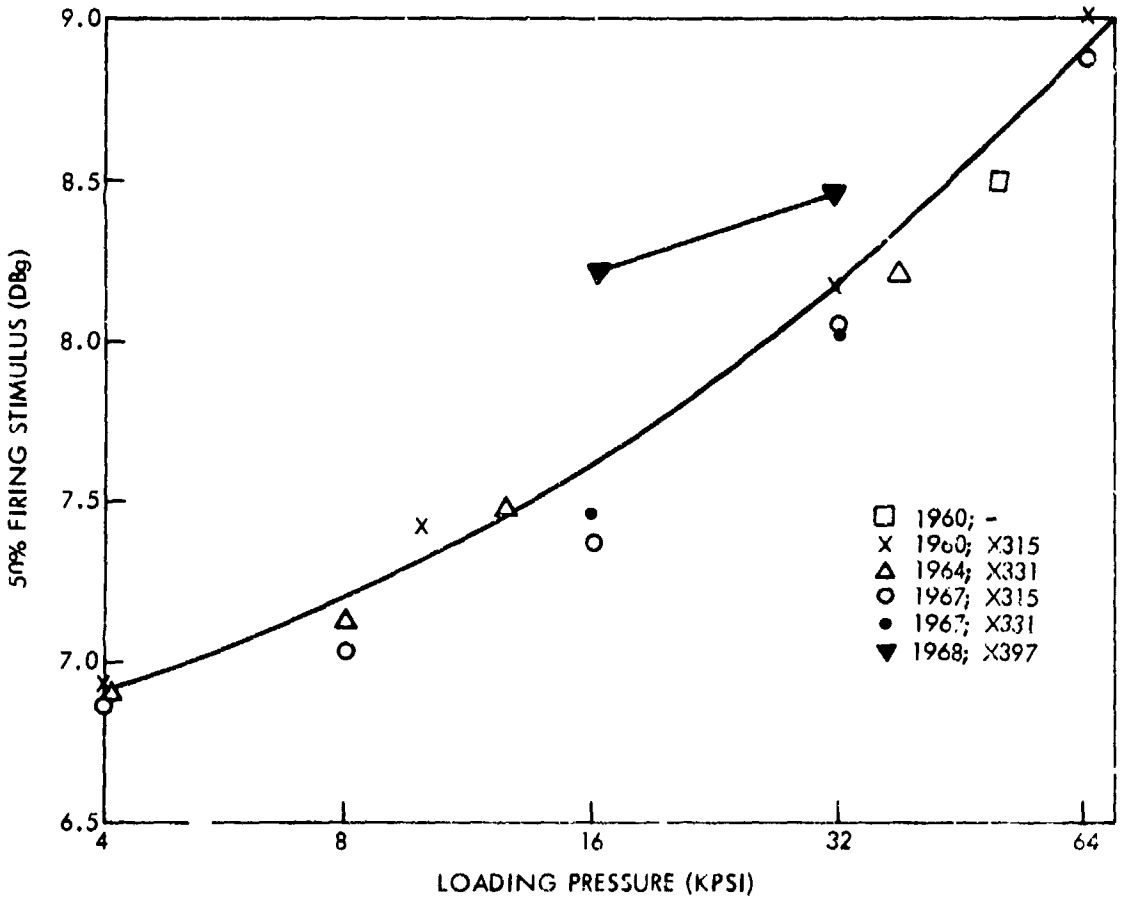


FIG. 10 COMPOSITE PLOT OF ALL DATB DATA SHOWING SENSITIVITY VS. LOADING PRESSURE

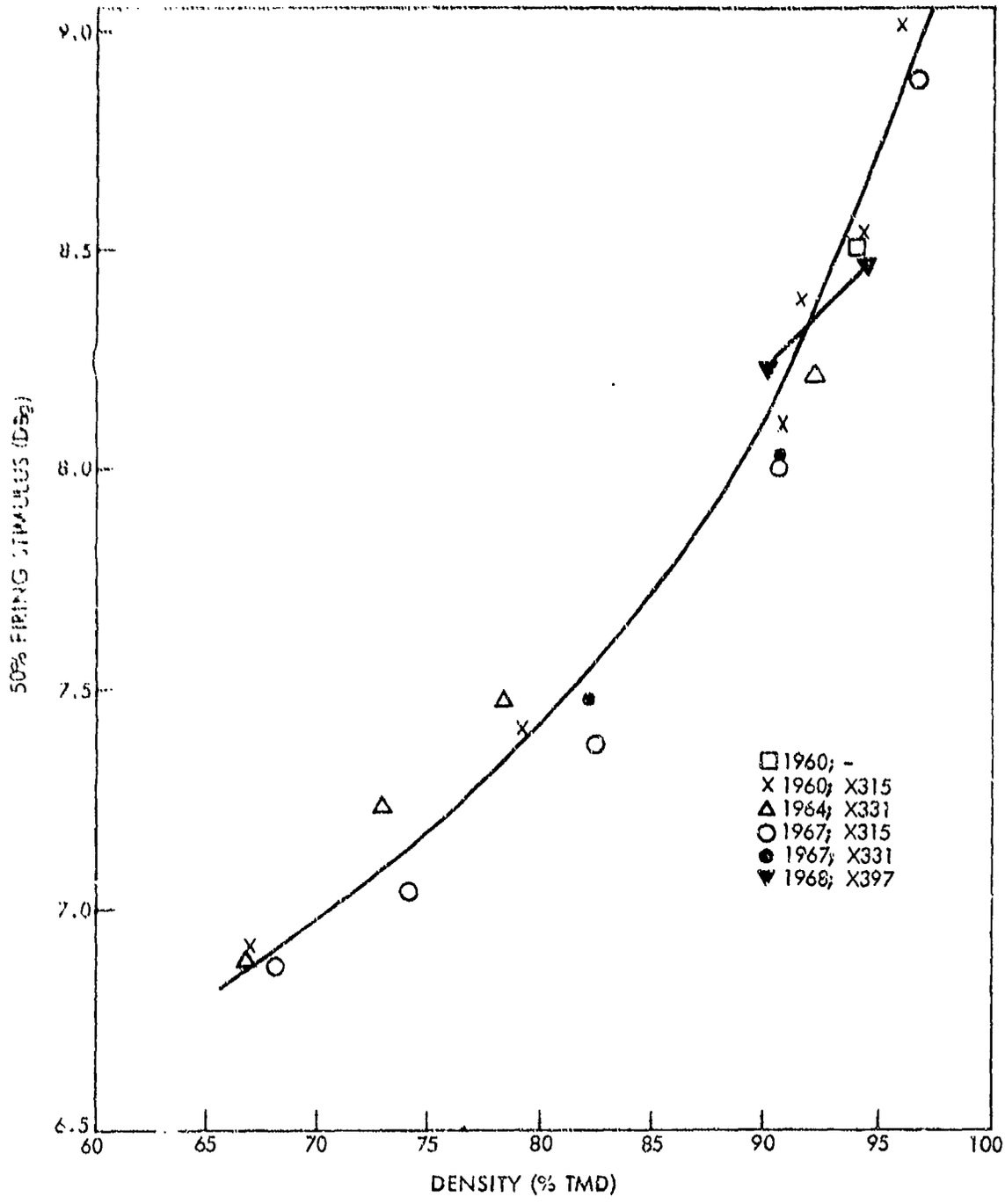


FIG. 11 COMPOSITE PLOT OF ALL DATB DATA SHOWING SENSITIVITY VS. DENSITY

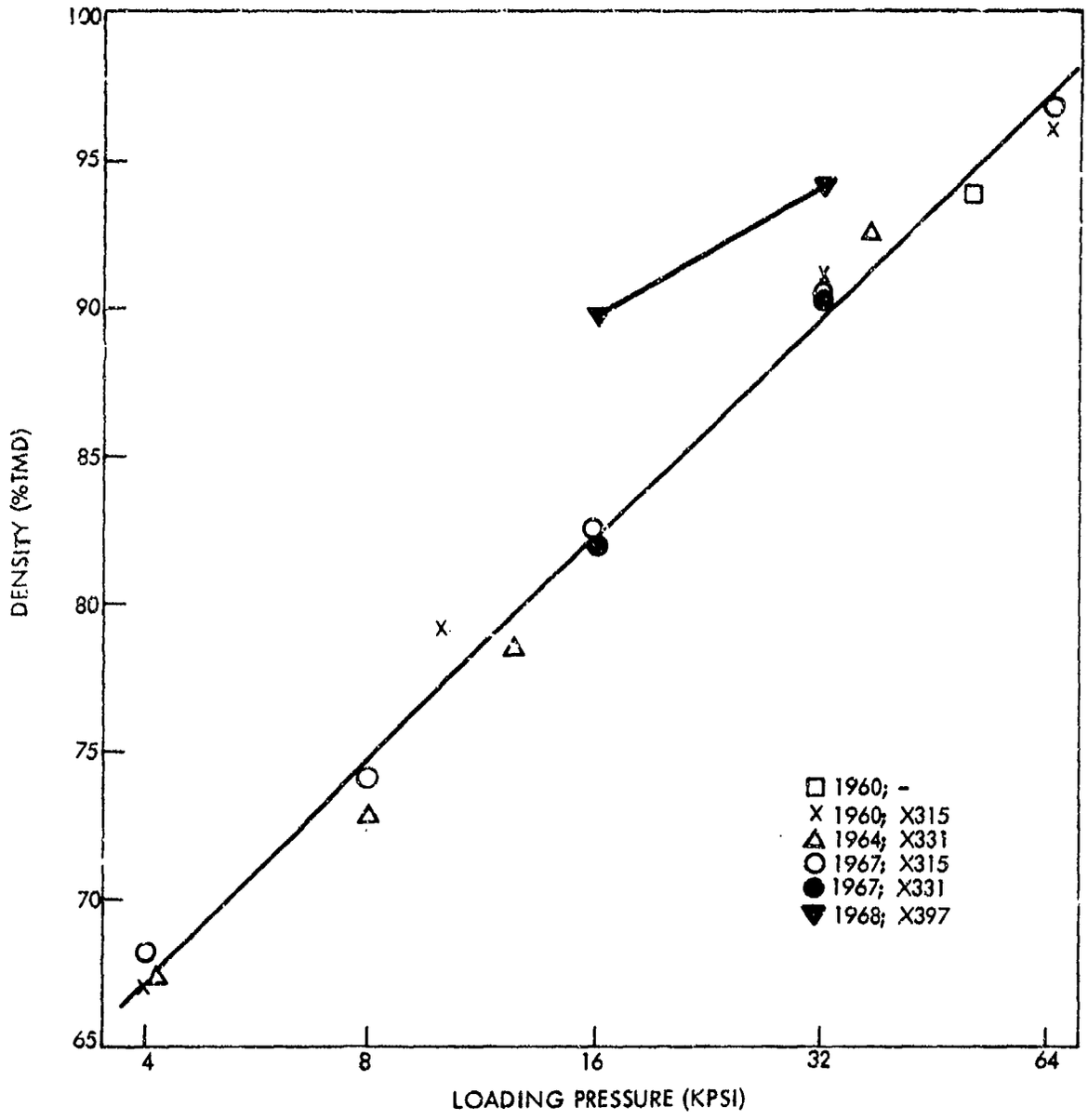


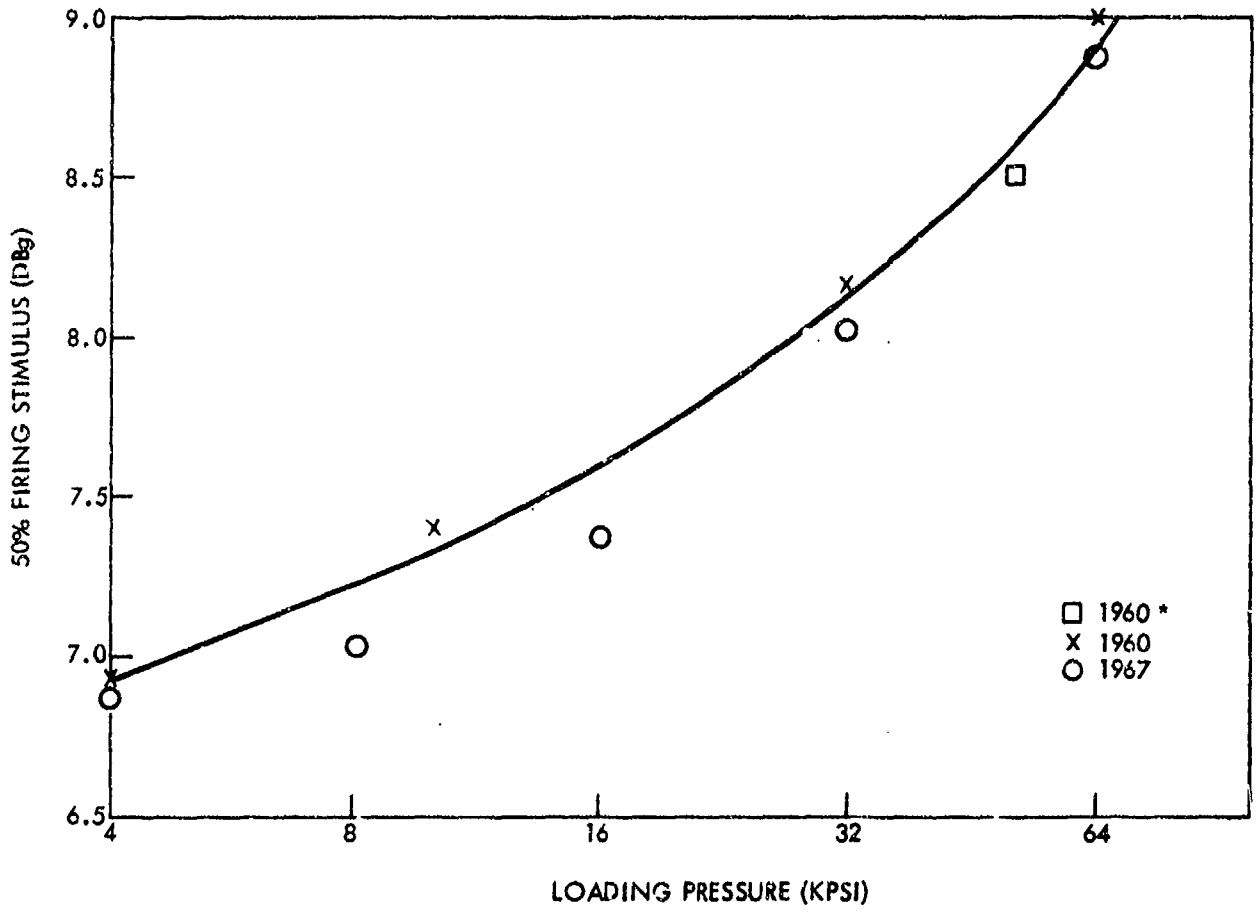
FIG. 12 COMPOSITE PLOT OF DATB SSGT LOADING COMPRESSIBILITY DATA

The data points of Figure 10 appear to be rather broadly scattered, particularly the two, connected by a straight line, for X No. 397, fired in 1968. However when the data are replotted to display sensitivity (the 50% firing stimulus) as a function of the density, as in Figure 11, we find that the points, (and even the two mavericks' fall much closer to the line. Inspection of Figure 12 shows that X No. 397 must be appreciably different from the rest of the DATB's tested. It has a different sqush modulus: at the same consolidating pressure it compresses to a significantly higher density and is therefore less sensitive.* At 16 KPSI, the sensitivity difference might be 0.6 DBg depending upon which of the two explosives happened to be chosen for loading. In some explosive train designs, the insertion of an explosive 0.6 DBg less sensitive than designed for could use up a large portion of the reliability reserve designed into the system; it could conceivably change a design from reliable to marginal.

5.5 Figures 13, 14, and 15 have been prepared to give some insight into time stability of the SSGT system. We point out that because of some confusion in our records we have information in Data Packs D1a, D1b, and D1c which we strongly suspect were all taken on the same explosive although we cannot so state categorically. The sensitivity versus loading pressure plot (Figure 13) seems to indicate that the more recent values indicate somewhat greater sensitivity. This trend is less marked for the sensitivity versus density plot (Figure 14) and if there is a significant difference (which we doubt, but have not subjected to statistical test) it could be said that the compressibility also has shifted (Figure 15) which in turn indicates that there has been a slight shift in the seven-year period 1960 to 1967.

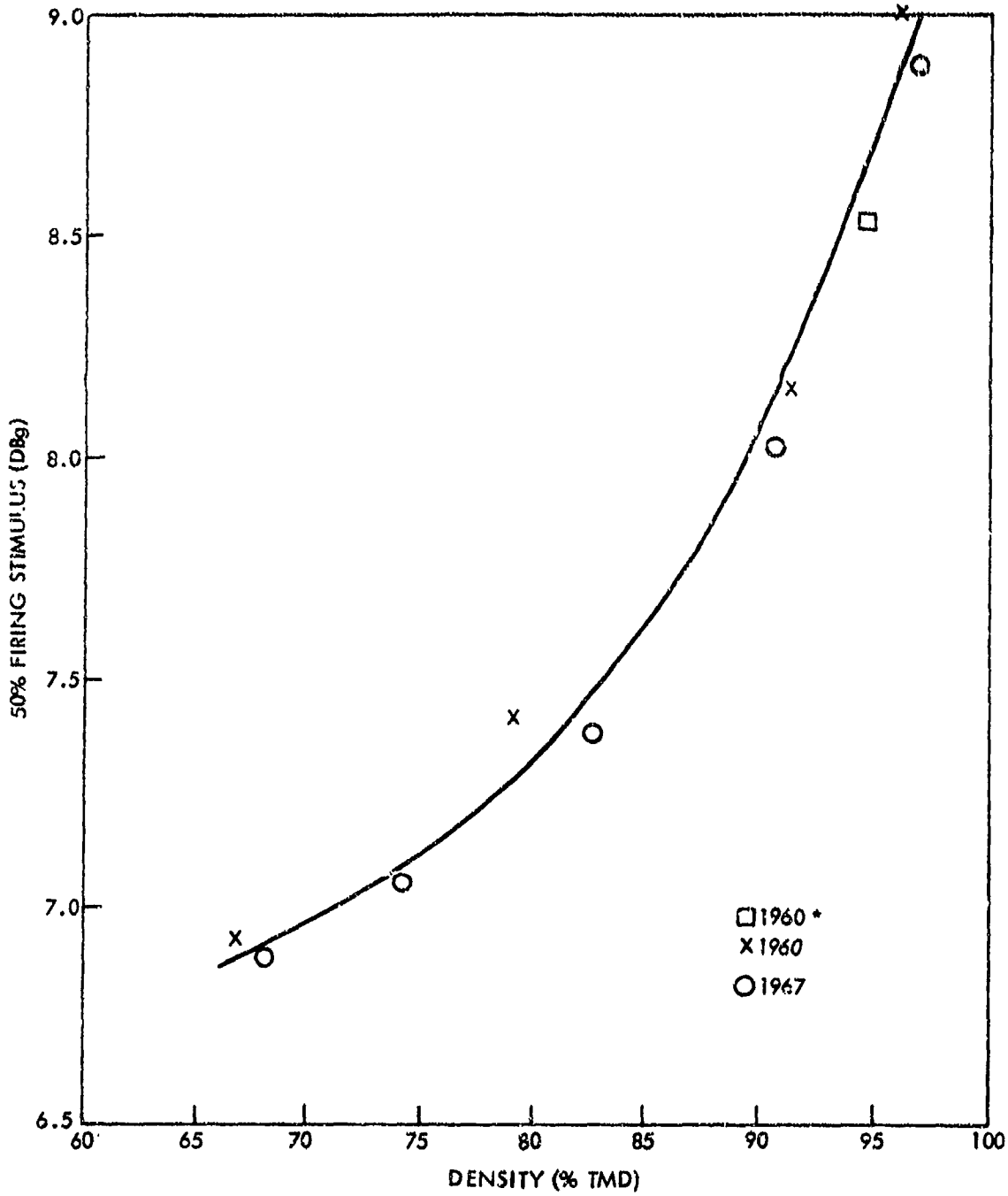
5.6 RDX/STEARIC ACID STUDIES. As part of the program for finding a substitute for tetryl (as of 1973, no more tetryl will be manufactured by the military) a study was instituted to give more understanding of RDX/Stearic Acid mixtures of which the explosive composition A-5 is a member. Two-pound samples of each of six compositions, ranging from 0.3 to 9.7% of stearic acid were made at Picatinny Arsenal and sent to NOL for sensitivity measurements. The sensitivity and compressibility data (Data Packs G6a, G6b....G6f)

*Reference to the appropriate pages of the Data Packs reveals that particle size differences exist which could in turn affect our measured parameters (See D1d2 and D1f2).



* D1a; ASSUMED TO BE X315. SEE PARAGRAPH 5.5

FIG. 13 DATB (X315) TIME-SHIFT (1960 TO 1967) OF SENSITIVITY VS. LOADING PRESSURE



*D1a; ASSUMED TO BE X315. SEE PARAGRAPH 5.5

FIG. 14 DATB (X315) TIME SHIFT (1960 TO 1967) OF SENSITIVITY VS. DENSITY

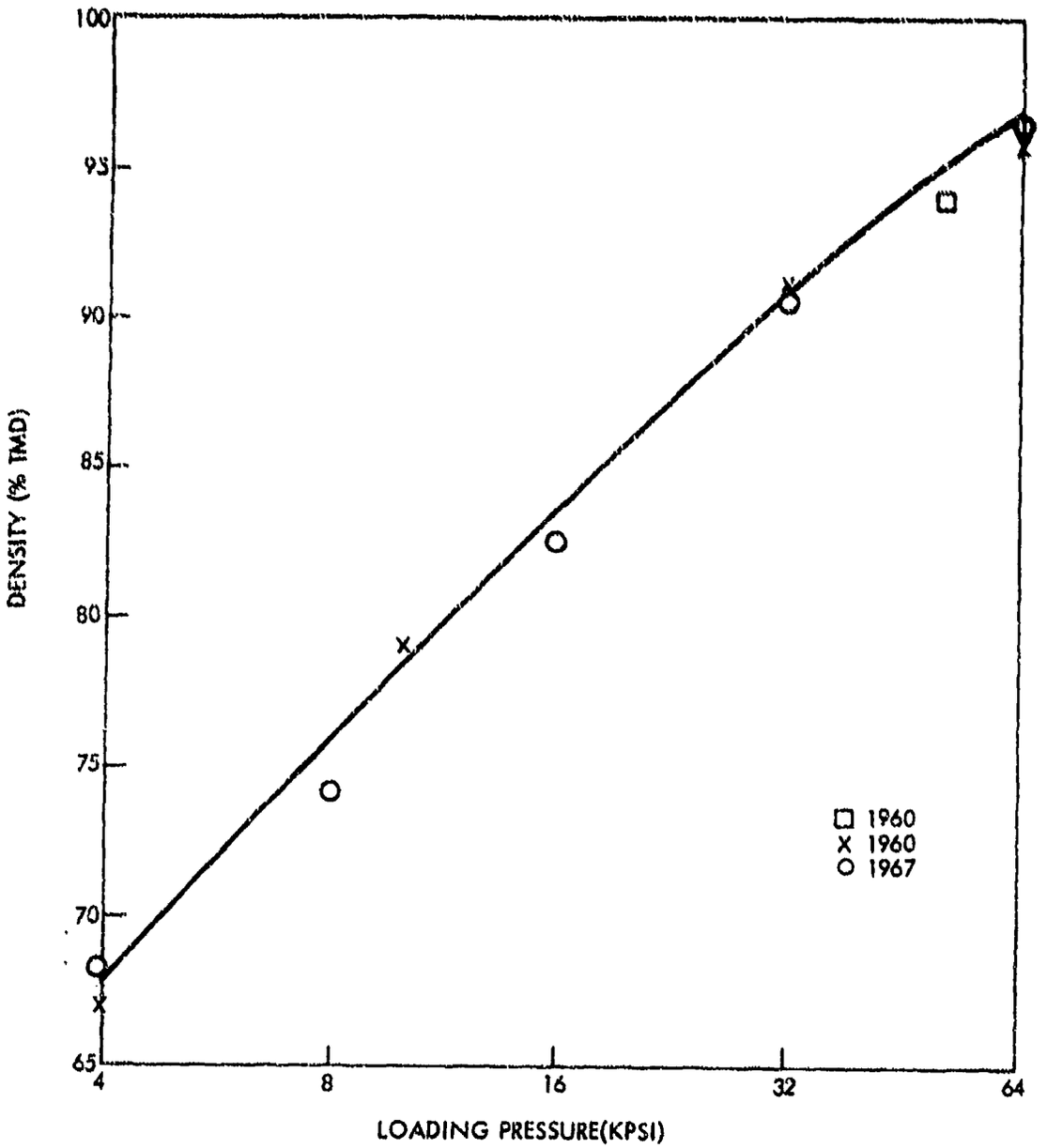


FIG. 15 DATB (X315) TIME SHIFT (1960 TO 1967) OF DENSITY VS. LOADING PRESSURE

when plotted as a function of chemical composition, showed irregularities which suggested that the coating of the RDX by stearic acid might not be uniform. Microscopic studies revealed that this was so -- that there were coated RDX crystals, uncoated crystals of RDX and free clumps of stearic acid. The degree of coating and the amount of free stearic acid, as a function of composition, could not be evaluated quantitatively except that the RDX appeared to be fully coated at the 3.3% and 9.7% stearic acid mixtures. For these two mixtures, however, we could not estimate how much free stearic acid there was.

5.8 We caution that the six mixtures probably do not represent truly the system of which A-5 is a member. That such may be the case is not too surprising since it is often very difficult to scale up or down chemical procedures which involve physical chemical processes such as adsorption, thin films, etc.

6. FINAL REMARKS

6.1 By way of an apology, we find that many of the Pages Two of the data packs are far from complete, sometimes containing only the name of the explosive. Any more traceability information, we fear, has been irretrievably lost. All too often we have come up against the attitude "TNT is TNT, is it not?" The correct attitude is, of course, "Well this batch of TNT just could be different from all others." But complete traceability can be accomplished only by foresight (not hindsight), much money, and mountains of documentation. Our friends in the Outer Space Industry and AEC have been able to perform exemplary jobs of "keeping track".

6.2 As we go to press (1973) we know that there is a considerable body of SSGT sensitivity data which are in varying degrees of readiness for publication but not yet complete. We have given available ancillary information, such as Impact Sensitivities (signified by the symbol $) as measured on the Bureau of Mines Drop Tester at NOL; particle size data, and any notations inscribed on the record cards that could conceivably trigger off a chain of additional information. There are other sources at NOL, such as limited distribution and internal progress reports, declassified documents, and assorted project notebooks which may turn up little gems of information. We hope also that our readers will be able to contribute information that they have found on materials which can be identified by the same X No. and/or batch and lot numbers.

6.3 It is our expectation, as time and money becomes available, to distribute new and updated pages to be inserted into appropriate locations in the data packs, incorporating material such as that mentioned in the preceeding paragraph.

REFERENCES

1. J. N. Ayres, "Standardization of the Small Scale Gap Test", NAVWEPS Report 7342, 16 Jan 1961
2. Statistical Research Group,, Princeton University", Statistical Analysis for a New Procedure in Sensitivity Experiments", AMP Report 101.1R, SRG-P No. 40 (OSRD Report 4040), Jul 1944
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9. A. Golub and F. E. Grubbs, "Analysis of Sensitivity Experiments When the Levels of Stimulus Cannot be Controlled", Jour. of Amer. Stat. Assoc., 51 (1956), 257-265
10. L. D. Hampton, G. D. Blum, "Maximum Likelihood Logistic Analysis of Scattered Go/No-Go (Quantal) Data", NOLTR 64-238, (AD622199), 26 Aug 1965
11. L. J. Montesi, "Steel Dent Output of a Number of Common Explosives", Vol. I Unclassified Explosives, NOLTR 72-92, 25 May 1972
12. D. Price, and T. P. Liddiard, Jr. "The Small Scale Gap Test: Calibration and Comparision with the Large Scale Gap Test", NOLTR 66-87, 7 Jul 1966
13. "Safety and Performance Tests for Qualification of Explosives", NAVORD OD 44811, Vol. 1, 1 Jan 1972

TABLE A-1
ALPHABETIC INDEX TO
APPENDICES B THROUGH G

Explosive Designation	Appendix Location
CH-6	C3
Comp A-5	C5
Comp B	C11
Comp C-3	F1
Comp C-4	F2
DATB	D1
DATB/BRL	E1
DATB/Bytel (95/5)	E2
DATB/Bytel (90/10)	E3
DATB/TATB	G4
DATB/HNS-II	G5
DIPAM	D4
EPM-2	F6
H-6	C4
HBX-3	C12
HMX	B6
HNAB	D3
HNB	F5
HNS-I	D7
HNS-II	D8
HNS-R	D6
HNS-I/TEFLON-30 (95/5)	E4
HNS-II/TEFLON-30 (95/5)	E11
HNS-II/TEFLON-30 (90/10)	E5
HNS-II/TEFLON (90/10)	E6
Lead Azide	B1
LX-04-0	E10
KHND	B3
Nitroguanidine	C6
Nitromannite	B2
Octol (75/25)	C9
Octol (65/35)	C10

Explosives Designation	Appendix Location
PBX 9407	E9
PBXC-6	E8
PBXN-3	E7
PBXN-5	E8
PENTOLITE (50/50)	C8
PETN	B4
PETN/DATB	G2
PETN/TATB	G3
PICRAMIDE	D14
RDX	B5
RDX/Calcium Stearate	G1
RDX/Stearic Acid	G6
TACOT-2	D5
TATB	D2
Tetryl, graphited	C2
Tetryl, yellow	C1
TNB	D15
TNEDV	F4
TNETB	F3
TNT	C7

TABLE A-2
SYNOPTIC INDEX TO APPENDICES B THROUGH G

Appendix B
(Initiating Explosives)

B1 Lead Azide
B2 Nitromannite
B3 KHND
B4 PETN
B5 RDX
B6 HMX

Appendix C
(Booster & Warhead Explosives)

C1 Yellow Tetryl
C2 Graphited Tetryl
C3 CH-6
C4 H-6
C5 Comp A-5
C6 Nitroguanidine
C7 TNT
C8 Pentolite (50/50)
C9 Octol (75/25)
C10 Octol (65/35)
C11 Comp B
C12 HBX-3

Appendix D
(Thermally Stable Explosives)

D1	DATB
D2	TATB
D3	HNAB
D4	DIPAM
D5	TACOT-[illegible]
D6	HNS-R
D7	HNS-I
D8	HNS-II
D9	See Vol. II
D10	See Vol. II
D11	See Vol. II
D12	See Vol. II
D13	See Vol. II
D14	DICRAMIDE
D15	TNB

Appendix E
(Plastic-Bonded Explosives)

E1 DATB/BRL (95/5)
E2 DATB/[illegible]ytel (95/5)
E3 DATB/[illegible]ytel (90/10)
E4 HNS-I/TEFLON-30 (95/5)
E5 HNS-II/TEFLON-30 (90/10)
E6 HNS-II/TEFLON-7c (90/10)
E7 PBXN-3
E8 PBXN-5 (also PBXC-6)
E9 PBX-9407
E10 LX-04-0
E11 HNS-II/TEFLON-30 (95/5)
E12 See Vol. II

Appendix F
(Miscellaneous Explosives)

F1 Comp C-3
F2 TNETB
F3 TNETB
F4 TNEDV
F5 HNB
F6 EPM-2

Appendix G
(Variable Composition Series)

G1 RDX/Calcium Stearate
G2 PETN/DATB
G3 PETN/TATB
G4 DATB/TATB
G5 DATB/HNS-II
G6 RDX/Stearic Acid

TABLE A-3
LIST OF DATA PACKS

Page Number	Explosive	x Number	ID Number
	APPENDIX B		
B1a	Lead Azide	-	-
B2a	Nitromannite	601	26
B3a	KHND	616	1001
B4a	PETN	321	-
B4b	PETN	321	1227
B5a	RDX	189	-
B5b	RDX	414	-
B6a	HMX	-	-
	APPENDIX C		
C1a	Tetryl (Yellow)	102	-
C2a	Tetryl (Graphited)	460	-
C2b	Tetryl (Graphited)	460	374
C2c	Tetryl (Graphited)	672	896
C3a	CH-6	Misc	-
C3b	CH-6	329	-
C3c	CH-6	344	-
C3d	CH-6	439	-
C3e	CH-6	440	-
C3f	CH-6	441	-
C3g	CH-6	442	-
C3h	CH-6	445	-
C3i	CH-6	702	1062
C4a	H-6	-	CH 4171
C4b	H-6	-	-
C5a	Comp A-5	815	1641
C6a	Nitroguanidine	547	-

C7a	TNT	159	-
C7b	TNT	412	-
C7c	TNT	-	-
C8a	PENTOLITE (50/50)	551	-
C9a	Octol (75/25)	469	-
C10a	Octol (65/35)	293	-
C11a	Comp B	279	311
C11b	Comp B	479	-
C11c	Comp B	576	-
C12a	HBX-3	-	CH 4170

APPENDIX D

D1a	DATB	-	-
D1b	DATB	315	-
D1c	DATB	315	185 & 921
D1d	DATB	331	-
D1e	DATB	331	920
D1f	DATB	397	922
D2a	TATB	335	-
D2b	TATB	406	-
D3a	HNAB	511,512	-
D3b	HNAB	518	-
D4a	DIPAM	346	-
D4b	DIPAM	402	-
D4c	DIPAM	428	-
D4d	DIPAM	452, 453	-
D4e	DIPAM	491	-
D4f	DIPAM	546	-
D4g	DIPAM	549	-
D5a	TACOT-8	330	-
D6a	HNS-R	401	-
D7a	HNS-I	498	-
D7b	HNS-I	534	-
D7c	HNS-I	537	-
D7d	HNS-I	537	-
D7e	HNS-I	539	-
D7f	HNS-I (B)	565	-
D7g	HNS-I (B)	705	1071
D7h	HNS-I	716	1090

D8a	HNS-II	-	Misc
D8b	HNS-II	Misc	-
D8c	HNS-II	528	-
D8d	HNS-II	550	-
D8e	HNS-II	Misc	-
D9a	(Vol II)	-	-
D10a	(Vol II)	-	-
D11a	(Vol II)	-	-
D12a	(Vol II)	-	-
D12b	(Vol II)	-	-
D13a	(Vol II)	-	-
D14a	PICRAMIDE	405	-
D15a	TNB	-	-

APPENDIX E

E1a	DATB/BRL (95/5)	-	0271
E2a	DATB/Bytel (95/5)	322	-
E2b	DATB/Bytel (95/5)	327	-
E3a	DATB/Bytel (90/10)	326	-
E4a	HNS-I/TEFLON-30 (95/5)	444	-
E4b	HNS-I/TEFLON-30 (95/5)	467	-
E4c	HNS-I/TEFLON-30 (95/5)	525	-
E4d	HNS-I/TEFLON-30 (95/5)	526	-
E4e	HNS-I/TEFLON-30 (95/5)	540	-
E5a	HNS-II/TEFLON-30 (90/10)	571	-
E5b	HNS-II/TEFLON-30 (90/10)	571	-
E5c	HNS-II/TEFLON-30 (90/10)	571	-
E5d	HNS-II/TEFLON-30 (90/10)	581	-
E5e	HNS-II/TEFLON-30 (90/10)	581	-
E6a	HNS-II/TEFLON-7c (90/10)	-	1462
E6b	HNS-II/TEFLON-7c (90/10)	757	1493
E6c	HNS-II/TEFLON-7c (90/10)	-	1541
E7a	PBXN-3	474	1507
E8a	PBXC-6	419	437, 438, 441
E8b	PBXN-5	618	579
E8c	PBXN-5	619	580
E8d	PBXN-5	715	1120

E9a	PBX-9407	-	1467
E10a	LX-04-0	-	1505
E11a	HNS-II/TEFLON-3C (95/5)	533	-
E12a	(Vol II)	-	-

APPENDIX F

F1a	Comp C-3	-	-
F2a	Comp C-4	524	-
F3a	TNETB	563	-
F4a	TNETV	579	-
F5a	HNB	501	-
F6a	EPN-2	-	-

APPENDIX G

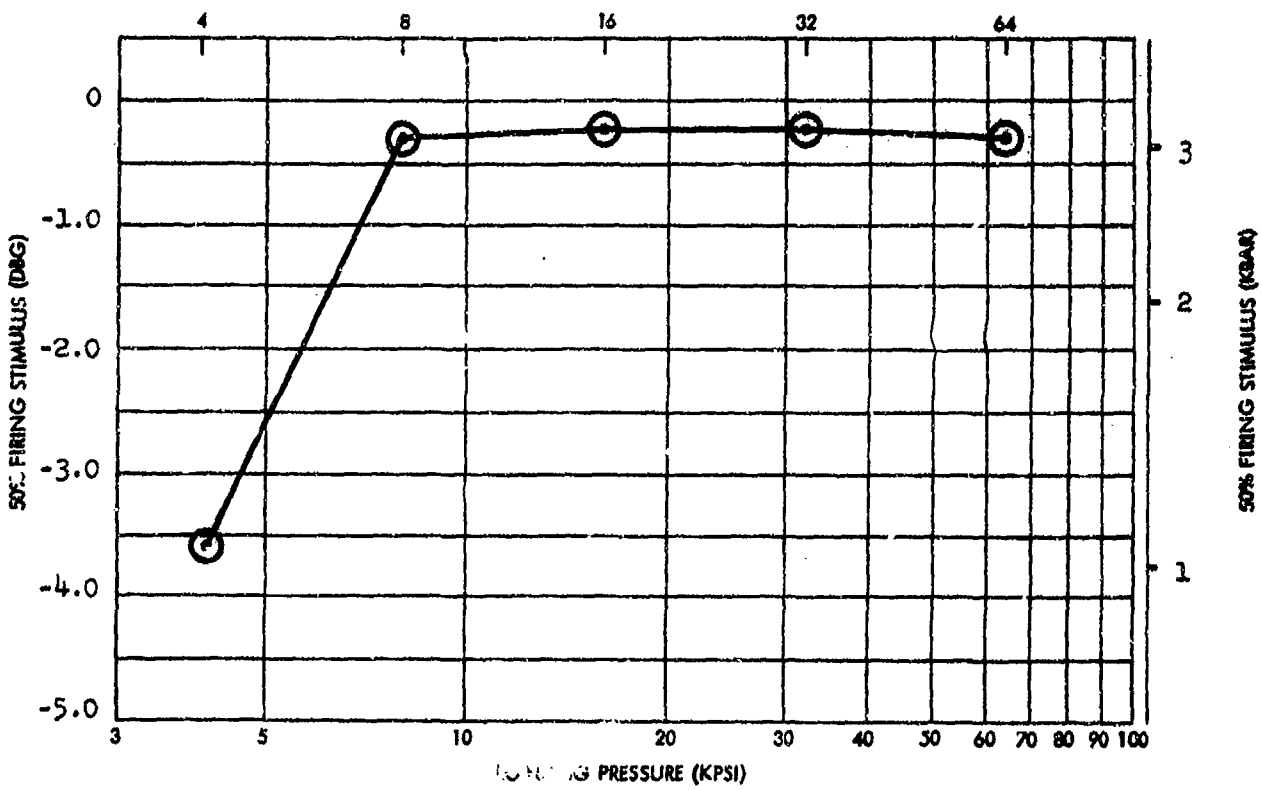
G1a	RDX/CA-ST.	(99.4/0.6)	348	-
G1b	RDX/CA-ST.	(99.3/0.7)	302	-
G1c	RDX/CA-ST.	(99.2/0.8)	349	-
G1d	RDX/CA-ST.	(98.6/1.4)	208	-
G1e	RDX/CA-St.	(98.3/1.7)	350	-
G1f	RDX/CA-ST.	(98.0/2.0)	215	-
G1g	RDX/CA-ST.	(98.0/2.0)	281	-
G1h	RDX/CA-ST.	(97.5/2.5)	353	-
G1i	RDX/CA-ST.	(97.2/2.8)	209	-
G1j	RDX/CA-ST.	(97.2/2.8)	282	-
G1k	RDX/CA-ST.	(96.7/3.3)	354	-
G1ℓ	RDX/CA-ST.	(96.0/4.0)	210	-
G1m	RDX/CA-ST.	(96.0/4.0)	283	-
G1n	RDX/CA-ST.	(95.0/5.0)	358	-
G1o	RDX/CA-ST.	(94.4/5.6)	211	-
G1p	RDX/CA-ST.	(93.9/6.1)	362	-
G1q	RDX/CA-ST.	(92.0/8.0)	212	-
G1r	RDX/CA-ST.	(92.0/8.0)	285	-
G1s	RDX/CA-ST.	(90.8/9.2)	366	-
G1t	RDX/CA-ST.	(89.0/11.0)	286	-
G1u	RDX/CA-ST.	(88.9/11.1)	370	-
G1v	RDX/CA-ST.	(88.7/11.3)	216	-
G1w	RDX/CA-ST.	(87.2/12.8)	374	-
G1x	RDX/CA-ST.	(85.8/14.2)	378	-
G1y	RDX/CA-ST.	(85.0/15.0)	287	-
G1z	RDX/CA-ST.	(84.2/15.8)	217	-
G1aa	RDX/CA-ST.	(84.2/15.8)	288	-
G1bb	RDX/CA-ST.	(83.4/16.6)	381	-

G1cc	RDX/CA-ST.	(81.3/18.7)	384	-
G1dd	RDX/CA-ST.	(78.5/21.5)	385	-
G1ee	RDX/CA-ST.	(76.2/23.8)	386	-
G1ff	RDX/CA-ST.	(74.0/26.0)	291	-
G1gg	RDX/CA-ST.	(71.2/28.8)	219	-
G2a	PETN/DATB	(75/25)	507	-
G2b	PETN/DATB	(50/50)	505	-
G2c	PETN/DATB	(25/75)	506	-
G2d	PETN/DATB	(15/85)	555	-
G2e	PETN/DATB	(5/95)	556	-
G3a	PETN/TATB	(50/50)	508	-
G4a	DATB/TATB	(50/50)	509	-
G5a	DATB/HNS-II	(75/25)	569	-
G5b	DATB/HNS-II	(50/50)	566	-
G6a	RDX/ST-AC	(99.7/0.3)	822	1670
G6b	RDX/ST-AC	(99.4/0.6)	823	1671
G6c	RDX/ST-AC	(99.2/0.8)	824	1672
G6d	RDX/ST-AC	(98.8/1.2)	825	1673
G6e	RDX/ST-AC	(96.7/3.3)	826	1674
G6f	RDX/ST-AC	(90.3/9.7)	827	1675

EXPLOSIVE	LEAD AZIDE, DEX.	X NO.	-	Date of Test
TMD	4.71	I. D. NO.	-	3/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	g_m	N	
4	2.535	0.0280	53.8	-3.622	-	-	18	(1)
8	2.775	0.0215	58.9	-0.302	0.3017	0.1839	18	
16	3.074	0.0155	65.3	-0.239	0.1672	0.0879	18	
32	3.361	0.0215	71.4	-0.227	0.0961	0.0558	18	
64	3.663	0.0237	77.8	-0.303	0.3370	0.2120	18	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
LEAD AZIDE, DEX.

Blal

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: LEAD AZIDE, DEX.

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.: 969

SOURCE:

CHEMICAL NAME: LEAD AZIDE, DEXTRINATED

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

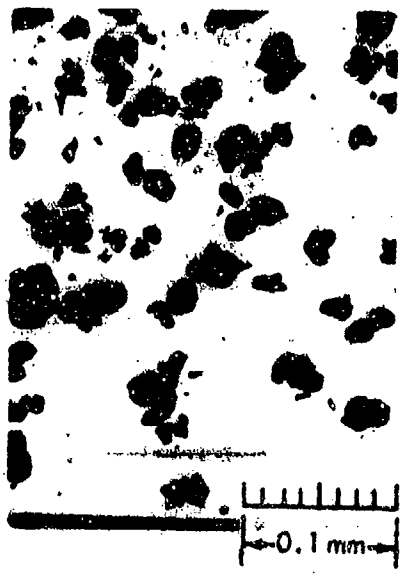
IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

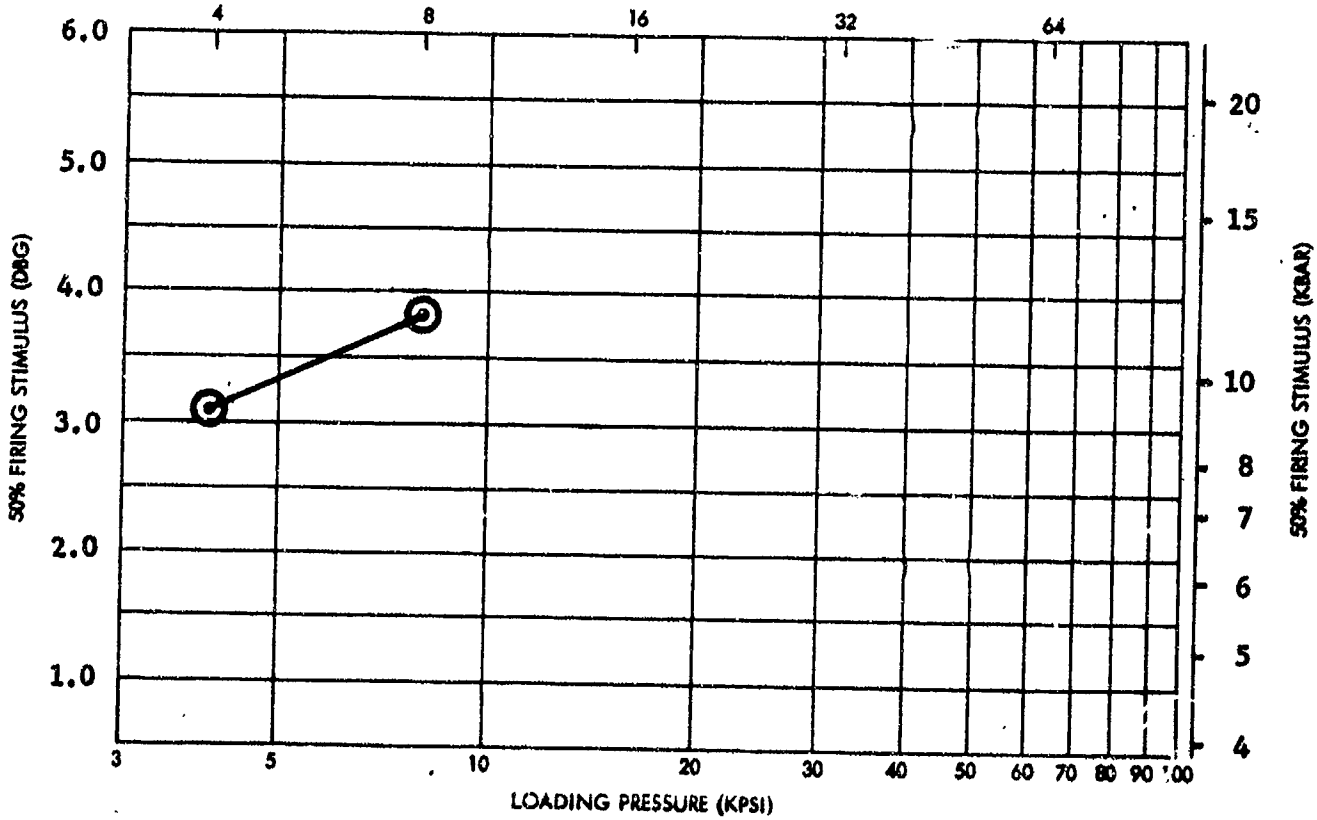
n =

Remarks



EXPLOSIVE	NITROMANNITE	X NO.	601	Date of Test
TMD	1.73	I. D. NO.	26	7/67

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
1	0.957	0.0186	55.3	1.967	0.2514	0.1269	20	
2	1.113	0.0124	64.3	2.968	0.0426	0.0269	20	
4	1.293	0.0081	74.7	3.103	0.0531	0.0308	20	
8	1.458	0.0063	84.3	3.820	0.0401	0.0294	20	



SMALL SCALE GAP TEST (SSGT) DATA
NITROMANNITE

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: NITROMANNITE

X NO.: 601 ID: 26 Z NO.: SSGT LOAD ORDER NO.: 1181

SOURCE:

CHEMICAL NAME: HEXANITROMANNITE

DATE RECEIVED: 7/27/67 LOT NO.: 12

INITIAL QUANTITY: 1 pound BATCH NO.:

MANUFACTURED BY:

Atlas Chemical Company
Wilmington, Del.

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

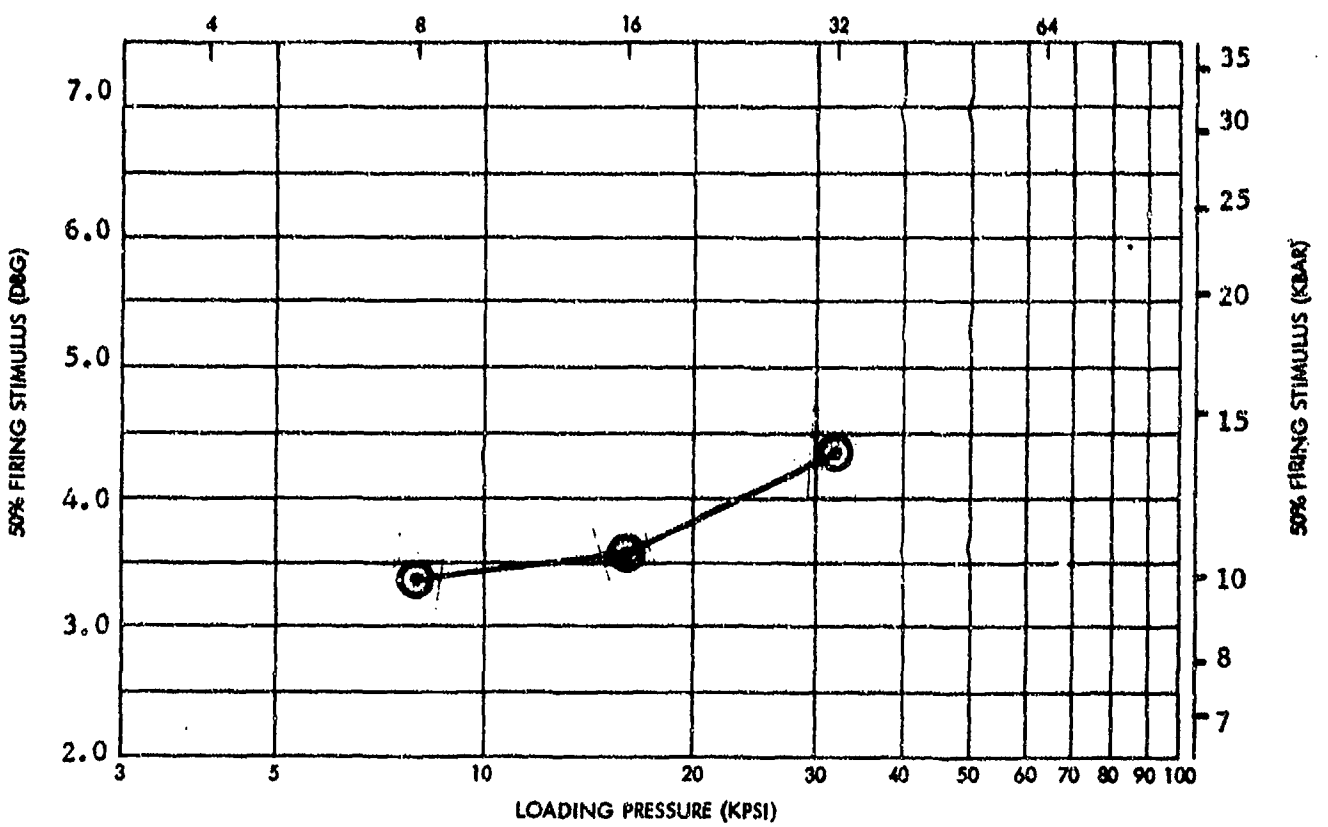
n =

Remarks

Rcvd & stored wet. Drying procedure 120°F, under vacuum, overnight.

EXPLOSIVE	KHND	X NO.	616	Date of Test
YMD	""	I. D. NO.	1001	9/67

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	s	% YMD	SENSITIVITY (DBG) AVG.	s	x_m	N	REMARKS
8	1.438	0.0187	"	3.370	0.0231	0.0188	20	
16	1.577	0.0126	"	3.604	0.0183	0.0159	20	
32	1.697	0.0089	"	4.357	0.0165	0.0152	20	



SMALL SCALE GAP TEST (SSGT) DATA
KHND

B3a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: KHND

X NO.: 616 ID: 1001 Z NO.: 766 SSGT LOAD ORDER NO.: 1193

SOURCE: NOL, (B310 Dacons), Rovd Initiation Research Group
227 grams in plastic bag, 26 Sep 67
CHEMICAL NAME: Potassium Hexanitrodiphenylamine

DATE RECEIVED: 3/1/65 LOT NO.: 251-98

INITIAL QUANTITY: 3.2 pounds BATCH NO.: 1,2,3,4,6,7

MANUFACTURED BY:

American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (Z or 50% point)
(Type 12 Tools; 2.5 Kg wt: Sandpaper)
DATE OF TEST

$\bar{x}$ = 26 cm

s = 0.07 log units

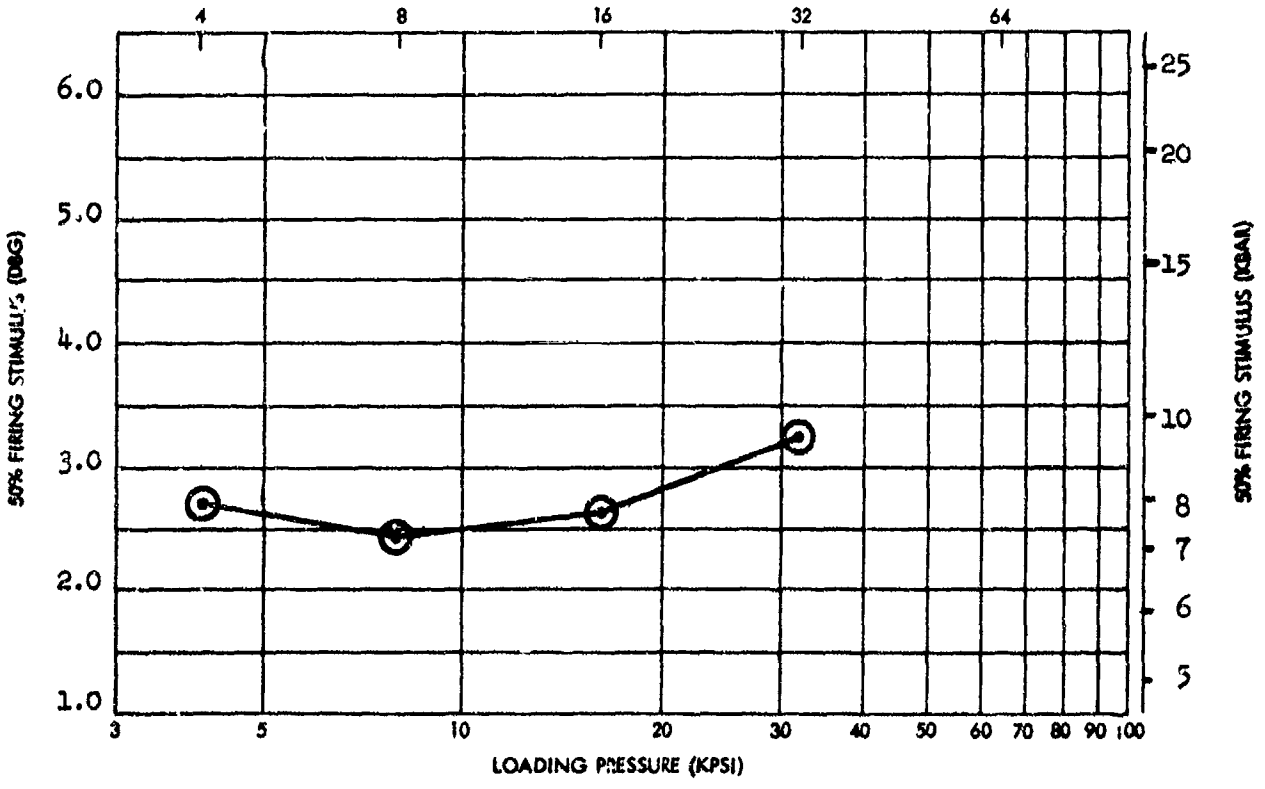
n =

Remarks

EXPLOSIVE	PETN	X NO.	321	Date of Test
TMD	1.78	I. D. NO.	-	5/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	s	s_m	N	
4	1.355	0.0053	76.1	2.726	0.0206	0.0215	18	
8	1.440	0.0049	80.9	2.476	0.0939	0.0555	18	
16	1.576	0.0058	88.5	2.621	0.0101	0.0106	18	
32	1.681	0.0041	94.4	3.258	-	-	18	(1)

(1) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
PETN

B4a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN Special (Sic) AN-P387 Class B

X NO.: 321 ID: Z NO.: SSGT LOAD ORDER NO.: 1122

SOURCE:

CHEMICAL NAME: Pentaerythrite Tetranitrate

DATE RECEIVED: 7/7/60 LOT NO.:

INITIAL QUANTITY: 200 pounds BATCH NO.:

MANUFACTURED BY:
Ravenna Arsenal, Ohio

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

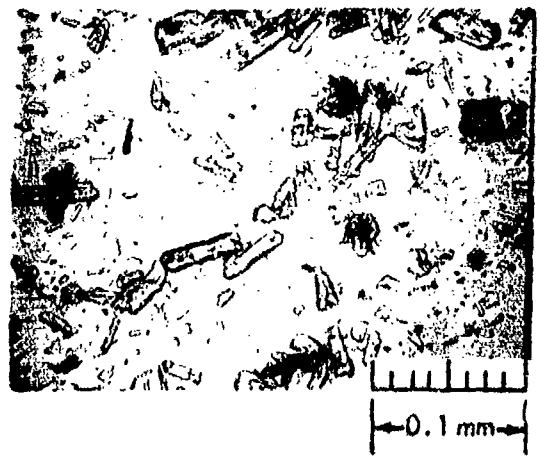
	TRIAL I	TRIAL II
$\bar{x}$ = 14	cm	16
s = 0.11	log units	<0.05
n = 25		25

Remarks

100 Gram Sieve Analysis, 1 Hour*

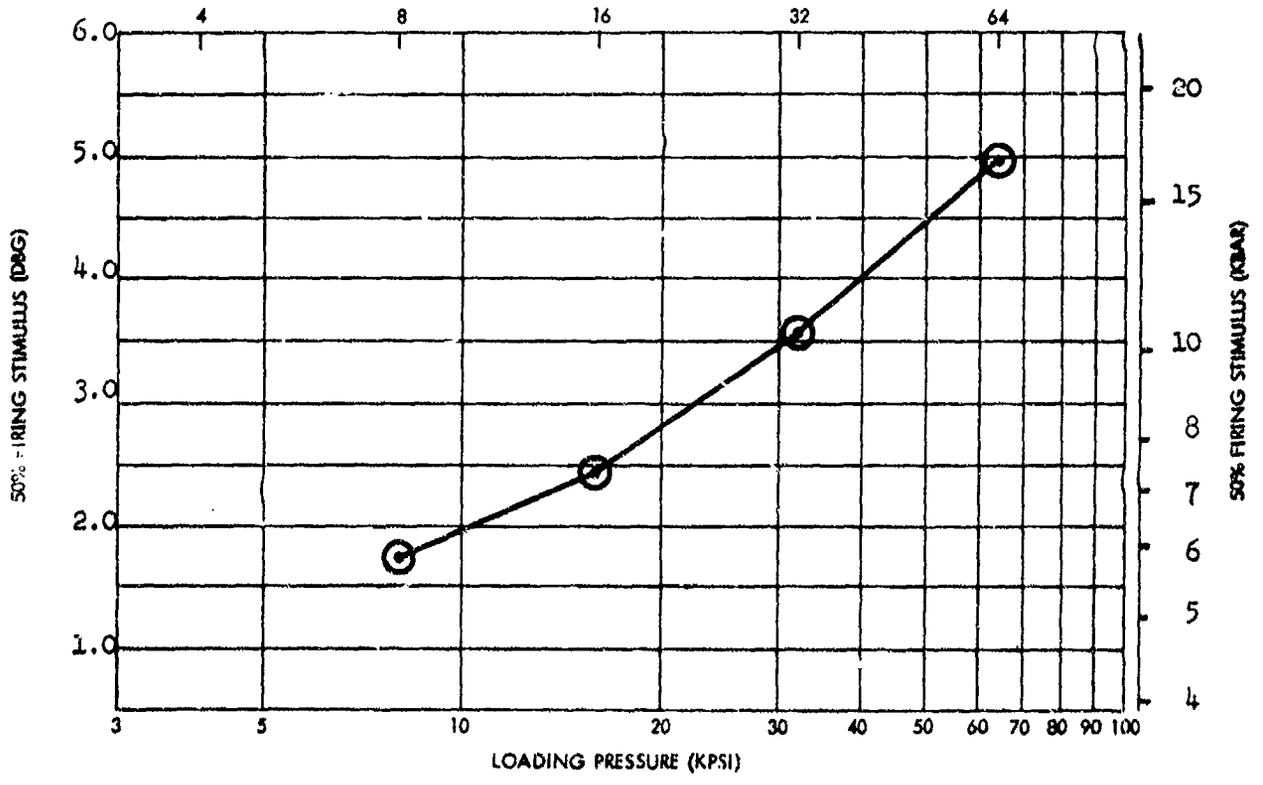
Mesh Size Through	Mesh Size On	Amount (%)
	40	0.53
40	70	3.69
70	100	47.67
100	140	30.03
140	170	4.22
170	200	1.17
200	PAN	12.69

*Assumed that this notation indicates 1 hour sieve time.



EXPLOSIVE	PETN	X NO.	321	Date of Test
TMD	1.78	I. D. NO.	1227	4/70

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.499	0.0065	84.2	1.725	0.5416	0.2529	22	
16	1.600	0.0058	89.9	2.468	0.0459	0.2568	23	
32	1.708	0.0047	96.0	3.555	0.0918	0.0445	23	
64	1.775	0.0057	99.7	4.998	0.0158	0.0167	23	



SMALL SCALE GAP TEST (SSGT) DATA
PETN

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN SPECIAL (Sic) AN-P387 Class B

X NO.: 321 **ID:** 1227 **Z NO.:** **SSGT LOAD ORDER NO.:** 1294

SOURCE:

CHEMICAL NAME: Pentaerythrite Tetranitrate

DATE RECEIVED: 7/7/60 **LOT NO.:**

INITIAL QUANTITY: 200 pounds **BATCH NO.:**

MANUFACTURED BY:
Ravenna Arsenal, Ohio

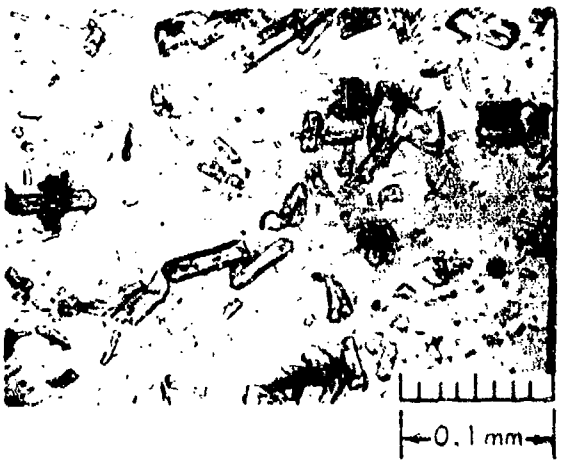
IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

	TRIAL I	TRIAL II
$\dot{x}$ =	14 cm	16
s =	0.11 log units	<0.05
n =	25	25

Remarks
*Dried 31 Mar 70

100 Gram Sieve Analysis, 1 Hour*

Mesh Size Through	On	Amount (%)
	40	0.53
40	70	3.69
70	100	47.67
100	140	30.03
140	170	4.22
170	200	1.17
200	PAN	12.69

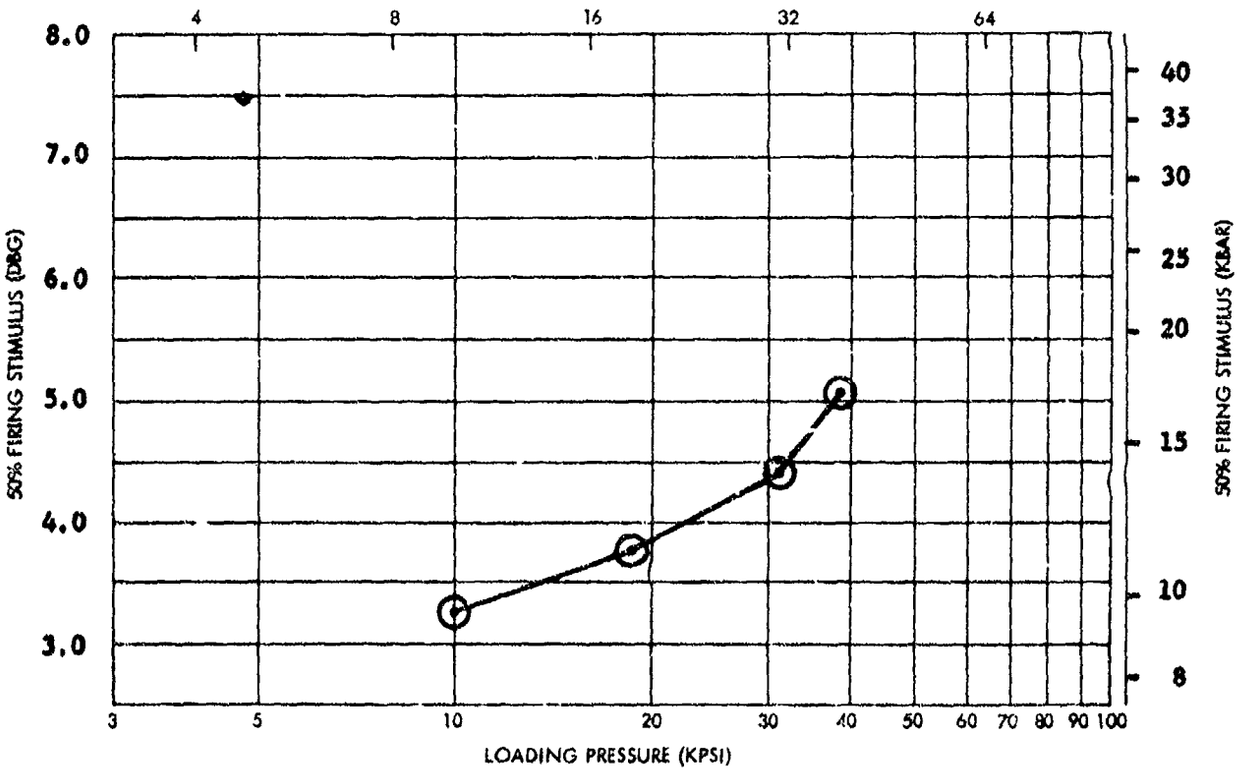


*Assumed that this notation indicates 1 hour sieve time.

EXPLOSIVE	RDX	X NO.	189 (1)	Date of Test
TMD	1.802	I. D. NO.	-	2/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10.0	1.546	0.0035	85.8	3.250	0.0049	0.0041	43	
18.3	1.618	0.0054	89.8	3.762	0.0385	0.0160	44	
31	1.702	0.0084	94.5	4.413	0.0783	0.0289	46	(2)
38.2	1.717	0.0050	95.3	5.073	0.1639	0.0555	43	

(1) RDX - Type B, Class B.
(2) Material loaded under vacuum.



SMALL SCALE GAP TEST (SSGT) DATA
RDX

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX Type B Class B, (JAN SPEC-R-398)

X NO.: 189 ID: % NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: Cyclotrimethylenetrinitramine (Cyclonite)

DATE RECEIVED: 11/30/54 LOT NO.:

INITIAL QUANTITY: 2000 pounds (Cost $800) BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = 24 cm (AVG.)

s = log units

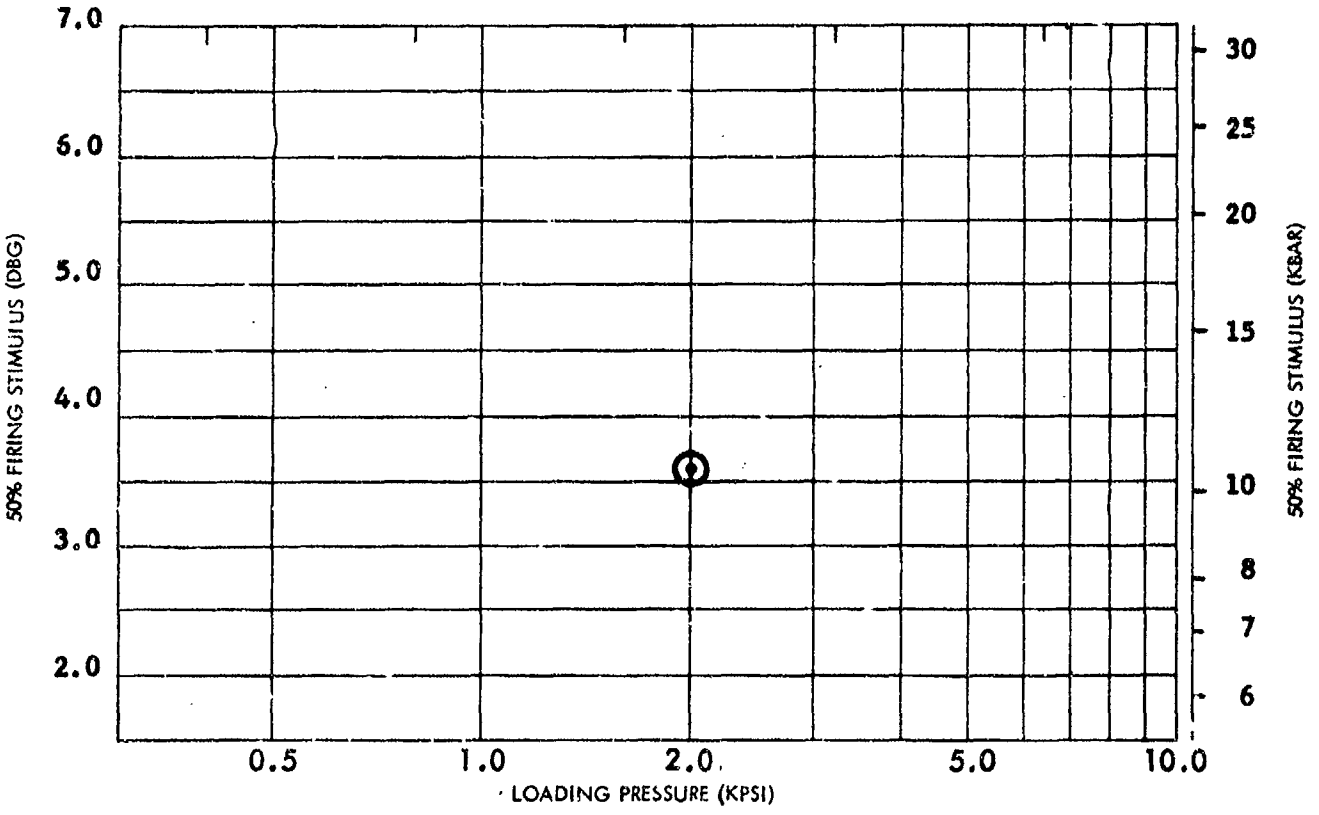
n =

Remarks

EXPLOSIVE	RDX	X NO.	414 (1)	Date of Test
TMD	1.802	I. D. NO.	-	1/63

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
2.0	1.188	0.0162	65.9	3.569	0.0305	0.0204	23	

(1) Exploding Bridgewire Grade



SMALL SCALE GAP TEST (SSGT) DATA
RDX

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX, EBW Grade

X NO.: 414 ID: Z NO.: 451 SSGT LOAD ORDER NO.:

SOURCE: Lockheed Missile & Space Co., Santa Cruz, CA.
(NOW 63-0050-C)

CHEMICAL NAME: Cyclotrimethylenetrinitramine (Cyclonite)

DATE RECEIVED: 1/3/63 LOT NO.:

INITIAL QUANTITY: 1/2 pound (WET) BATCH NO.: SCTB 36659-1-1
Date 1951

MANUFACTURED BY:

Wabash Ordnance Depot
Wabash, Ill.

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

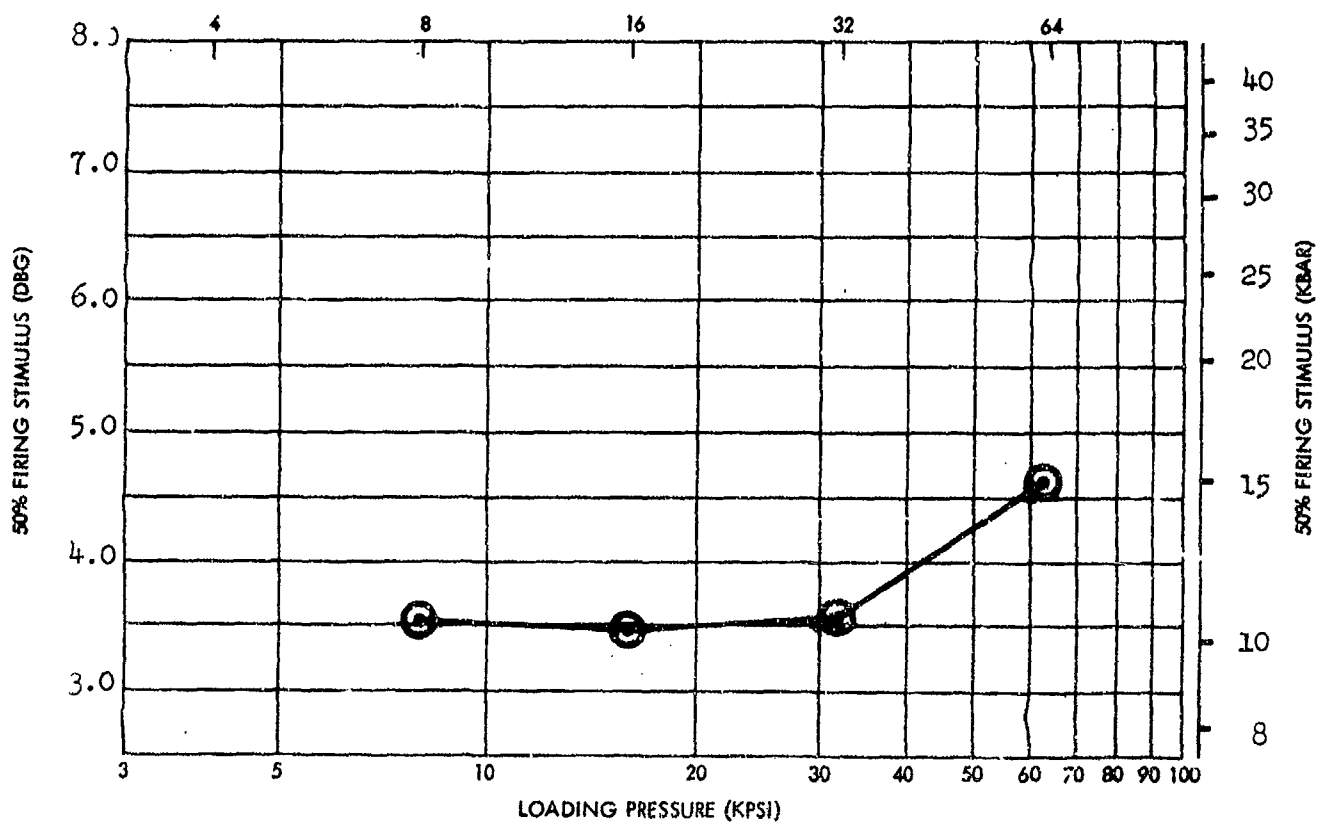
Remarks

B 5 b 2

4 Sep 1973

EXPLOSIVE	HMX	X NO.	-	Date of Test 6/61
TMD	1.903	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.517	-	79.7	3.526	0.0172	0.0216	20	
16	1.627	-	85.5	3.475	0.0548	0.0328	20	
32	1.718	-	90.3	3.508	0.0102	0.0097	20	
64	1.814	-	95.3	4.644	0.1546	0.1023	20	



SMALL SCALE GAP TEST (SSGT) DATA
HMX

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HMX

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: Cyclotetramethylenetetranitramine

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

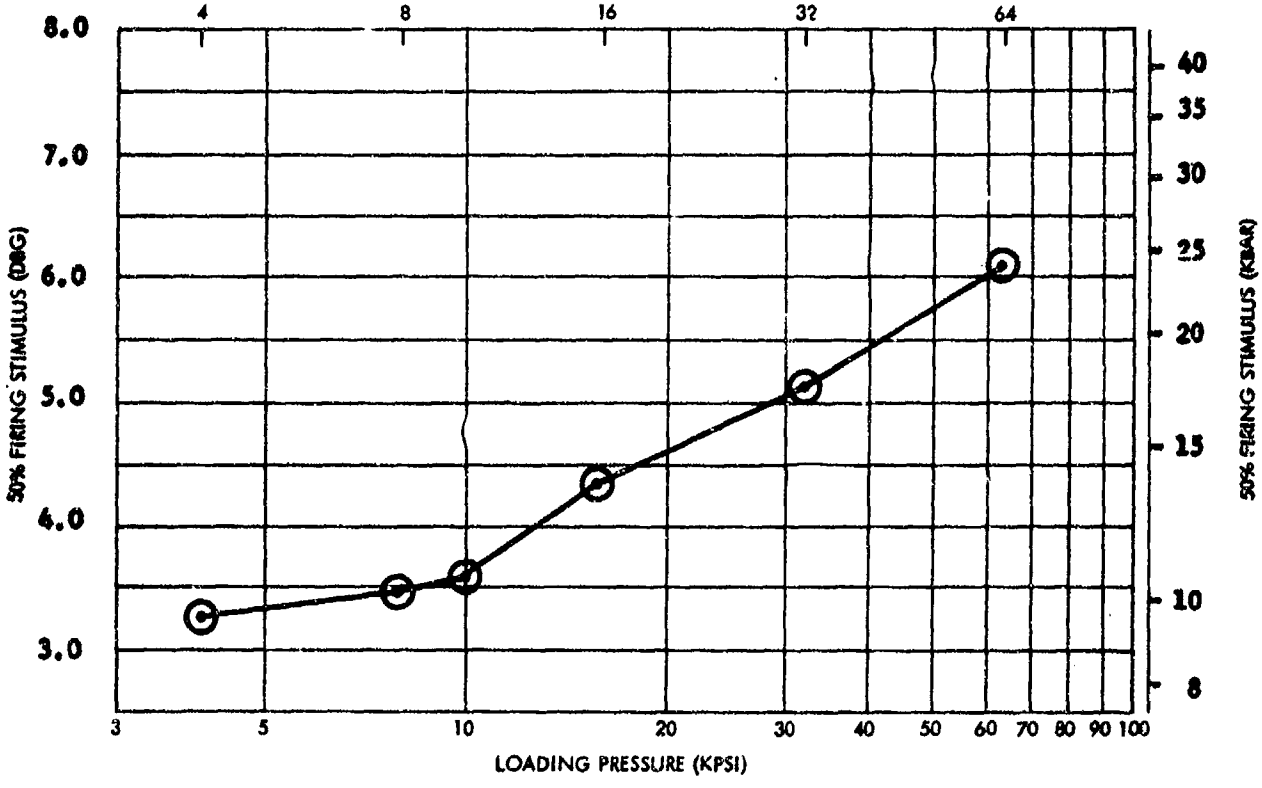
n =

Remarks
No information available

EXPLOSIVE	TETRYL (1)	X NO.	102	Date of Test
TMD	1.73	I. D. NO.	-	6/61

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.434	-	82.9	3.267	0.0175	0.0243	20	
8	1.535	-	88.7	3.478	0.0477	0.0297	20	
10	1.527	0.0096	88.3	3.586	0.1307	0.0434	46	(2)
16	1.623	-	93.8	4.360	0.1631	0.0901	20	
32	1.687	-	97.5	5.133	0.0242	0.0205	20	
64	1.732	-	100.1 (3)	6.093	0.0242	0.0202	20	

(1) TETRYL, YELLOW
(2) DATE OF TEST; 6/60
(3) EXPERIMENTAL ERROR



SMALL SCALE GAP TEST (SSGT) DATA
TETRYL (YELLOW)

Clal

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: Tetryl (Yellow)

X NO.: 102 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:**

SOURCE: NAD Crane, Indiana

CHEMICAL NAME:

DATE RECEIVED: 4/5/49 **LOT NO.:**

INITIAL QUANTITY: 2000 pound **BATCH NO.:**
Expended Feb 62

MANUFACTURED BY:

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H̄ = **cm**

s = **log units**

n =

Remarks

Sieve Analysis
(100 grams, for 1 hour)*

Held on 12	0 %
Through 12 on 16	0.32%
Through 16 on 60	97.87%
Through 60 on 100	1.17%
on Pan	0.64%

21 Feb 1957

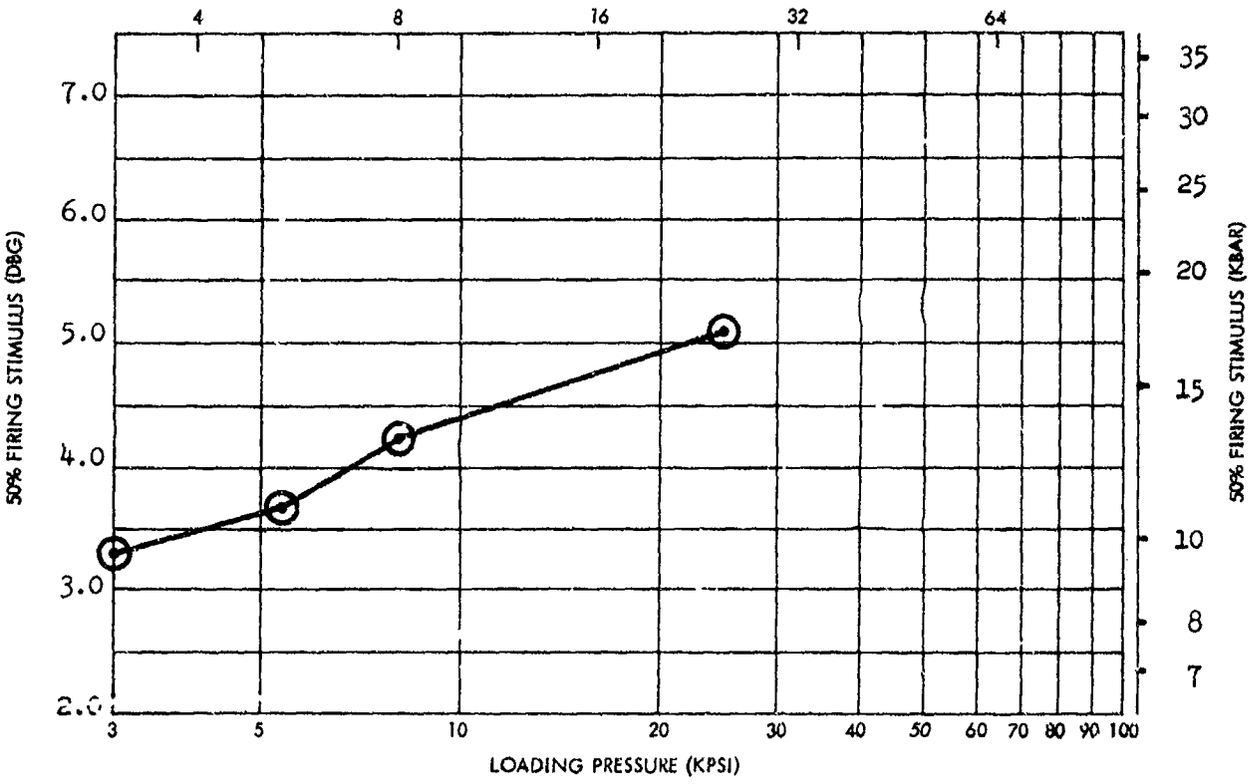
*Assumed that this notation indicates 1 hour sieve time.

EXPLOSIVE	TETRYL (GRAPHITED)	X NO.	460	Date of Test
TMD	1.73 (1)	I. D. NO.	-	6/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
3	1.423	0.0073	82.3	3.291	0.0369	0.0220	28	
5.3	1.503	0.0032	86.9	3.684	0.0282	0.0209	28	
8	1.549	-	89.5	4.239	0.0098	0.0337	20	(2)
24	1.660	0.0015	96.0	5.081	0.0393	0.0229	28	

(1) The TMD of pure tetryl is used since Graphited Tetryl can contain either Calcium Stearate (ρ = 1.040) or Graphite (ρ = 2.25), or both in any combination, up to a total of 2% by weight.

(2) Date of Test - 2/65



SMALL SCALE GAP TEST (SSGT) DATA

TETRYL (GRAPHITED)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TETRYL (Graphited)*

X NO.: 460 ID: Z NO.: SSGT LOAD ORDER NO.: 1069

SOURCE: NOP Macon, Reqn 60921-4-000103

CHEMICAL NAME:

DATE RECEIVED: LOT NO.: R/O ARE = 00045-N2

INITIAL QUANTITY: 200 pounds BATCH NO.:

MANUFACTURED BY:

Naval Ordnance Plant
Macon, Georgia

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

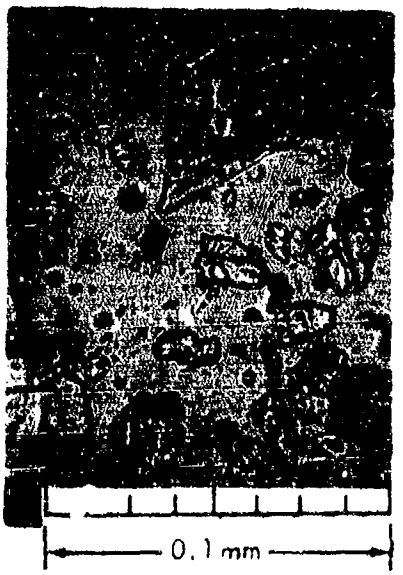
$\bar{x}$ = cm

s = log units

n =

Remarks

* Composition: Tetryl/Graphite (2% Max.)

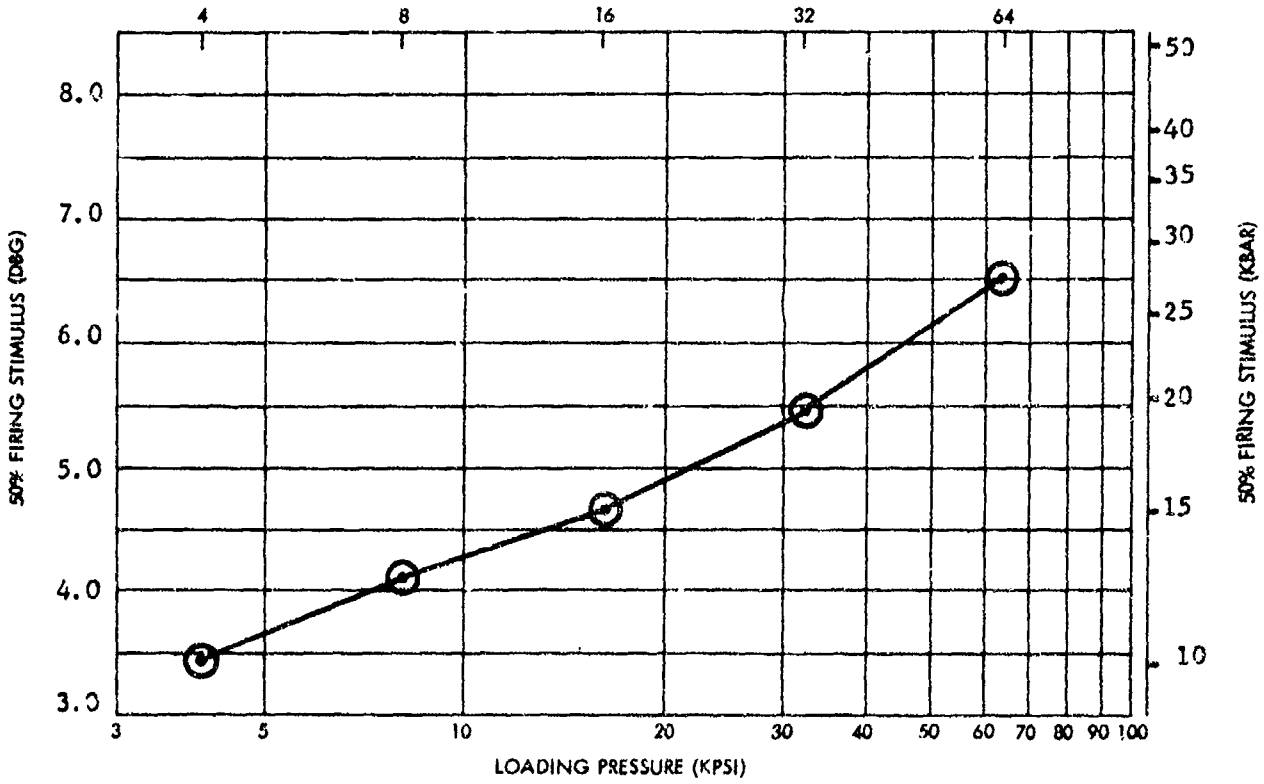


EXPLOSIVE	TETRYL (GRAPHITED)	X NO.	450
TMD	1.73 (1)	I. D. NO.	374

Date of Test 6/68

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.445	0.0042	83.5	3.450	0.0352	0.0220	23	
8	1.541	0.0057	89.1	4.103	0.0123	0.0132	23	
16	1.630	0.0038	94.2	4.659	0.0400	0.0237	23	
32	1.696	0.0022	98.0	5.465	0.0489	0.0297	23	
64	1.737	0.0022	100.4	6.503	0.0748	0.0404	23	

(1) The TMD of pure tetryl is used since Graphited Tetryl can contain either Calcium Stearate (ρ = 1.040) or Graphite (ρ = 2.25), or both in any combination, up to a total of 2% by weight.



SMALL SCALE GAP TEST (SSGT) DATA

TETRYL (GRAPHITED)

C2b1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TETRYL (Graphited)*

X NO.: 460 **ID:** 374 **Z NO.:** **SSGT LOAD ORDER NO.:** 1236

SOURCE: NOP Macon, Reqn 60921-4-000103

CHEMICAL NAME:

DATE RECEIVED: **LOT NO.:** R/O ARE = 00045-N2

INITIAL QUANTITY: 200 pounds **BATCH NO.:**

MANUFACTURED BY:

Naval Ordnance Plant
Macon, Georgia

IMPACT SENSITIVITY (H̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H̄ = cm

s = log units

n =

Remarks

* Composition: Tetryl/Graphite (2% Max.)

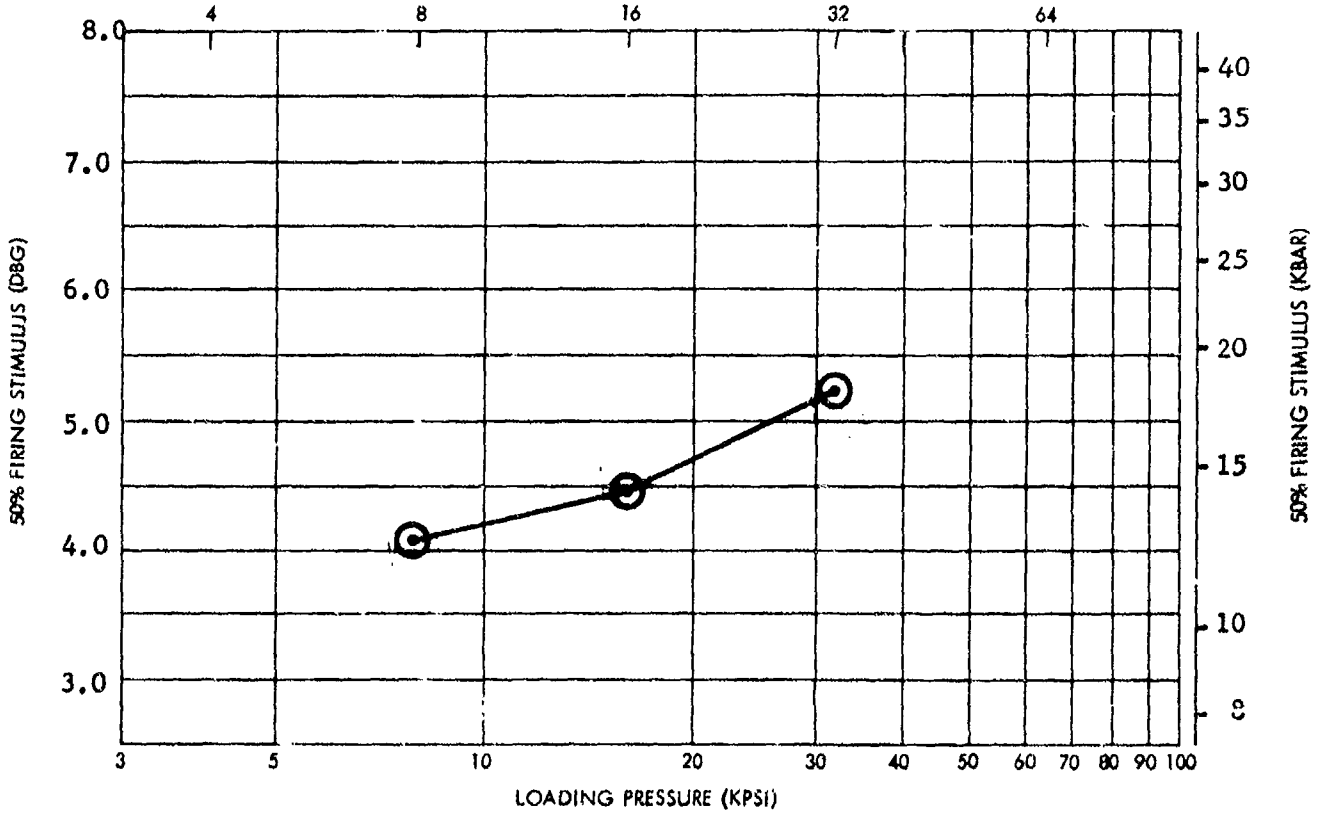
4 Sep 1973

EXPLOSIVE	TETRYL (GRAPHITED)	X NO.	672
TMD	1.738	I. D. NO.	896

Date of Test 4/70

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.545	0.0030	88.9	4.112	0.0037	0.0047	20	
16	1.623	0.0023	93.4	4.487	-	-	20	(1)
32	1.695	0.0021	97.5	5.243	-	-	20	(1)

(1) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
TETRYL (GRAPHITED)

C2c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TETRYL (Graphited)*

X NO.: 672 ID: 896 Z NO.: SSGT LOAD ORDER NO.: 1266

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/16/68 LOT NO.: RN601

INITIAL QUANTITY: 1200 grams BATCH NO.:

MANUFACTURED BY:

NOL: 233 Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

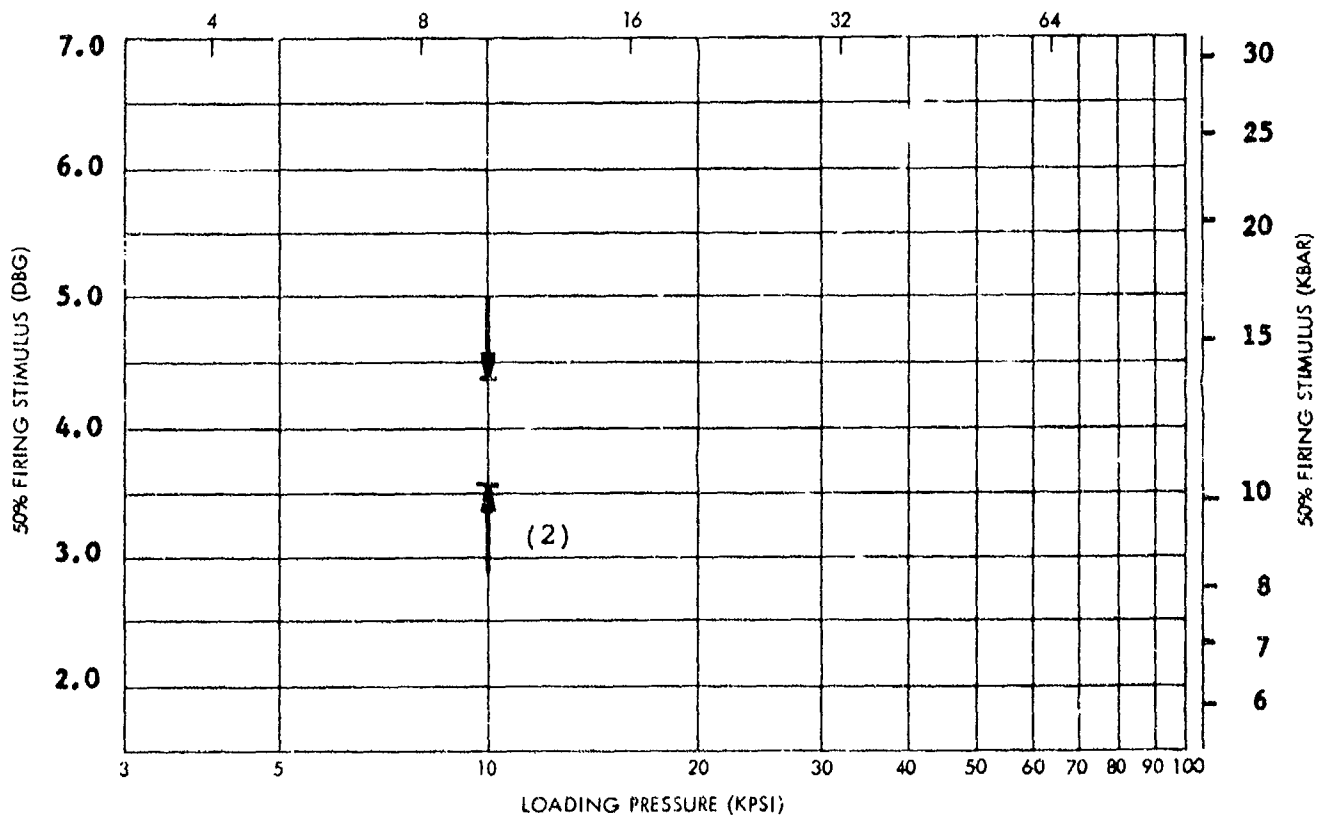
*Made by adding 2% of N-11 Graphite
to yellow tetryl X436

EXPLOSIVE	CH-6	X NO.	See remarks	Date of Test
TMD	1.774	I. D. NO.	-	6/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.619	0.0069	91.3	3.573	0.0220	0.0114	46	X No. 255; #1
10	1.619	0.0079	91.3	3.529	0.1459	0.0478	46	X No. 255; #2
10	1.641	0.0045	92.5	4.362	0.0538	0.0213	46	X No. 267
10	1.605	0.0128	90.5	4.092	0.0422	0.0167	46	X No. 303
10	1.598	0.0067	90.1	3.644	0.0889	0.0305	46	X No. 304
10	1.619	0.0055	91.2	3.676	0.1174	0.0403	46	X No. 305 (1)
10	1.597	0.0061	90.0	4.011	0.0348	0.0150	46	X No. 307
10	1.598	0.0075	90.1	3.572	0.0175	0.0120	46	X No. 309

(1) Date of Test - 10/60

(2) Range indicted gives minimum and maximum sensitivity value observed from above table.



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

CHEMICAL DATA - Explosive: CH-6*

Manufacturers: Holston Ordnance Works (Kingsport, Tenn.)

X Number	Date Rcvd	Initial Amount	Lot Number	Batch	Remarks
255	6 Jul 56	210 pounds	Pilot Prod lot		From NOP Macon, Ga.
267	19 Apr 57	920 pounds	HOL-SR-8-57	86-88-1	
303					
304	24 Nov 59	35 pounds	HOL-SR-200-58	86-207-2	Mfg. Jan 59. From NAD Crane, Ind., Via NAD Seal Beach, Calif.
305	21 Nov 59	35 pounds			
307	17 Dec 59	250 grams	HOL-SR-200-58 HOL-SR-201-58 HOL-SR-202-58		Composite Sample fro. NAD Crane, Ind.
309	17 Dec 59	250 grams			Replicate sampling of same 3 lots as X307.

Impact Sensitivity

X255	42 cm,	s = 0.12
X267	29 cm,	s = 0.07
X303	30 cm,	s = 0.14
X304	32 cm,	s = 0.12

*Composition: RDX----------97.5%
Calcium Stearate---- 1.5%
Graphite---------- 0.5%
Polyisobutylene----- 0.5%

NOLTR 73-132

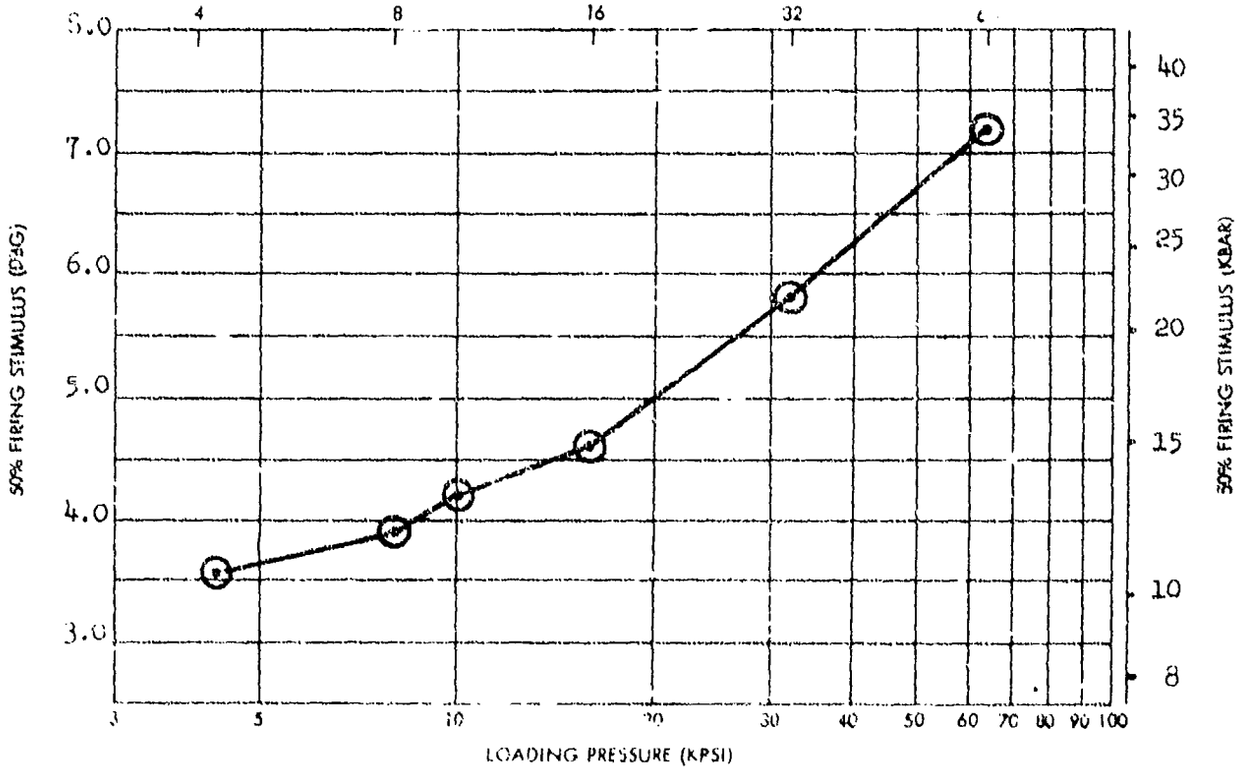
Chap. 4 Sep 1971

EXPLOSIVE	CH-6	X NO.	329
TMD	1.774	I. D. NO.	-

Date of Test
12/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	g_m	N	
4	1.489	0.0114	83.9	3.503	0.0050	0.0039	18	
8	1.567	0.0056	88.3	3.876	0.0010	0.0017	18	
10	1.623	0.0028	91.4	4.229	0.0384	0.0265	18	
16	1.665	0.0069	93.9	4.620	0.0052	0.0047	18	
32	1.734	0.0015	97.7	5.812	0.0612	0.0377	18	
64	1.777 (1)	0.0026	100.2	7.207	0.0413	0.0283	18	

(1) Experimental error



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: CH-6 *

X NO.: 329 ID: Z NO.: SSGT LOAD ORDER NO.: 997

SOURCE: NAD Crane, Indiana

CHEMICAL NAME:

DATE RECEIVED: 1/5/61 LOT NO.: HOL-SR-200-58

INITIAL QUANTITY: 630 pounds BATCH NO.: **

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

*For composition see * C3a2

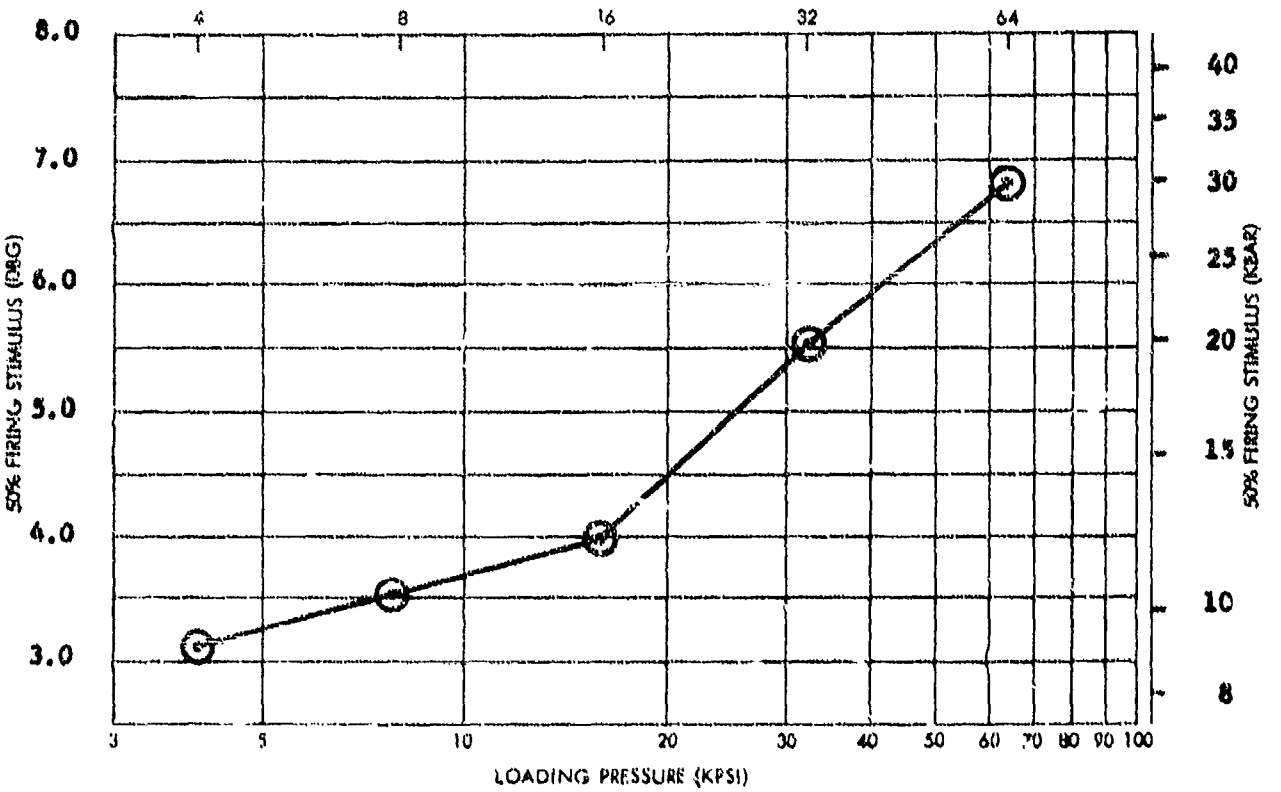
** Box Batch

Box	Batch
1 & 2	86-207-4B
3	86-207-5
4	86-207-3

EXPLOSIVE	CH-6	X NO.	344	Date of Test
TMD	1.774	I. D. NO.	-	1/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG) (1)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.500	-	84.6	3.131	-	-	18	
8	1.573	-	88.7	3.541	-	-	18	
16	1.665	-	93.9	3.984	-	-	18	
32	1.726	-	97.3	5.344	-	-	18	
64	1.767	-	99.6	6.838	-	-	18	

(1) Sensitivity parameters computed using a Gaussian distribution and using the Bruceton Analytical Method.



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: CH-6 *

X NO.: 344 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H = cm

s = log units

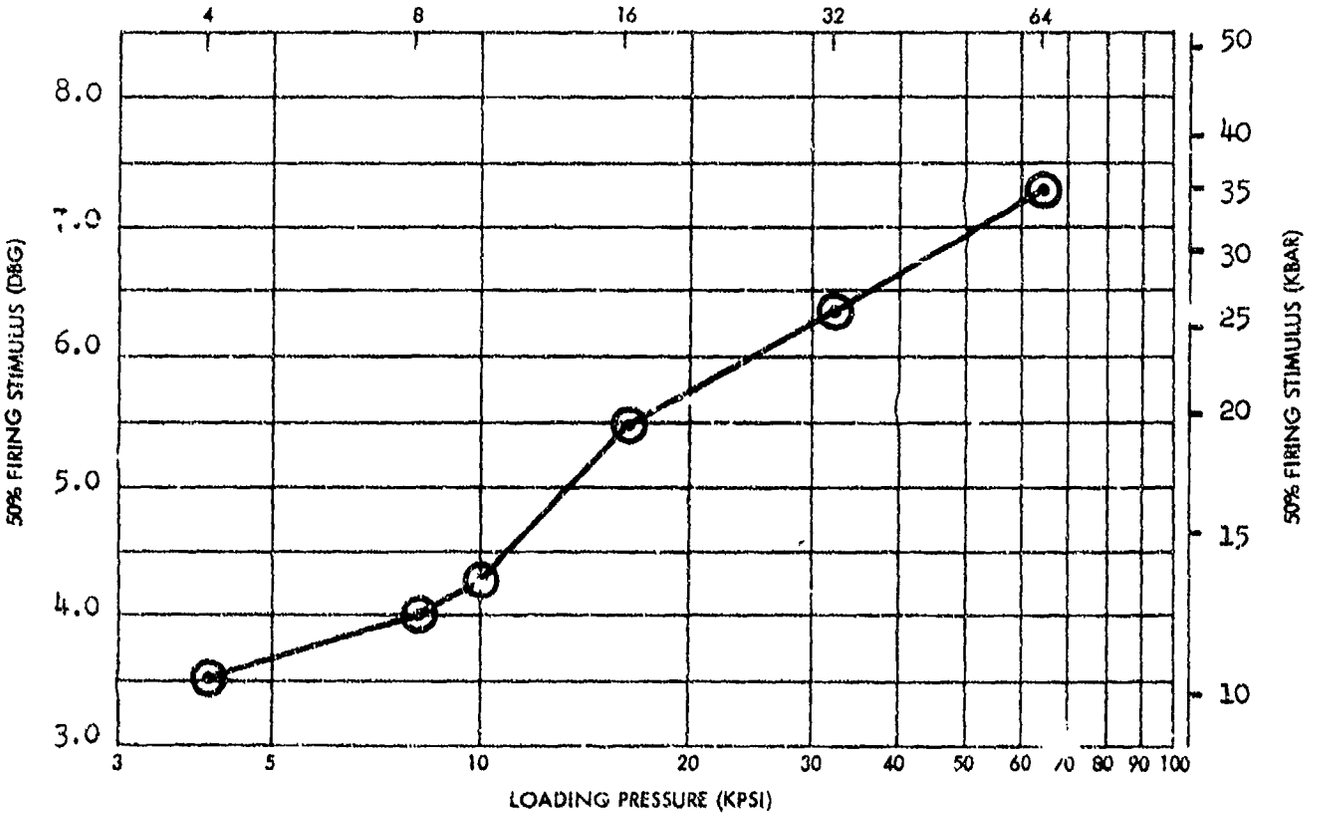
n =

Remarks
*For composition see * C3a2

Chem
20 Dec 1973

EXPLOSIVE	CH-6	X NO.	439	Date of Test
TMD	1.774	I. D. NO.	-	1/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.551	0.0043	87.4	3.532	0.0415	0.0276	18	
8	1.618	0.0045	91.2	3.993	0.0037	0.0035	18	
10	1.657	-	93.4	4.250	0.0662	0.0532	18	
16	1.704	0.0030	96.1	5.465	0.0353	0.0264	18	
32	1.749	0.0016	98.6	6.355	0.0210	0.0163	18	
64	1.770	0.0038	99.8	7.297	0.0307	0.0233	18	



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

CHEMICAL DATA

EXPLOSIVE NAME: CH-6*

X NO.: 439 ID: Z NO.: SSGT LOAD ORDER NO.: 933

SOURCE: NOP Macon, Georgia

CHEMICAL NAME:

DATE RECEIVED: 10/15/63 LOT NO.: 109-L

INITIAL QUANTITY: 2 pounds BATCH NO.:

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

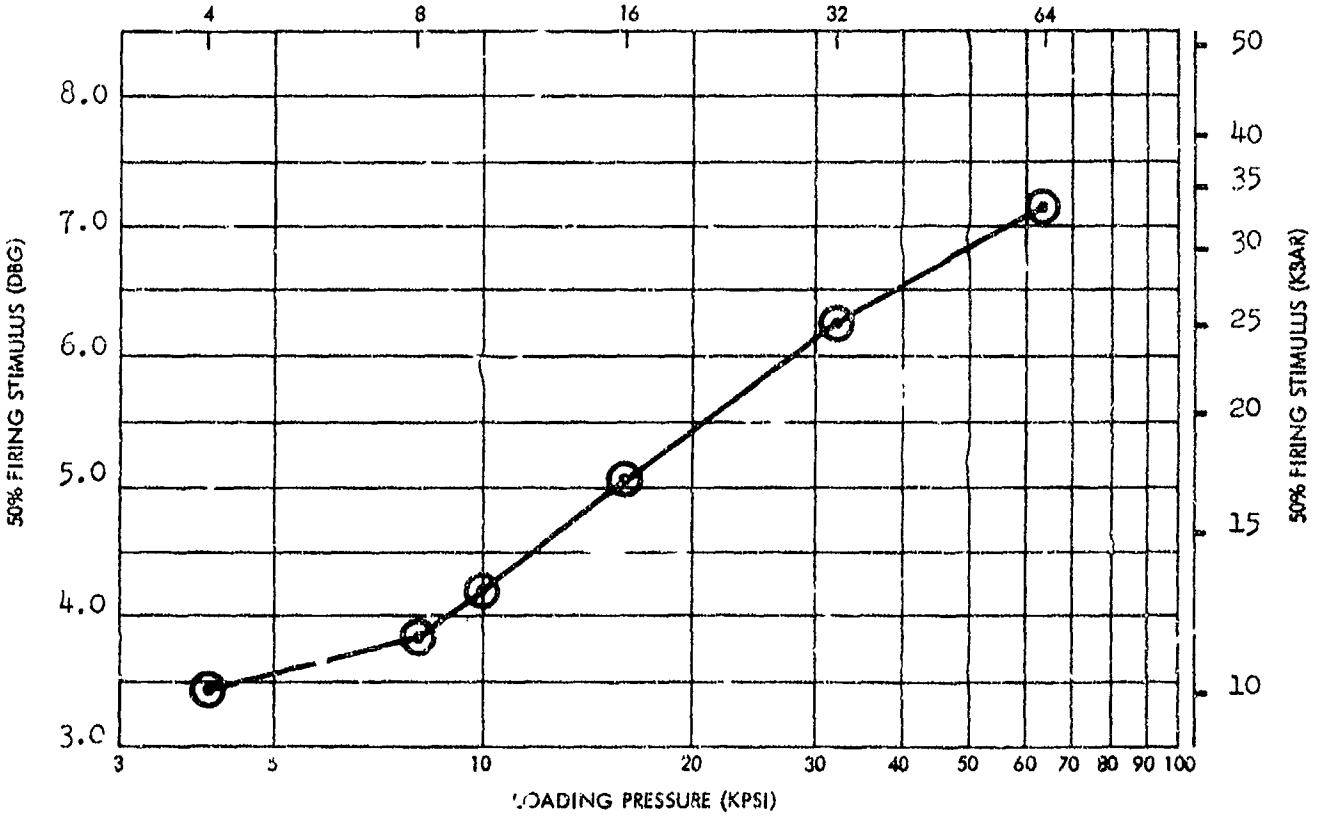
n =

Remarks
* For composition see * C3a2

EXPLOSIVE	CH-6	X NO.	440
TMD	1.774	I. D. NO.	--

Date of Test 1/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.541	0.0077	86.9	3.444	0.0384	0.0281	18	
8	1.603	0.0057	90.4	3.853	0.0744	0.0437	18	
10	1.648	-	92.9	4.205	0.0511	0.0359	18	
16	1.682	0.0028	94.8	5.076	0.0547	0.0337	18	
32	1.741	0.0022	98.1	6.243	0.0328	0.0240	18	
64	1.772	0.0020	99.9	7.184	0.0349	0.0275	18	



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

CHEMICAL DATA

EXPLOSIVE NAME: CH-6*

X NO.: 440 ID: Z NO.: SSGT LOAD ORDER NO.: 934

SOURCE: NOP, Macon, Georgia

CHEMICAL NAME:

DATE RECEIVED: 10/15/63 LOT NO.: 109-N

INITIAL QUANTITY: 2 pounds BATCH NO.:

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

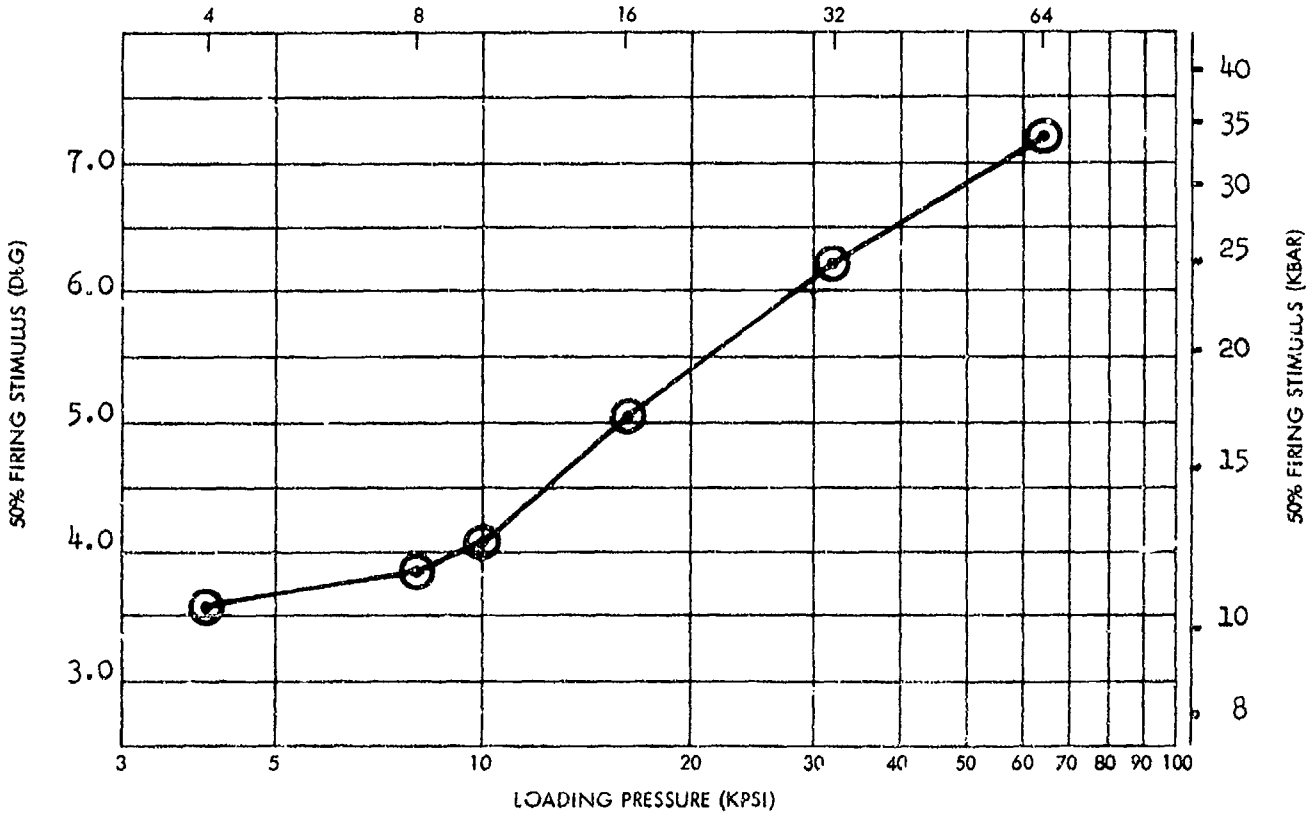
n =

Remarks
*For composition see * C3a2

EXPLOSIVE	CH-6	X NO.	441
TMD	1.774	I. D. NO.	-

Date of Test
1/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.537	0.0041	86.6	3.580	0.0932	0.0653	18	
8	1.603	0.0045	90.3	3.833	0.0737	0.0446	18	
10	1.645	0.0035	92.7	4.089	0.2291	0.2656	18	
16	1.681	0.0021	94.8	5.045	0.0713	0.0500	18	
32	1.738	0.0017	98.0	6.218	0.0187	0.0245	18	
64	1.767	0.0020	99.6	7.202	0.0507	0.0339	18	



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: CH-6 *

X NO.: 441 ID: Z NO.: SSGT LOAD ORDER NO.: 935

SOURCE: NOP Macon, Georgia

CHEMICAL NAME:

DATE RECEIVED: 10/15/63 LOT NO.: 109-O

INITIAL QUANTITY: 2 pounds BATCH NO.:

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

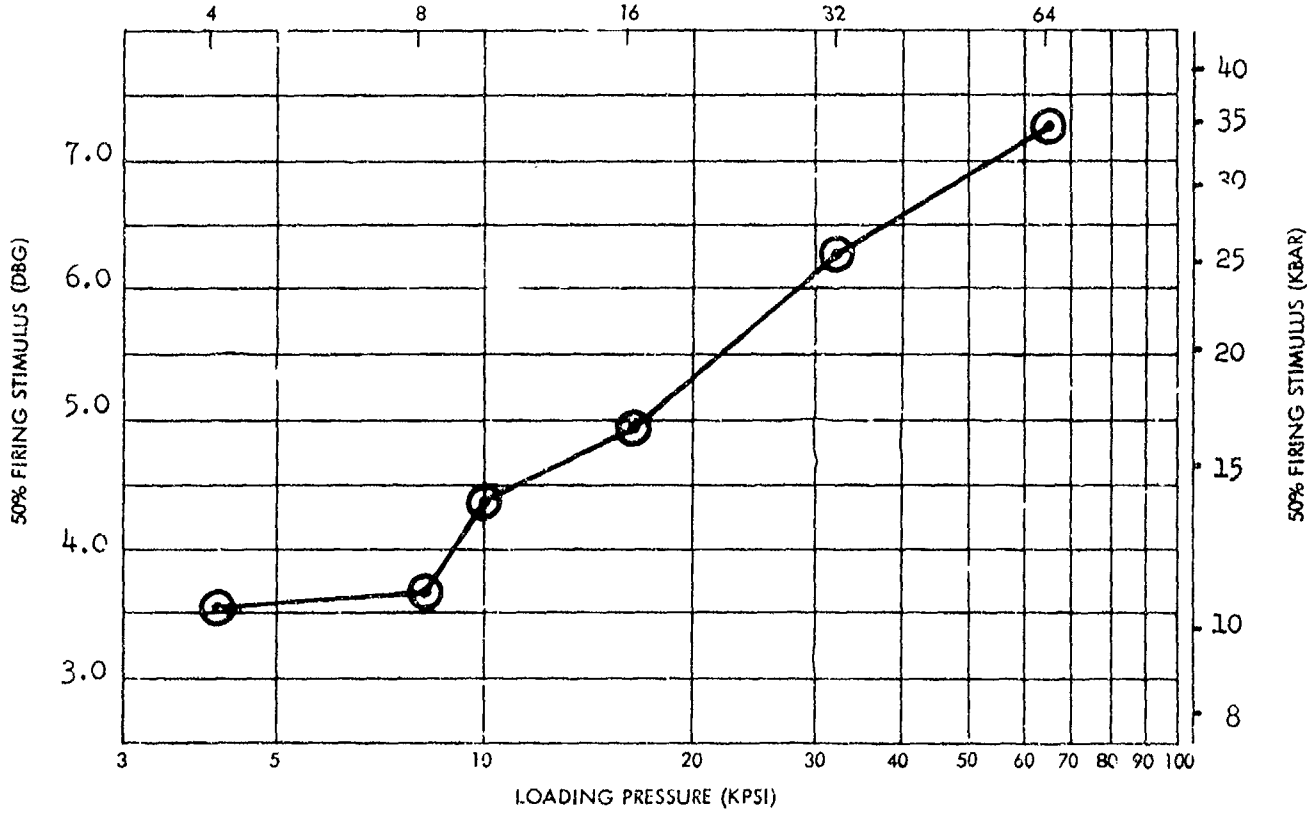
n =

Remarks

* For composition see * C3a2

EXPLOSIVE	CH-6	X NO.	442	**Date of Test**
TMD	1.774	I. D. NO.	-	**1/64**

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.507	0.0096	84.9	3.523	0.0142	0.0150	18	
8	1.579	0.0029	89.0	3.627	0.0010	0.0018	18	
10	1.626	0.0254	91.7	4.369	0.0026	0.0031	18	
16	1.668	0.0031	94.0	4.915	0.1912	0.1206	18	
32	1.738	0.0093	98.0	6.245	0.0618	0.0403	18	
64	1.769	0.0016	99.7	7.257	0.0508	**0.0326**	18	



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

C3g1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: Ch-6 *

X NO.: 442 ID: Z NO.: SSGT LOAD ORDER NO.: 936

SOURCE: NOP Macon, Georgia

CHEMICAL NAME:

DATE RECEIVED: 10/15/63 LOT NO.: HOL-SR-109-P-62

INITIAL QUANTITY: BATCH NO.: 485-16

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.
(1962)

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẋ = cm

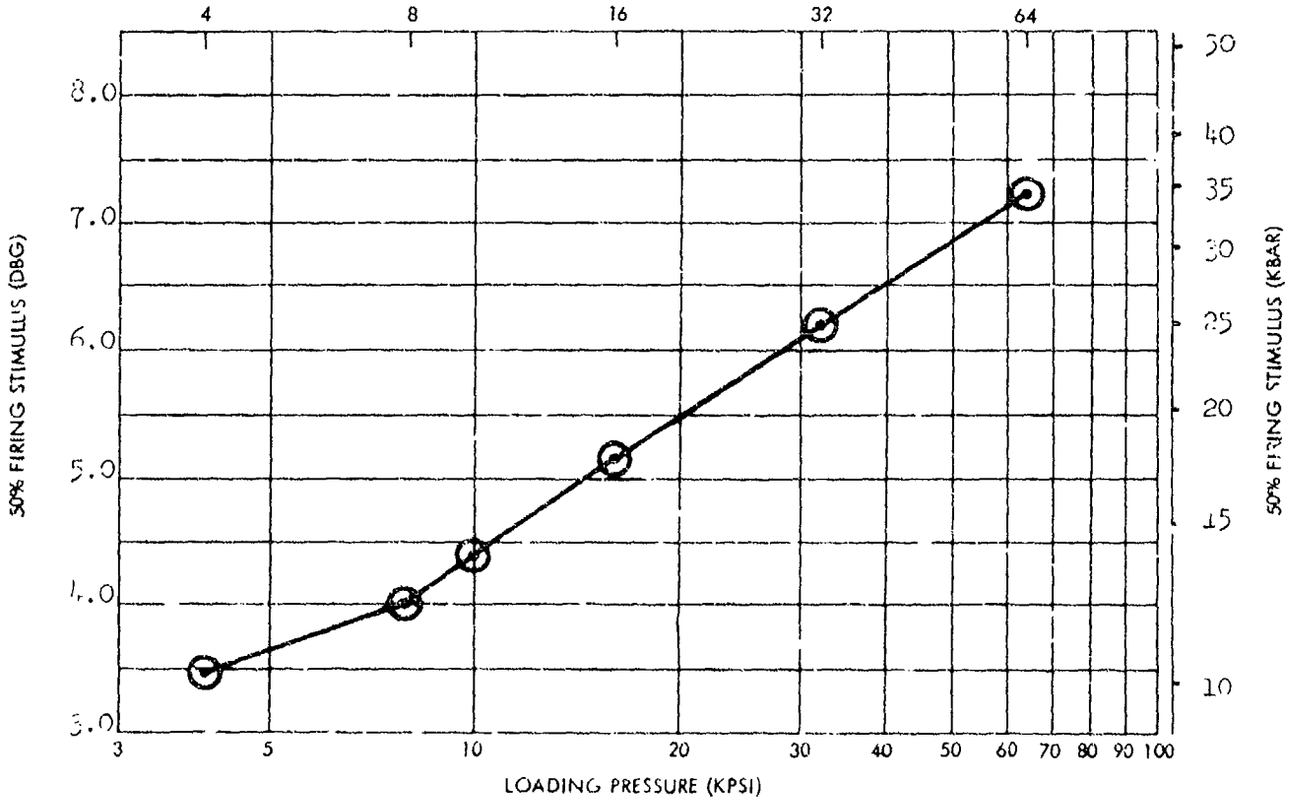
s = log units

n =

Remarks
*For composition see * C3a2

EXPLOSIVE	CH-6	X NO.	445	**Date of Test**
TMD	1.774	I. D. NO.	-	**1/64**

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.511	0.0106	85.2	3.481	0.0635	0.0411	18	
8	1.602	0.0026	90.3	4.001	0.0554	0.0317	23	
10	1.640	0.0033	92.4	4.417	0.0692	0.0410	18	
16	1.680	0.0022	94.7	5.157	0.0454	0.0315	18	
32	1.740	0.0020	98.1	6.236	0.0283	0.0209	18	
64	1.774	0.0029	100.0	7.227	0.0588	0.0358	18	



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: CH-6 *

X NO.: 445 ID: Z NO.: SSGT LOAD ORDER NO.: 958

SOURCE: NOP Macon, Georgia

CHEMICAL NAME:

DATE RECEIVED: 1/6/64 LOT NO.: HOL-SR-109-P-62

INITIAL QUANTITY: 100 pounds BATCH NO.: 485-16

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.
(1962)

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

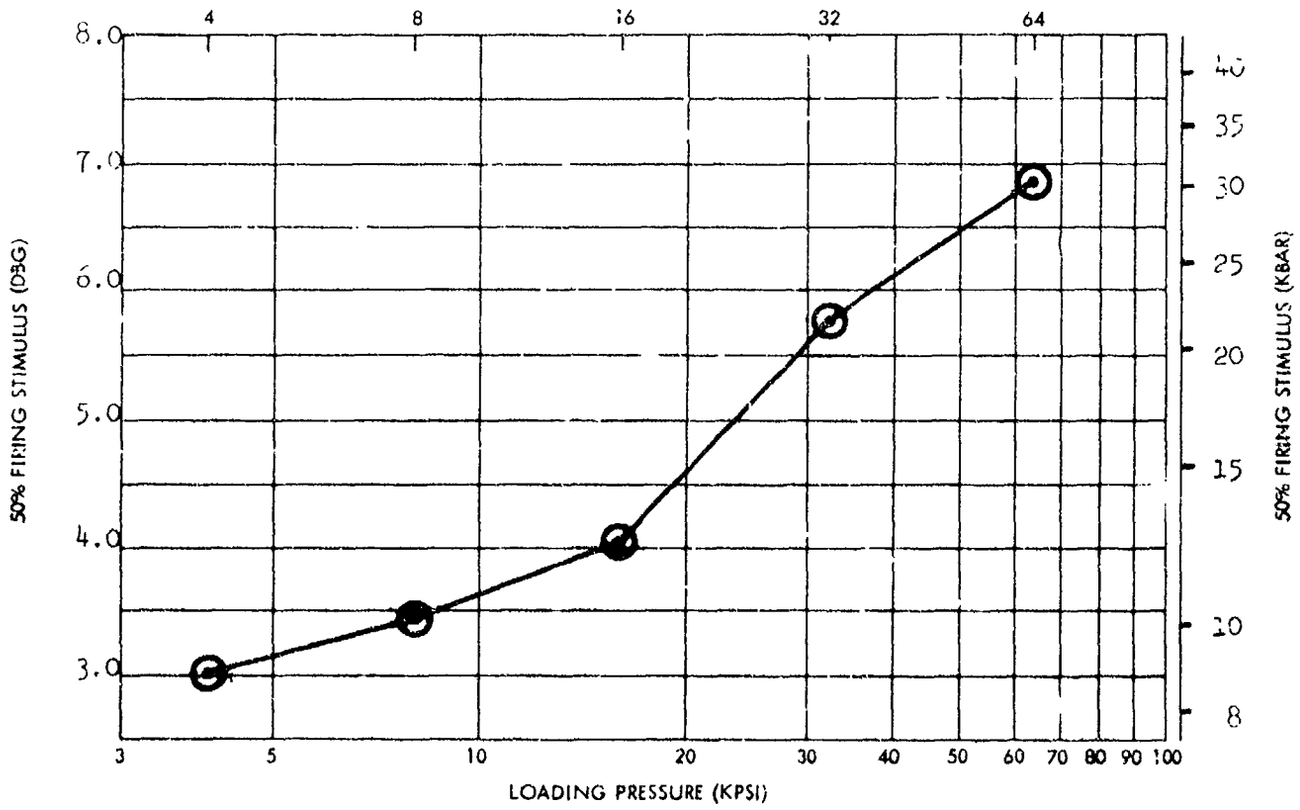
Remarks
*For composition see * C3a2

4 Sep 1973

EXPLOSIVE	CH-6	X NO.	702	**Date of Test**
TMD	1.774	I. D. NO.	1062	**6/69**

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.519	0.0045	85.6	3.039	-	-	20	(1)
8	1.608	0.0079	90.6	3.437	0.0298	0.0226	20	
16	1.670	0.0023	94.1	4.069	0.0361	0.0278	20	
32	1.734	0.0026	97.7	5.764	0.0578	0.0345	20	
64	1.768	0.0045	99.7	6.850	0.0297	0.0212	20	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
CH-6

CHEMICAL DATA

EXPLOSIVE NAME: CH-6 *

X NO.: 702 ** ID: 1062 Z NO.: SSGT LOAD ORDER NO.: 1270

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/20/69 LOT NO.: HOL-69-24

INITIAL QUANTITY: 200 pounds BATCH NO.: 5A

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.
(Feb 1969)

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

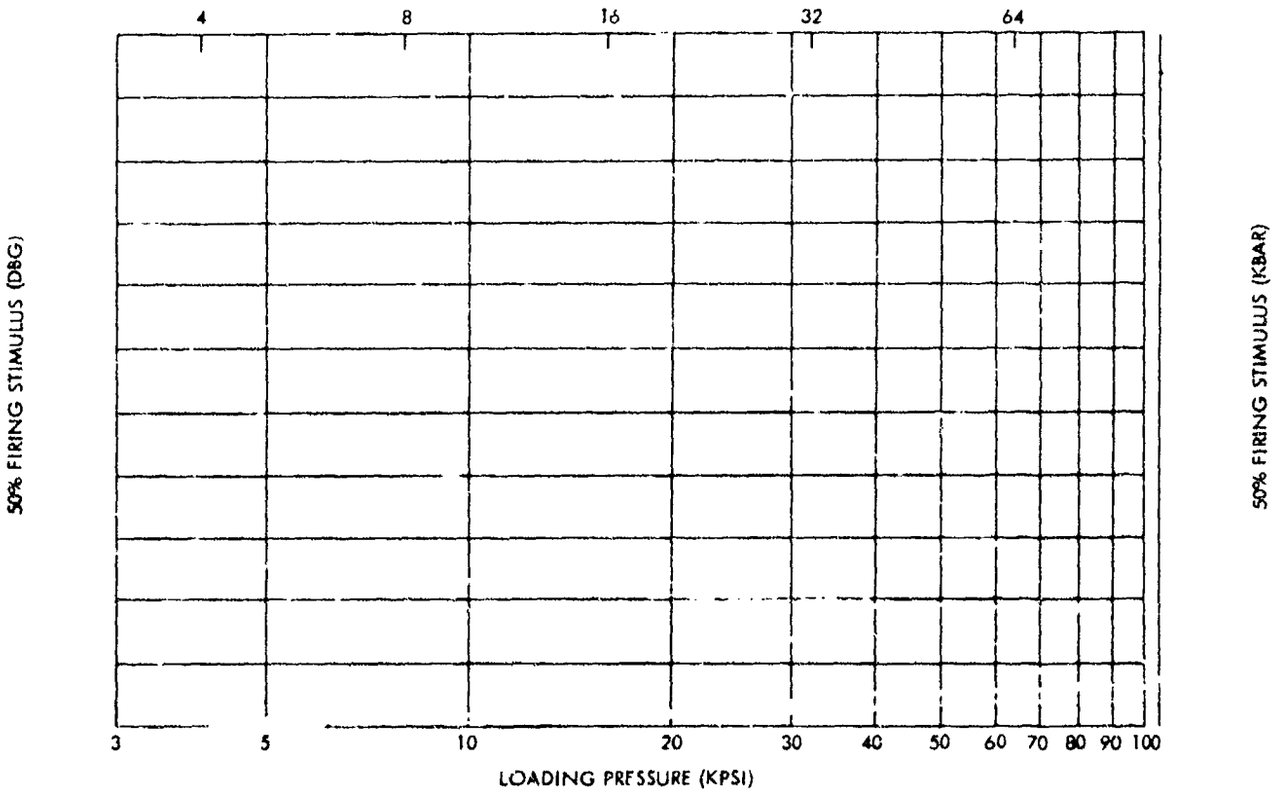
n =

Remarks
*For composition see * C3a2

**Identical with X No. 700

EXPLOSIVE	H-6	X NO.	-	Date of Test
TMD	1.80	I. D. NO.	-	3/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
-	1.733	0.0199	96.3	9.587	0.1580	0.0665	46	Vacuum cast into bodies.



SMALL SCALE GAP TEST (SSGT) DATA
H-6

C4a1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: H-6*

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.: CH No. 4171

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:
NOL

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

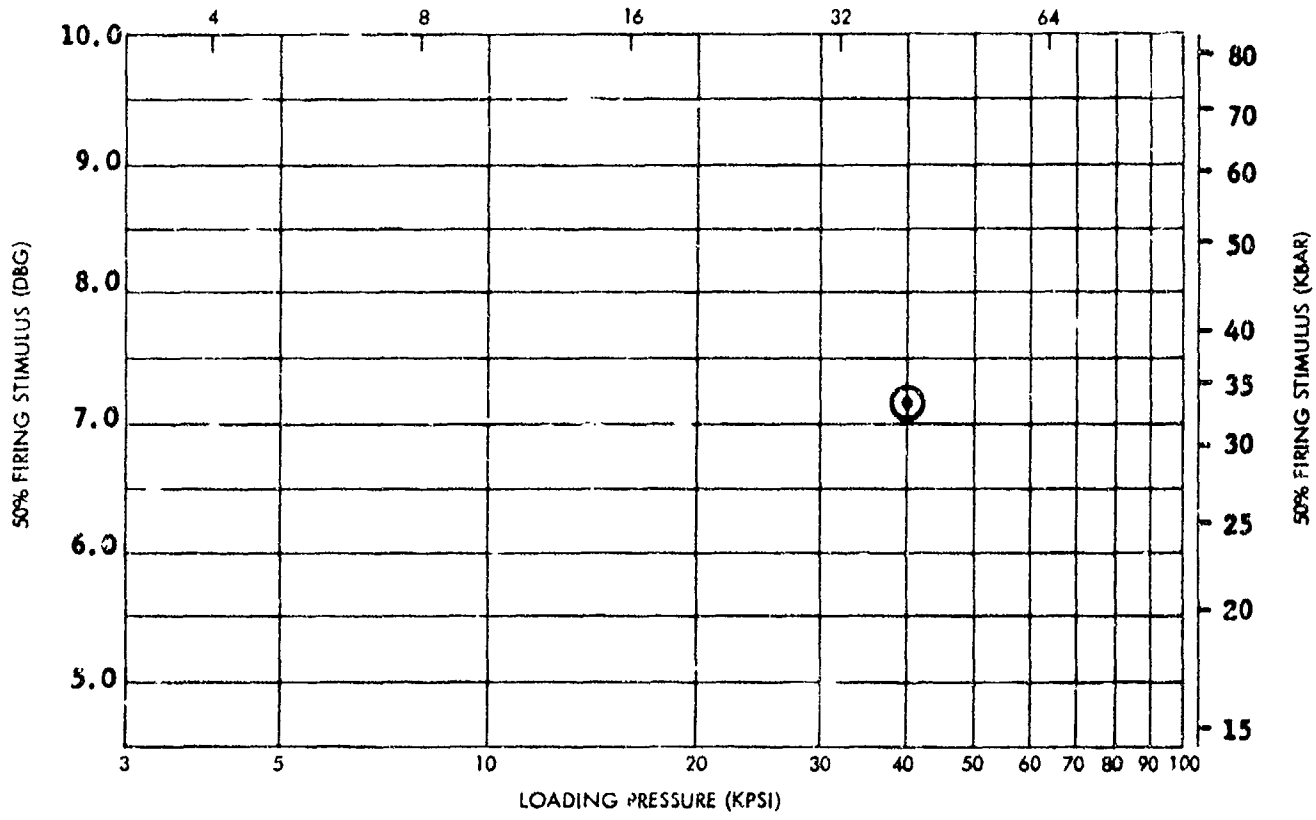
Remarks

*Composition:

RDX	45%
TNT	30%
Aluminum	20%
D-2 Wax	5%
(plus 0.5% $CaCl_2$)	

EXPLOSIVE	H-6	X NO.	-	Date of Test
TMD	1.80	I. D. NO.	-	3/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
40	1.708	0.0036	94.9	7.182	0.0397	0.0175	46	



SMALL SCALE GAP TEST (SSGT) DATA
H-6

C4b1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: H-6 (Granular)*

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

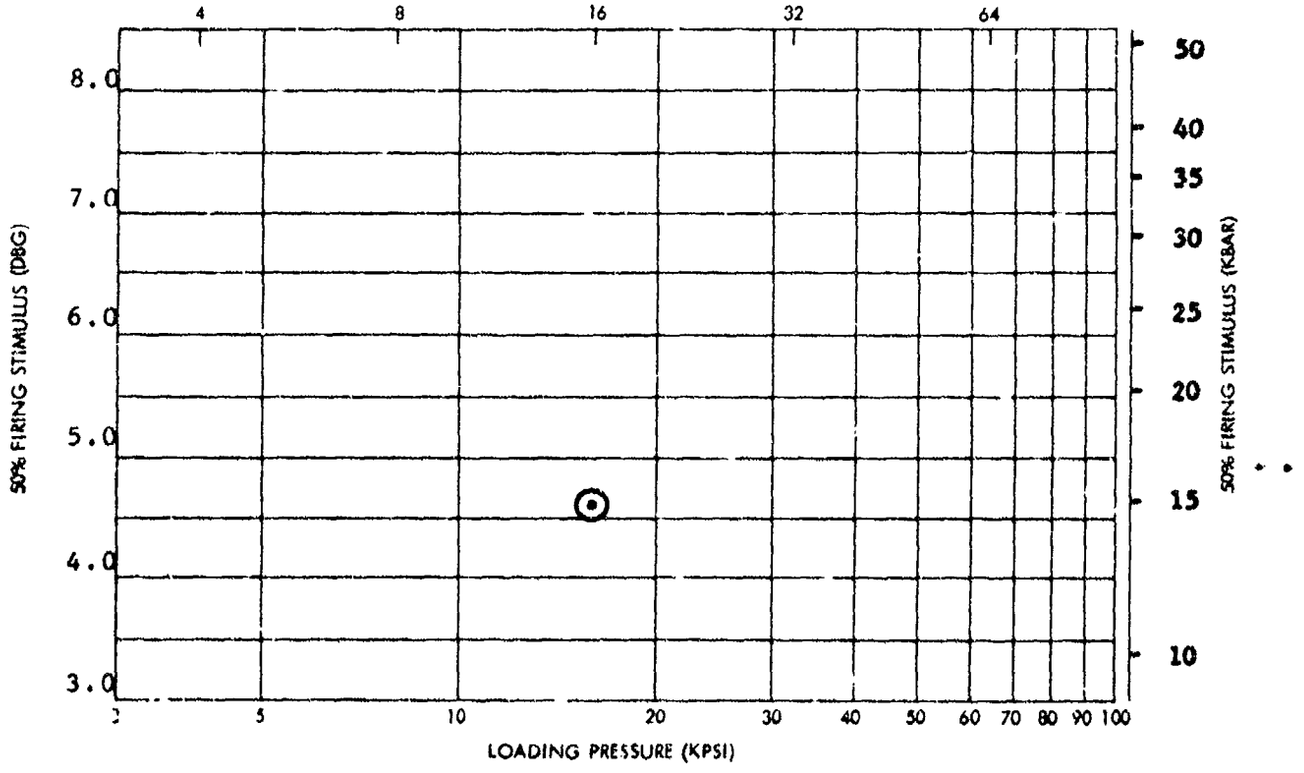
Remarks

*Composition:

RDX	45%
TNT	30%
Aluminum	20%
D-2 Wax	5%
(plus 0.5% $CaCl_2$)	

EXPLOSIVE	COMP A-5	X NO.	815	Date of Test
TMD	1.78	I. D. NO.	1641	8/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	$\hat{\sigma}$	s_m	N	
16	1.700	0.0078	95.5	4.616	0.0038	0.0034	20	



SMALL SCALE GAP TEST (SSGT) DATA
COMP A-5

C5a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: COMP A-5 *

X NO.: [illegible] ID: 1641 Z NO.: SSGT LOAD ORDER NO.:

SOURCE: NWC China Lake N60530-2151-2543

CHEMICAL NAME:

DATE RECEIVED: 6/7/72 LOT NO.: 015-29

INITIAL QUANTITY: 1 pound BATCH NO.: 3-119

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

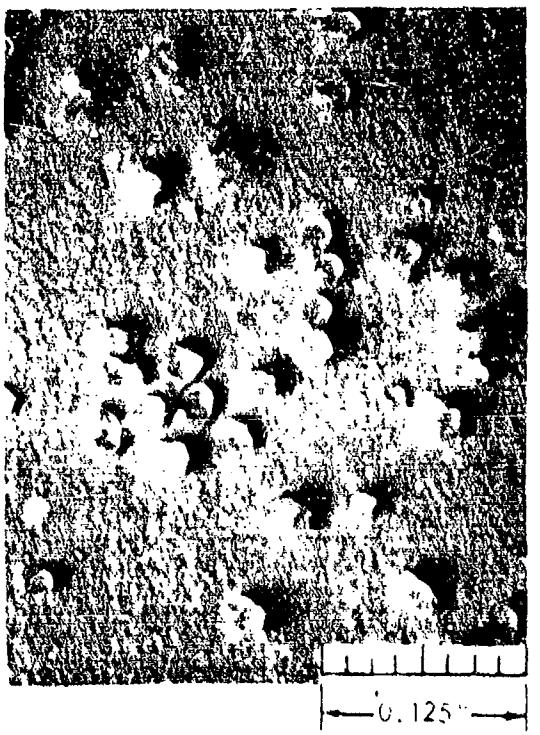
$\bar{x}$ = cm

s = log units

n =

Remarks

*Composition: RDX/STEARIC ACID (98.5/1.5)

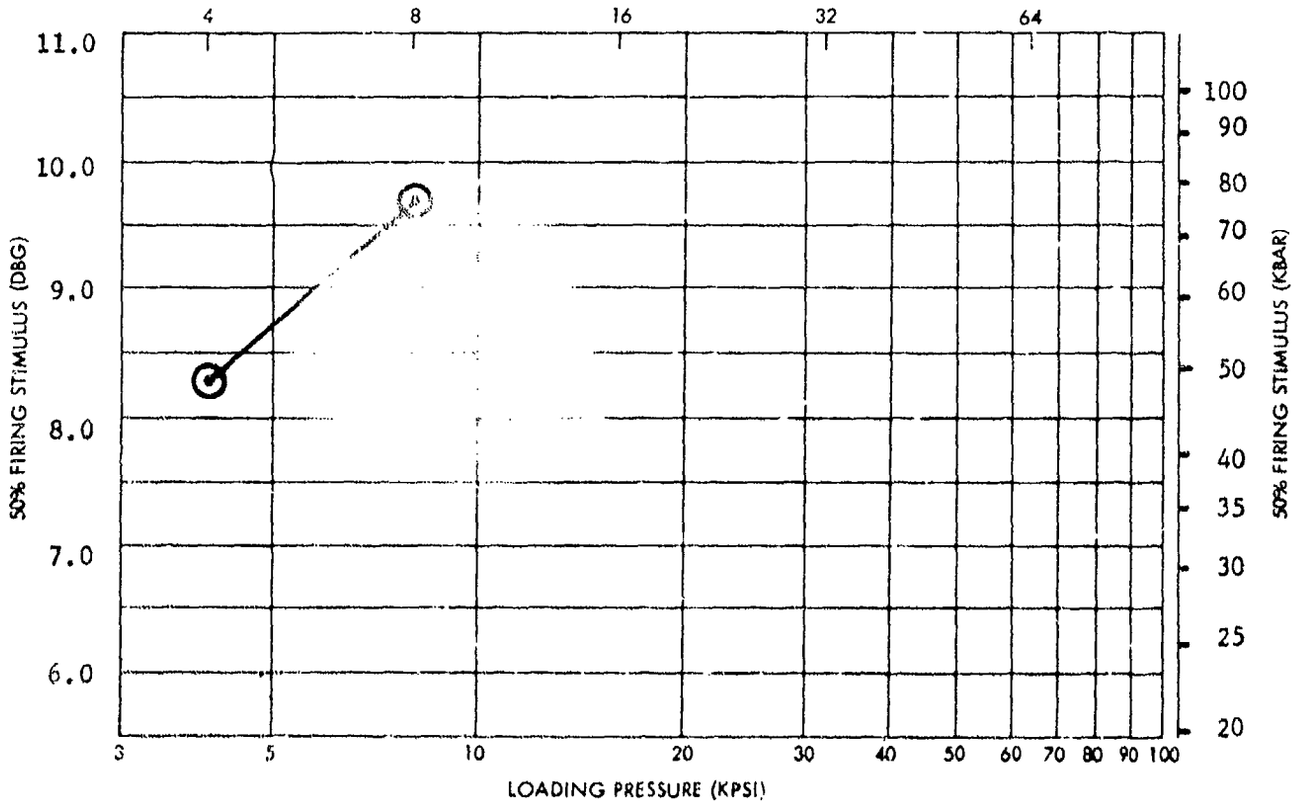


EXPLOSIVE	NITROGUANIDINE	X NO.	547
TMD	1.78	I. D. NO.	-

Date of Test
10/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
1.3	0.954	0.0105	53.6	6.387	0.0458	0.0244	28	
2.	1.021	0.0095	57.4	6.951	0.1016	0.0500	28	
4.1	1.161	0.0098	65.2	8.285	0.1379	0.0685	22	
8.	1.273	0.0062	71.5	9.689	-	-	**28**	**(1)**

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
NITROGUANIDINE

C6a1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: NITROGUANIDINE, LOW BULK DENSITY

X NO.: 547 ID: Z NO.: 669 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 9/1/65 LOT NO.: NCW-2-2984

INITIAL QUANTITY: 200 rounds BATCH NO.: Drum 198 8/54

MANUFACTURED BY:
Naval Propellant Plant
Indian Head, Md.

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 9/15/67

I =>320 cm

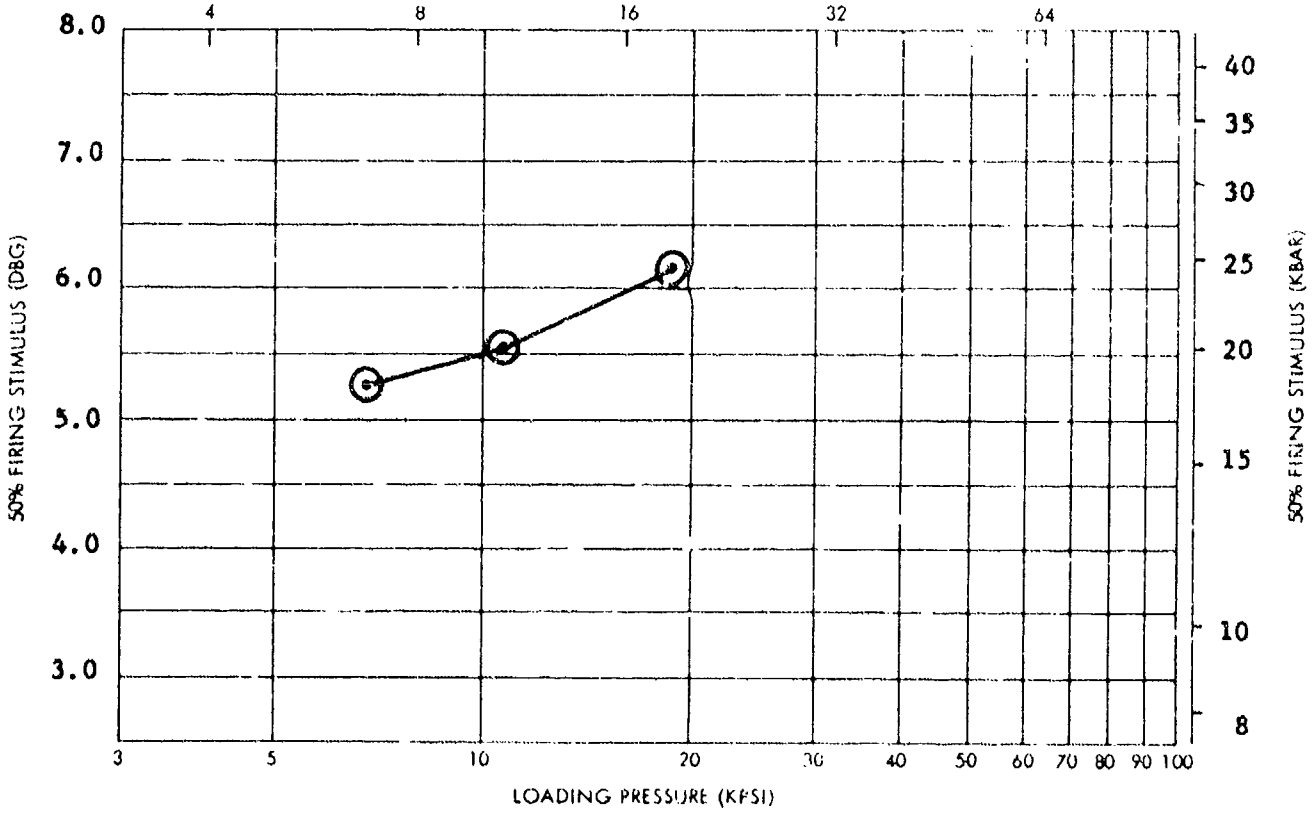
s = log units

n =

Remarks

EXPLOSIVE	TNT	X NO.	159	Date of Test
TMD	1.651	I. D. NO.	~	4/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
7.0	1.413	0.0041	85.6	5.255	0.0237	0.0107	46	
11.0	1.489	0.0068	90.2	5.523	0.1428	0.0493	46	
19.0	1.568	0.0039	95.0	6.130	0.0429	0.0176	46	



SMALL SCALE GAP TEST (SSGT) DATA
TNT

C7a1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: TNT

X NO.: 159 ID: Z NO.: SSGT LOAD ORDER NO.:

SOUSCE:

CHEMICAL NAME: Trinitrotoluene

DATE RECEIVED: 8/14/52 LOT NO.:

INITIAL QUANTITY: 3000 pounds
Expended 6 Sep 66 BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY (ℵ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℵ = cm

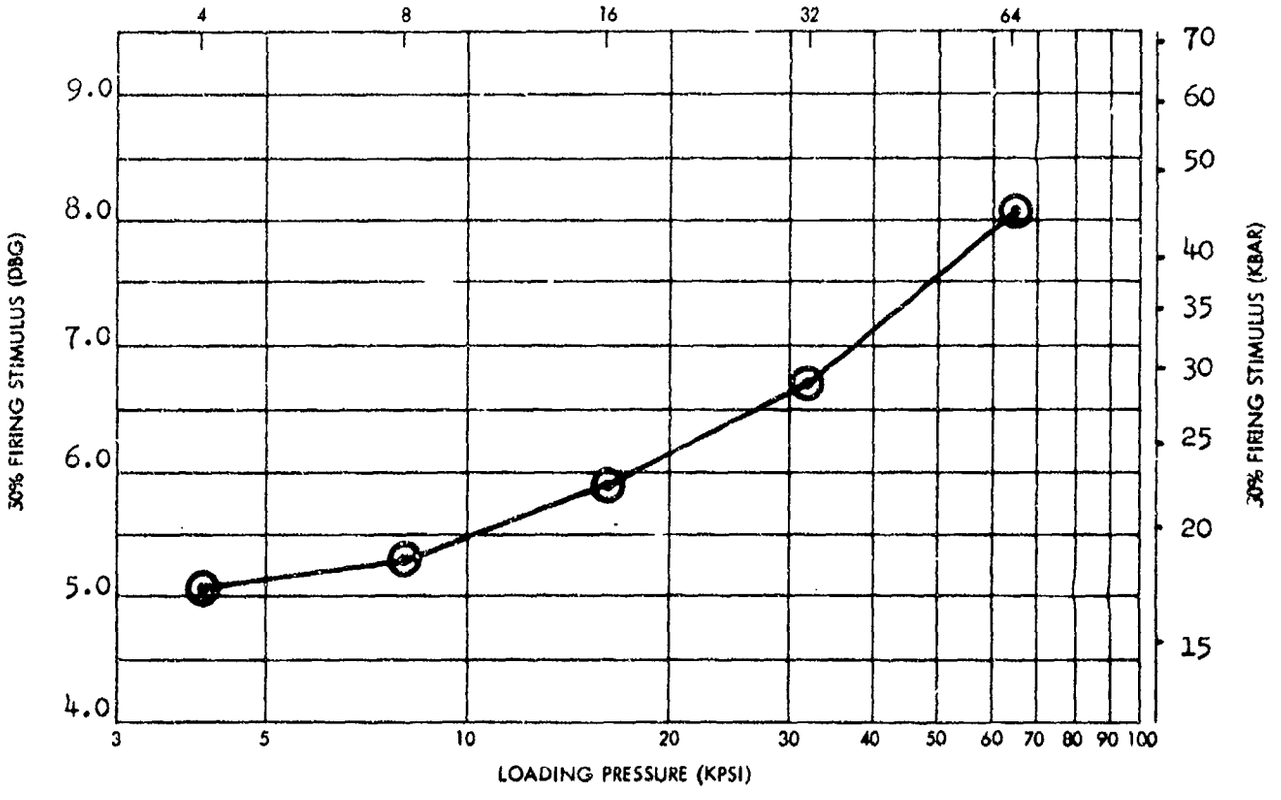
s = log units

n =

Remarks

EXPLOSIVE	TNT	X NO.	412	Date of Test
TMD	1.651	I. D. NO.	-	3/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.353	0.0130	82.0	5.067	0.0321	0.0274	18	
8	1.446	0.0075	87.6	5.316	0.0338	0.0277	18	
16	1.549	0.0024	93.8	5.877	0.0645	0.0366	18	
32	1.623	0.0019	98.3	6.703	0.0434	0.0321	18	
64	1.651	0.0025	100.0	8.066	0.0710	0.0446	18	



SMALL SCALE GAP TEST (SSGT) DATA
TNT

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TNT*

X NO.: 412 ID: Z NO.: SSGT LOAD ORDER NO.: 953

SOURCE:

CHEMICAL NAME: Trinitrotoluene

DATE RECEIVED: 12/12/62 LOT NO.:

INITIAL QUANTITY: 5000 pounds BATCH NO.:
Expended 9/6/66

MANUFACTURED BY:

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 12/2/64

$ = 227 cm

s = 0.17 log units

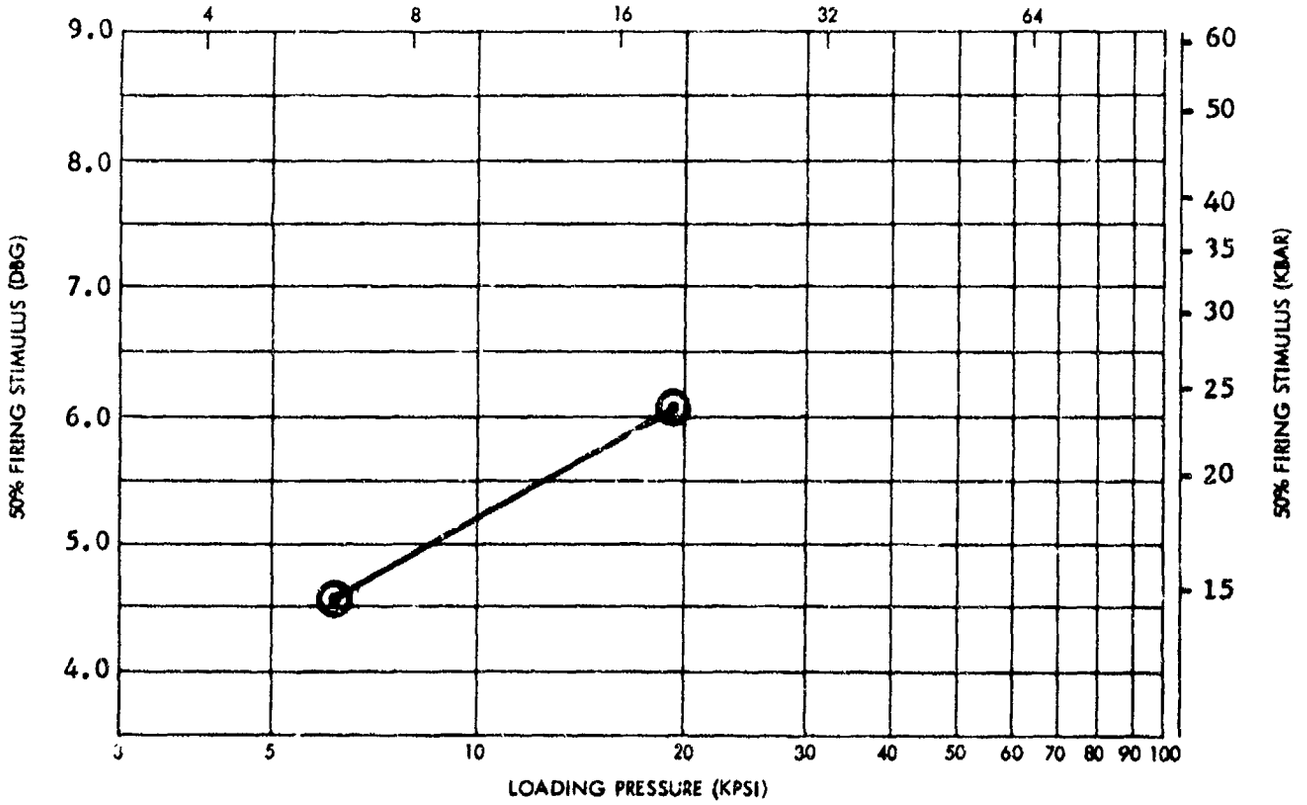
n =

Remarks
*Had trouble with this TNT in isostatic press. Had two fires at elevated temperatures.

EXPLOSIVE	TNT	X NO.	-
TMD	1.651	I. D. NO.	-

Date of Test 9/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
6.2	1.386	0.0066	83.9	4.551	0.0495	0.0317	53	
19	1.561	0.0064	94.5	6.095	0.1186	0.0539	42	



SMALL SCALE GAP TEST (SSGT) DATA
TNT

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TNT

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: Trinitrotoluene

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

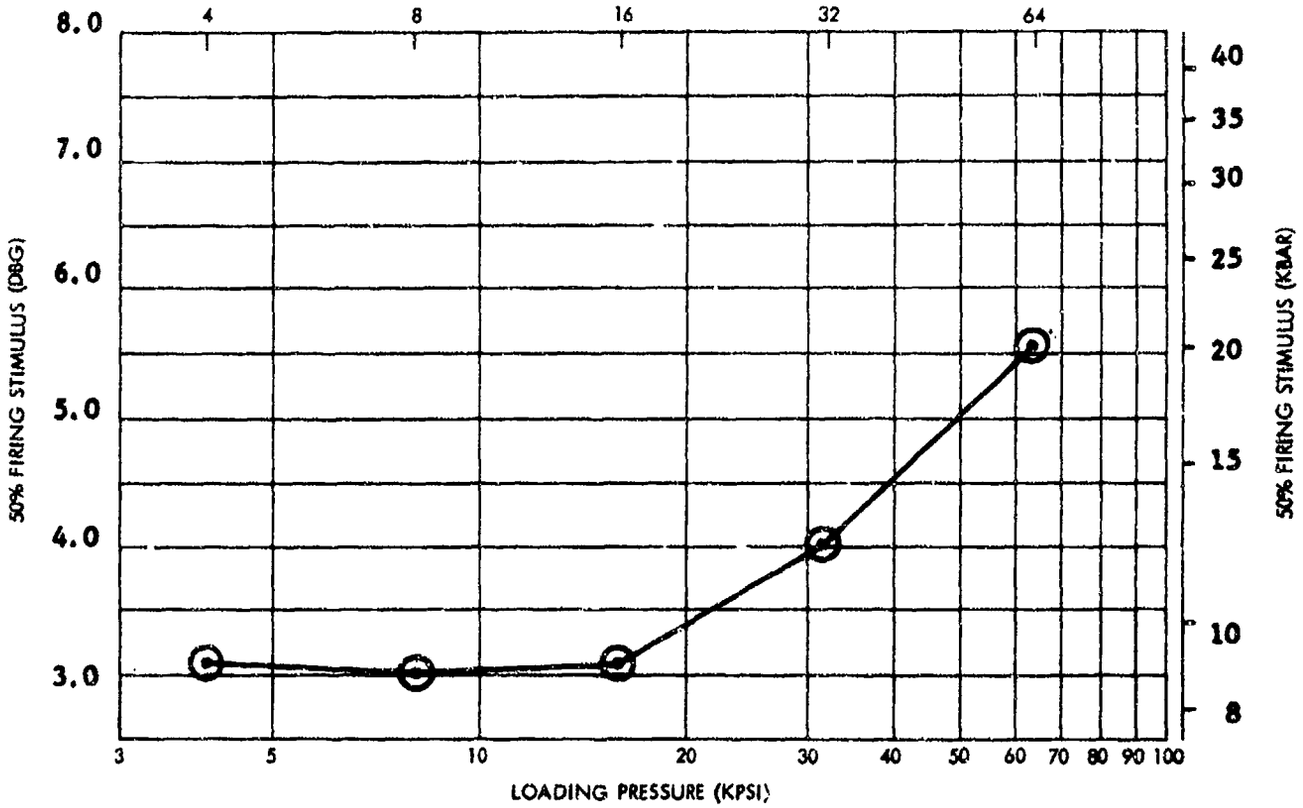
n =

Remarks
(1) No information available

EXPLOSIVE	PENTOLITE (50/50)	X NO.	551	Date of Test
TMD	1.71	I. D. NO.	-	8/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.363	0.0029	79.7	3.097	0.0121	0.0151	23	
8	1.465	0.0100	85.7	3.013	0.0259	0.0243	23	
16	1.571	0.0060	91.9	3.082	0.0189	0.0150	23	
32	1.671	0.0075	97.7	4.030	0.0960	0.0514	23	
64	1.721	0.0020	100.6 (1)	5.544	0.0572	0.0328	23	

(1) Experimental error



SMALL SCALE GAP TEST (SSGT) DATA
PENTOLITE (50/50)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PENTOLITE (50/50)*

X NO.: 551 ID: Z NO.: SSGT LOAD ORDER NO.: 1146

SOURCE: NAD Crane, Indiana

CHEMICAL NAME

DATE RECEIVED: 12/1/65 LOT NO.: PLM 49 & 272

INITIAL QUANTITY: 9900 pounds BATCH NO.:

MANUFACTURED BY:
Plumbrook Ordnance
Plumbrook, Ohio

IMPACT SENSITIVITY (5% or 50% point)**
(Type 12 Tools; 2.5 Kg wt; Sandpaper)

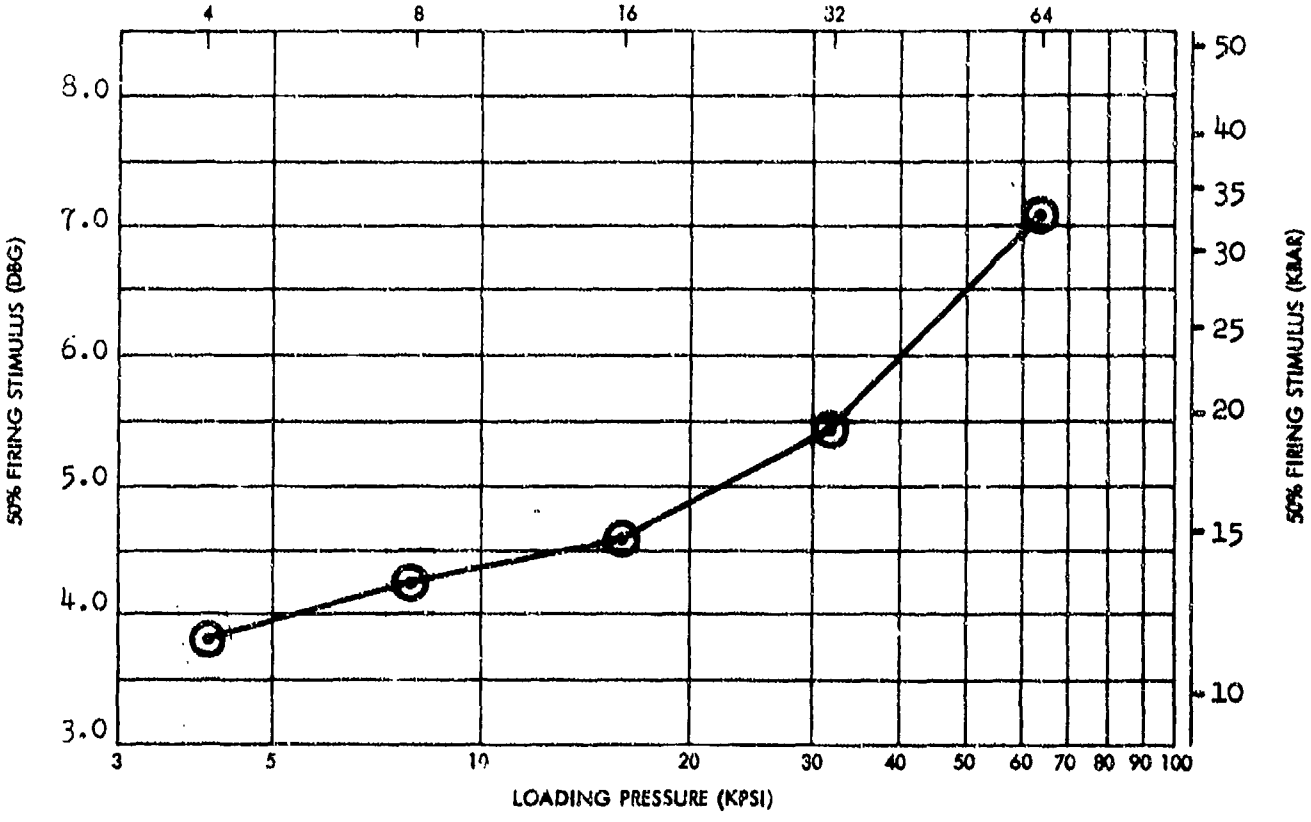
	DATE OF TEST	DATE OF RETEST
	1/5/66	2/10/66
$\bar{x}$ =	18 cm	21 cm
s =	0.07log units	0.05 log units
n =		

Remarks
*Composition: PETN/TNT (50/50)

**Cast and ground and put through 16, 30 and 50 mesh sieves. Sensitivity measured on mixture of equal parts of fractions staying on 30 mesh and on 50 mesh sieves.

EXPLOSIVE	OCTOL (75/25)	X NO.	469	Date of Test 7/66
TMD	1.83	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.541	0.0048	84.2	3.795	0.0435	0.0289	18	
8	1.613	0.0030	88.1	4.251	0.0245	0.0171	18	
16	1.677	0.0032	91.6	4.603	0.0209	0.0210	18	
32	1.761	0.0032	96.2	5.460	0.0184	0.0255	23	
64	1.829	0.0020	100.0	7.086	0.0174	0.0212	18	



SMALL SCALE GAP TEST (SSGT) DATA

OCTOL (75/25)

C9a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: OCTOL (75/25)*

X NO.: 469 ID: Z NO.: SSGT LOAD ORDER NO.: 1142

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 4/8/64 LOT NO.: HOL 85-4

INITIAL QUANTITY: 500 pounds BATCH NO.: 696-3

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.
Jan 1964

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

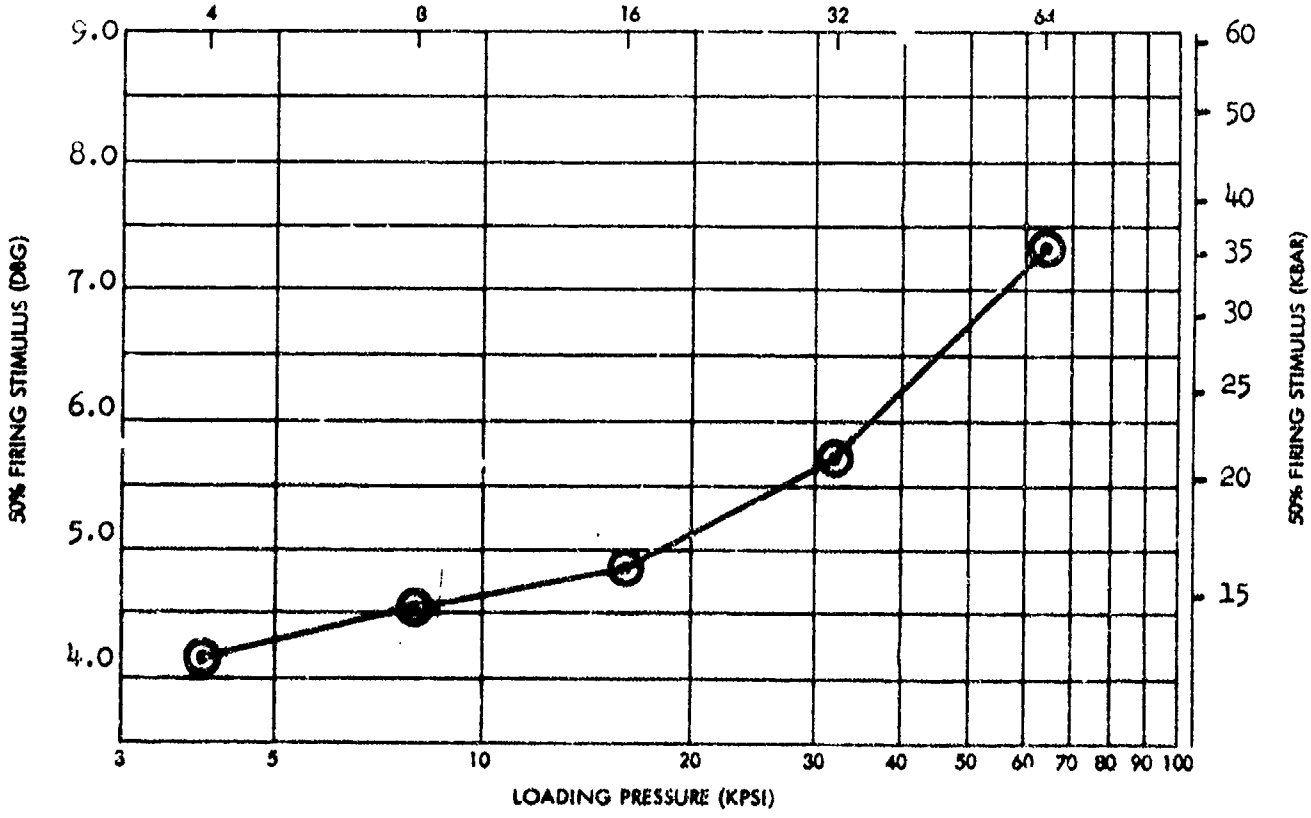
n =

Remarks
*Composition: HMX/TNT (75/25)

EXPLOSIVE	OCTOL (65/35)	X NO.	293	Date of Test:
TMD	1.81	I. D. NO.	-	7/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.539	0.0048	85.0	4.159	0.0187	0.0202	23	
8	1.620	0.0062	89.5	4.530	0.0191	0.0202	23	
16	1.699	0.0356	93.9	4.870	0.0163	0.0106	23	
32	1.768	0.0027	97.7	5.743	-	-	23	(1)
64	1.810	**0.0023**	100.0	7.316	0.0667	0.0373	23	
-	**1.602**	**0.3242**	88.5	**8.545**	**0.1153**	**0.0507**	**29**	**Cast**

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
OCTOL (65/35)

C10a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: OCTOL (65/35)*

X NO.: 293 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/24/58 LOT NO.: W-11-173-ORD-35

INITIAL QUANTITY: 2,539 pounds BATCH NO.:

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (50 or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

50 = cm

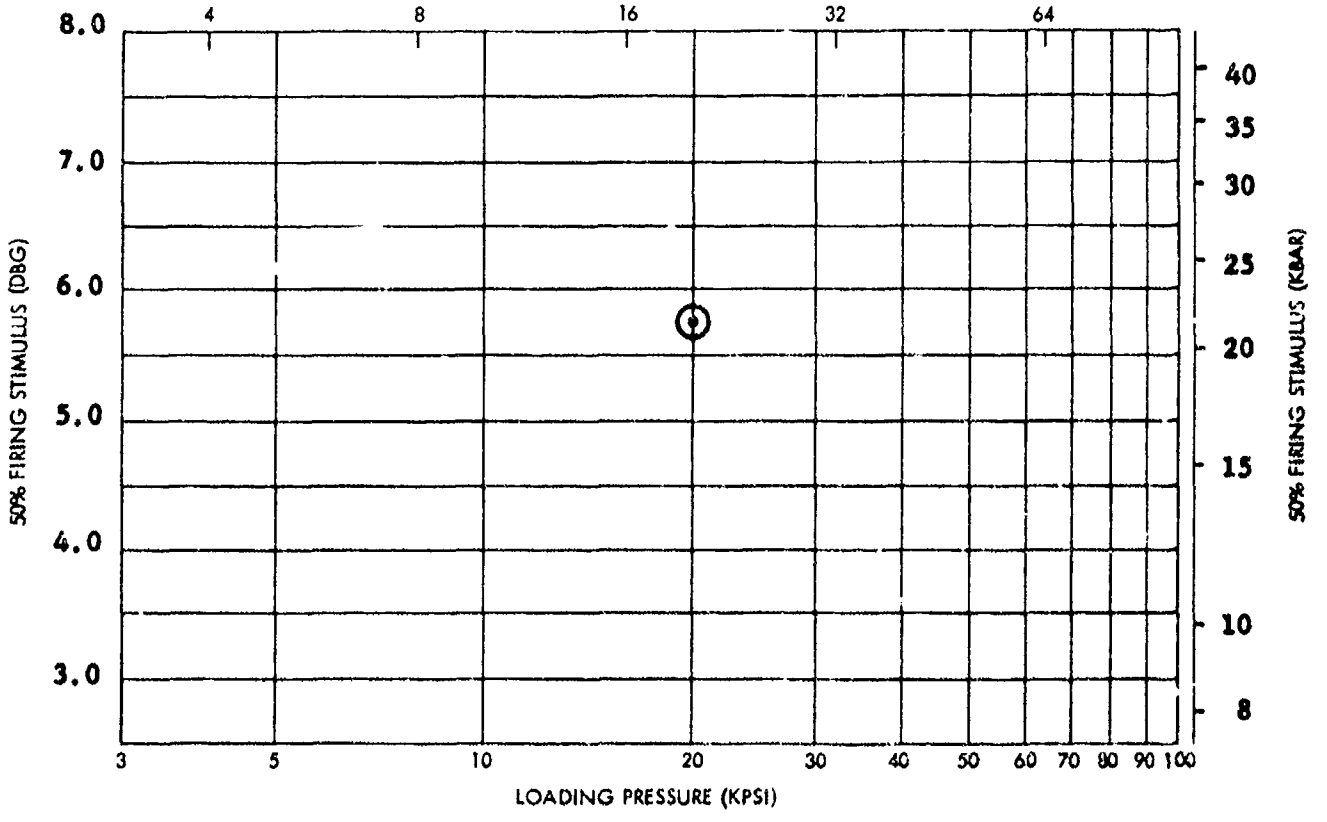
s = log units

n =

Remarks
*Composition: HMX/TNT (65/35)

EXPLOSIVE	COMP-B	X NO.	279	Date of Test
TMD	1.72	I. D. NO.	Z 311	4/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
20	1.629	0.0036	94.7	5.745	0.0239	0.0104	46	



SMALL SCALE GAP TEST (SSGT) DATA
COMP B

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: COMP B *

X NO.: 279 ID: Z NO.: 311 SSGT LOAD ORDER NO.: 660

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 4/1/60 LOT NO.:

INITIAL QUANTITY: 1/2 pound BATCH NO.:

MANUFACTURED BY:
NOL: WE Division**

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

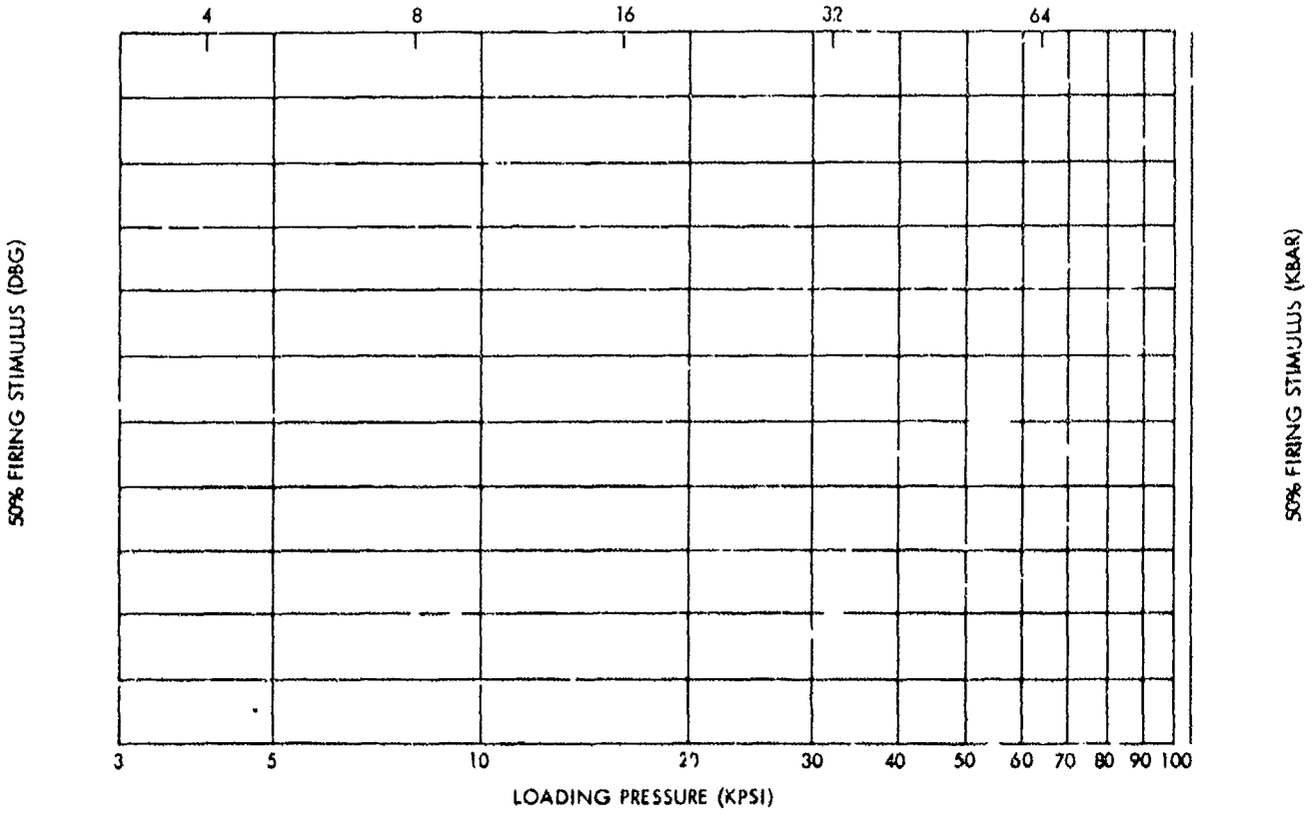
n =

Remarks
*Composition: RDX/TNT (60/40) plus 1% wax.

**"Mixed and ground by WE 4/1/60 in sigma mixer."

EXPLOSIVE	COMP B	X NO.	479	Date of Test
TMD	1.72	I. D. NO.	-	6/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
-	1.529	0.2194	88.9	8.929	0.1895	0.0915	29	Cast



SMALL SCALE GAP TEST (SSGT) DATA
COMP B

C11b1

4 Sep 1973

C

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: COMP B (Cast) *

X NO.: 479 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 3/28/64 LOT NO.: HOL-7-1870

INITIAL QUANTITY: 900 pounds BATCH NO.: **

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

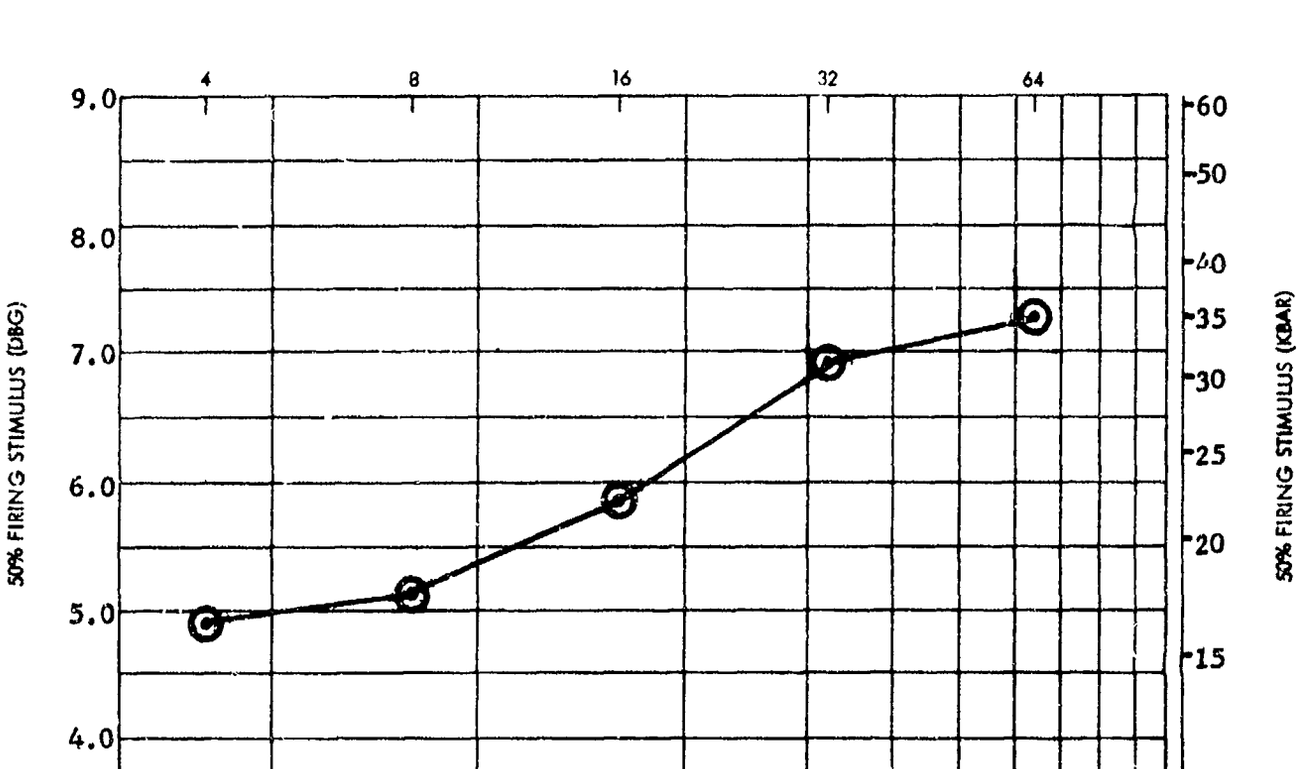
Remarks
*Composition: RDX/TNT (60/40)
plus 1% wax.

* *Batch No. - 47158, 47164, 47172 to 47174
47176 to 47181, 47188 to 47190
47193 to 47195, 47203, 47207
47246

EXPLOSIVE	COMP B	X NO.	576	Date of Test
TMD	1.72	I. D. NO.	-	-

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.473	0.0083	85.6	4.904	0.0194	0.0267	18	
8	1.558	0.0044	90.6	5.127	-	-	18	(1)
16	1.652	0.0014	96.0	5.863	0.0181	0.0288	18	
32	1.716	0.0027	99.8	6.942	0.0660	0.0271	23	
64	1.735	0.0015	100.9 (2)	7.277	-	-	18	(1)

(1) No mixed response zone
(2) Experimental error



SMALL SCALE GAP TEST (SSGT) DATA
COMP B

C11c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: COMP-B *

X NO.: 576 ID: Z NO.: SSGT LOAD ORDER NO.: 1144

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/26/66 LOT NO.:

INITIAL QUANTITY: 1 pound BATCH NO.:

MANUFACTURED BY:
NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

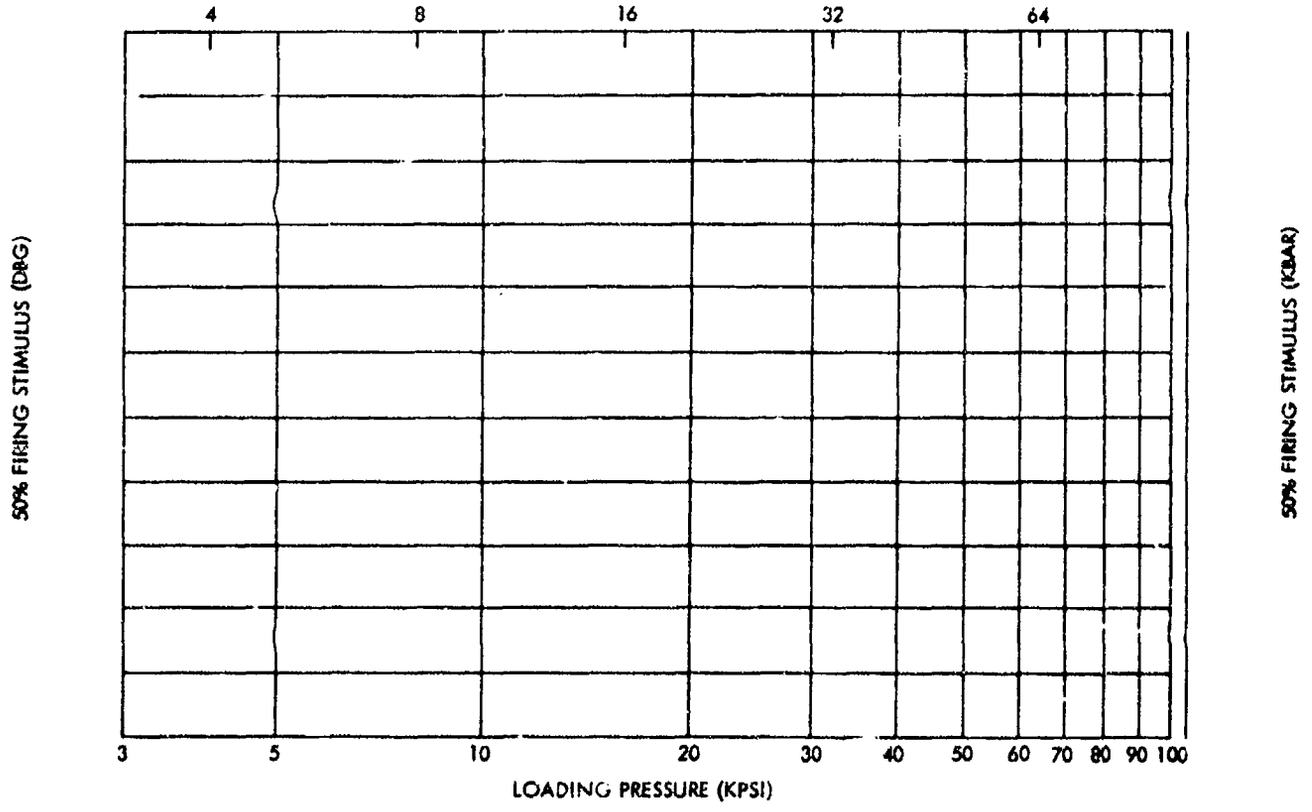
n =

Remarks
* Pellet grade from X479

Composition: RDX/TNT (60/40)
plus 1% wax.

EXPLOSIVE	HBX-3	X NO.	-	Date of Test
TMD	1.89	I. D. NO.	-	3/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
-	1.827	0.0252	96.7	9.938	0.0740	0.0725	46	Vacuum cast into bodies



SMALL SCALE GAP TEST (SSGT) DATA

HBX-3

C12 a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HBX-3 *

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.: CH No. 4170

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

NOL: WE Division

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

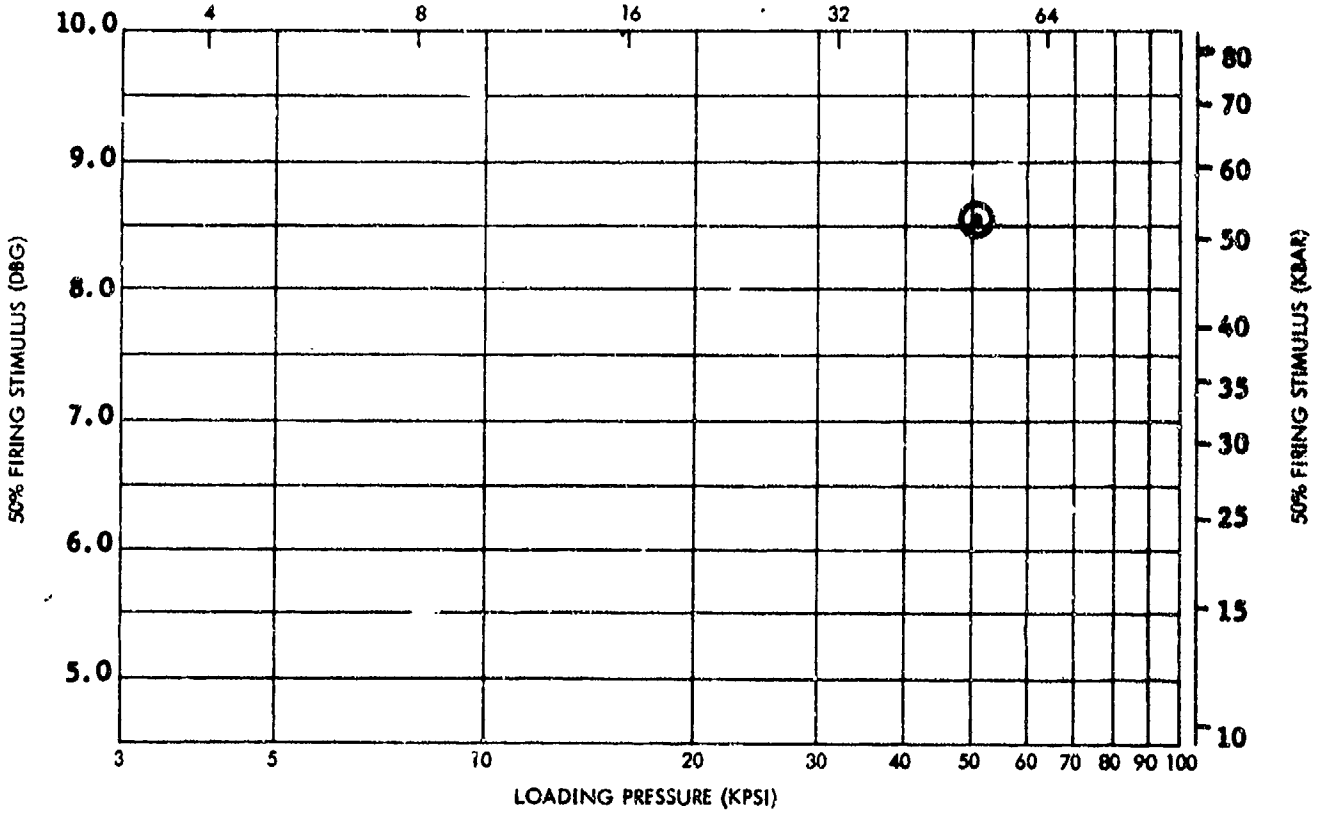
n =

Remarks

*Composition: RDX---------31%
Tetryl------29%
Aluminum----35%
D-2 wax.---- 5%
(plus 0.5% $CaCl_2$)

EXPLOSIVE	DATB	X NO.	-	Date of Test
TMD	1.84	I. D. NO.	-	3/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
50.2	1.732	0.0072	94.1	8.535	0.0329	0.0137	46	



SMALL SCALE GAP TEST (SSGT) DATA
DATB

Dlal

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: ID: S NO.: SSGT LOAD ORDER NO.: 657

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: LOT NO.:

VITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY (S or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

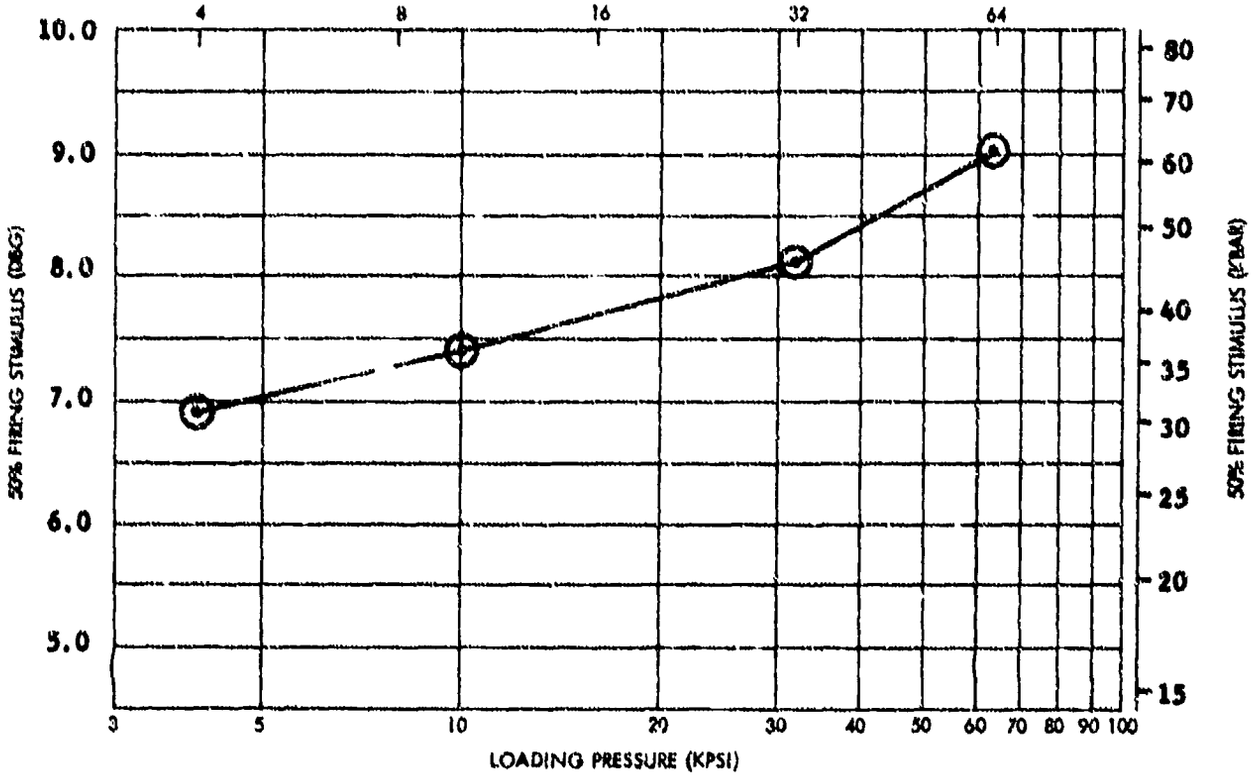
n =

Remarks

EXPLOSIVE	DATB	X NO.	313	Date of Test
%MD	1.64	I. D. NO.	"	10/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	σ		AVG.	σ	σ_m	N	
4	1.233	0.0219	67.0	6.909	-	-	12	(1)
10	1.455	0.0087	79.1	7.411	-	-	8	(1)
32	1.676	0.0060	91.1	8.153	-	-	8	(1)
64	1.763	0.0057	95.8	9.006	0.837	0.0793	12	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
DATB

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: 315 ID: Z NO.: 365 SSGT LOAD ORDER NO.: 702

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 4/11/60 LOT NO.: SR 3-60

INITIAL QUANTITY: 800 pounds* BATCH NO.: 2

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

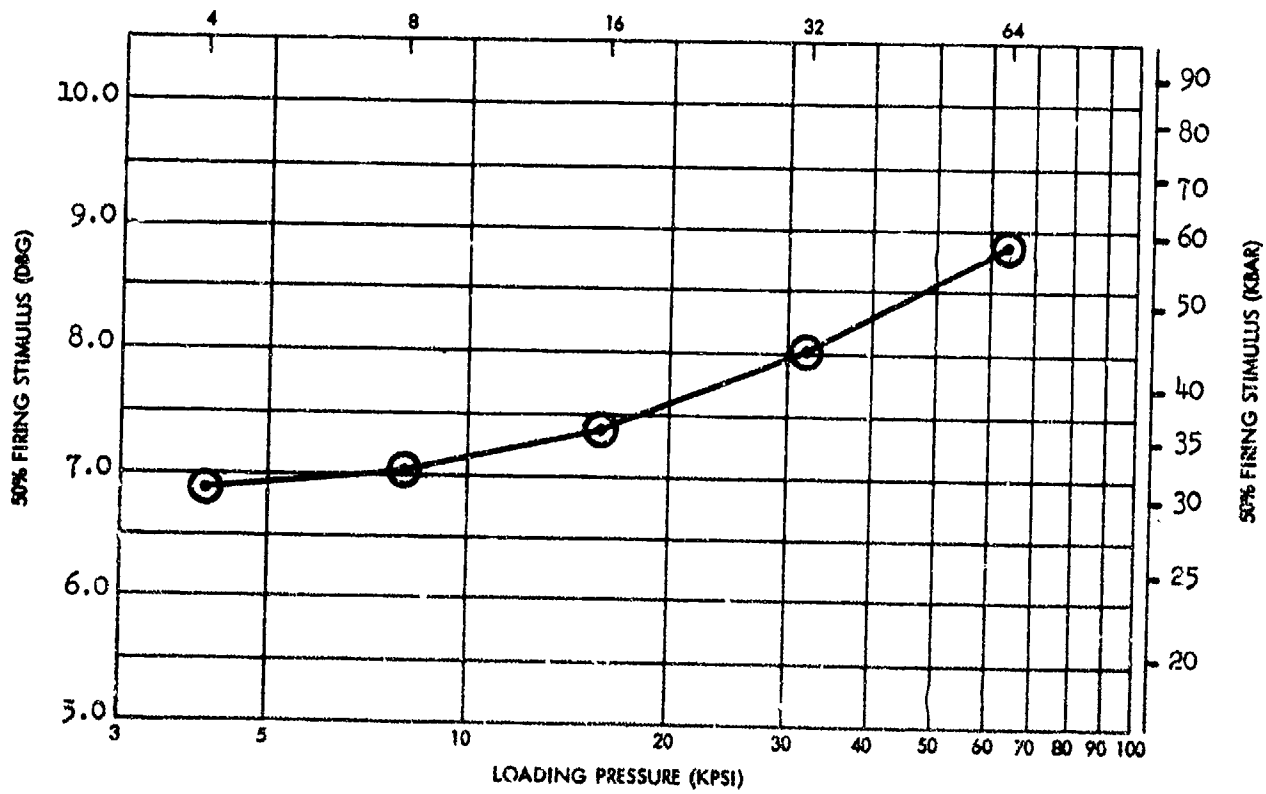
n =

Remarks
*600 pounds used to make DATB/ZYTEL

EXPLOSIVE	DATB	X NO.	315
TMD	1.84	I. D. NOS.	185 and 921

Date of Test 11/67

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.255	0.0025	68.2	6.870	0.0103	0.0060	22	
8	1.365	0.0043	74.2	7.042	0.0134	0.0196	20	
16	1.518	0.0054	82.5	7.374	0.0122	0.0100	20	
32	1.665	0.0034	90.5	8.023	0.0535	0.0316	20	
64	1.775	0.0083	96.5	8.682	0.0443	0.0276	20	



SMALL SCALE GAP TEST (SSGT) DATA
DATB

D1c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: 315 ID: 185 & 921 Z NO.: 365 SSGT LOAD ORDER NO.: 1208

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 4/11/60 LOT NO.: SR 3-60

INITIAL QUANTITY: 800 pounds* BATCH NO.: 2

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks
*600 pounds used tc make DATB, ZYTEL

DATB (X 315, ID 921)
PRESSURE (KPSI)
2
4
8
16
32
64
60.000
65.000
70.000
75.000
80.000
85.000
90.000
95.000
100.000
DENSITY (% TMD)

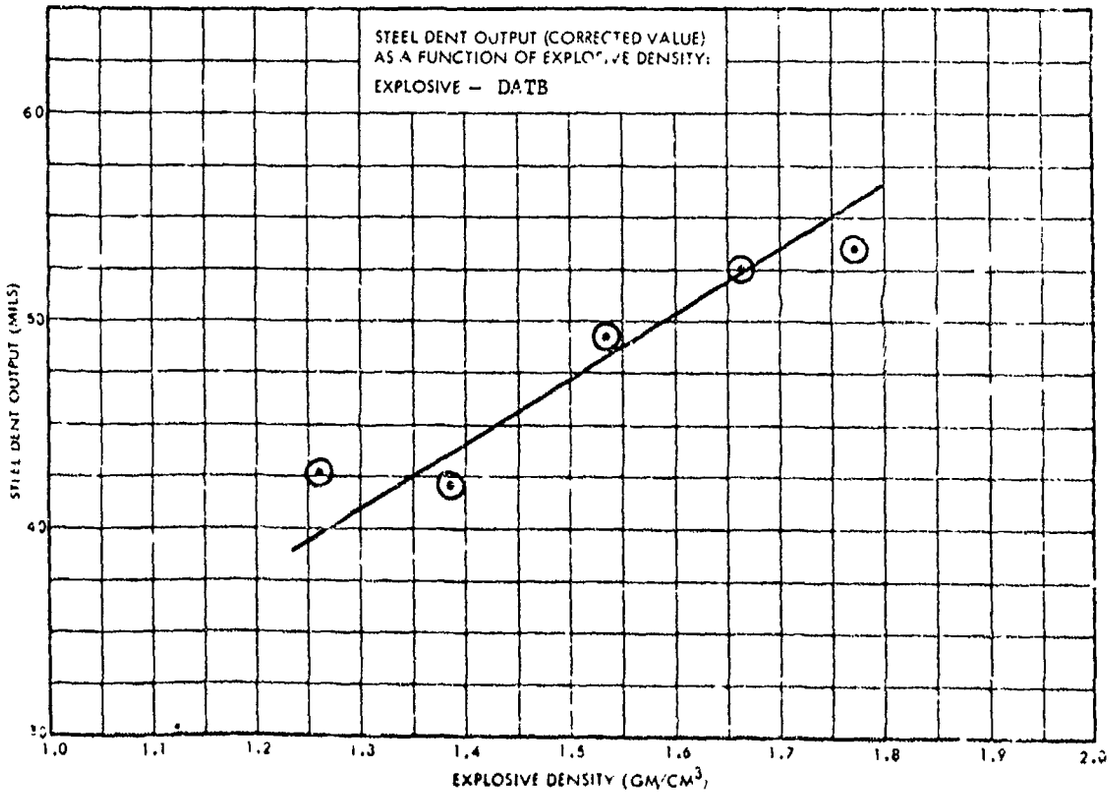
DATB (X 315, ID 921)
DENSITY (% TMD)
60.000
68.000
76.000
84.000
92.000
100.000
6.000
6.500
7.000
7.500
8.000
8.500
9.000
9.500
10.000
SENSITIVITY (DBG)

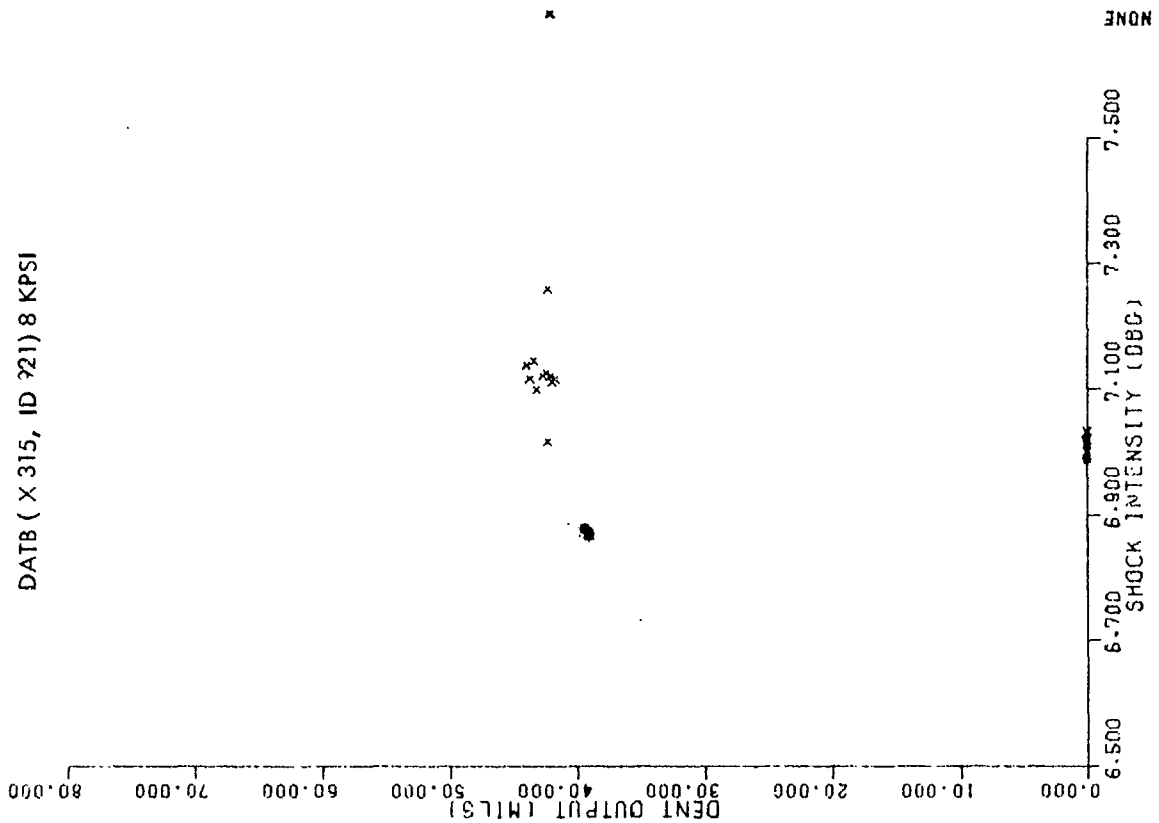
STEEL DENT OUTPUT DATA FOR DATB

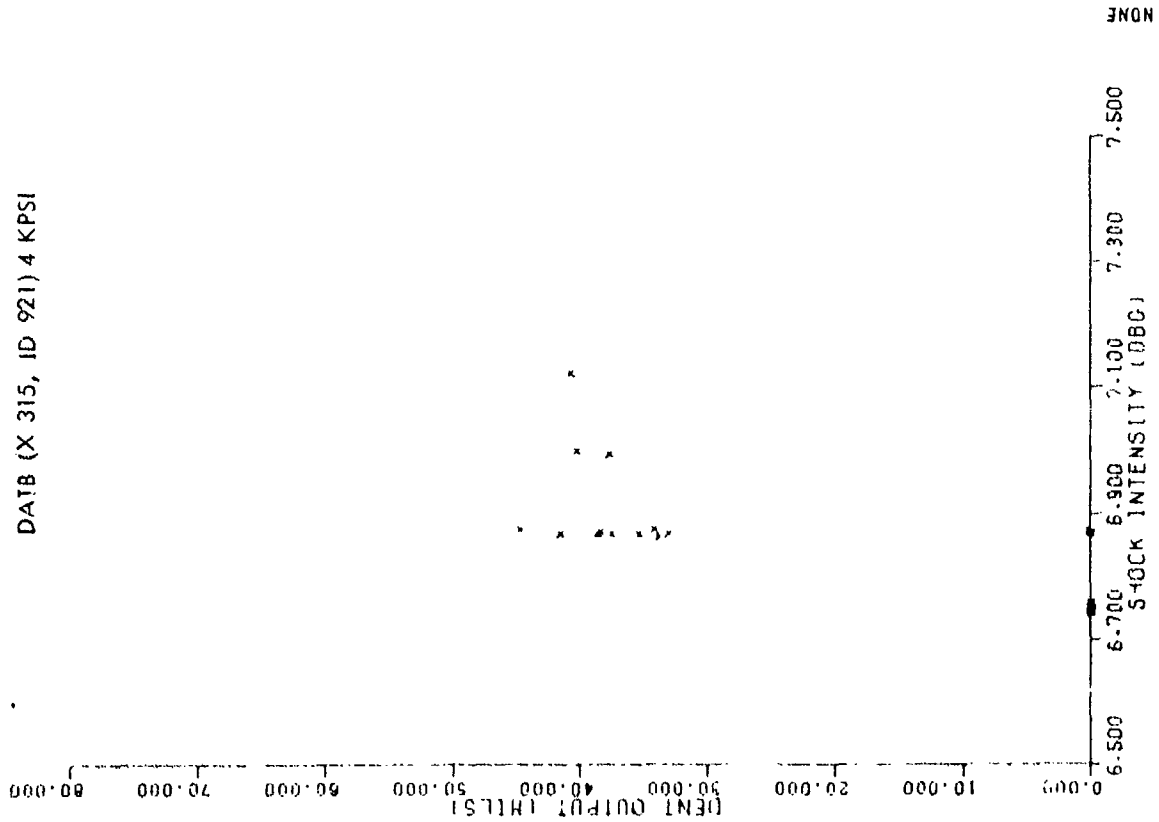
EXPLOSIVE	DATB	X NO.	315
TMD	1.84 gm/cm³	I. D. NO.	185

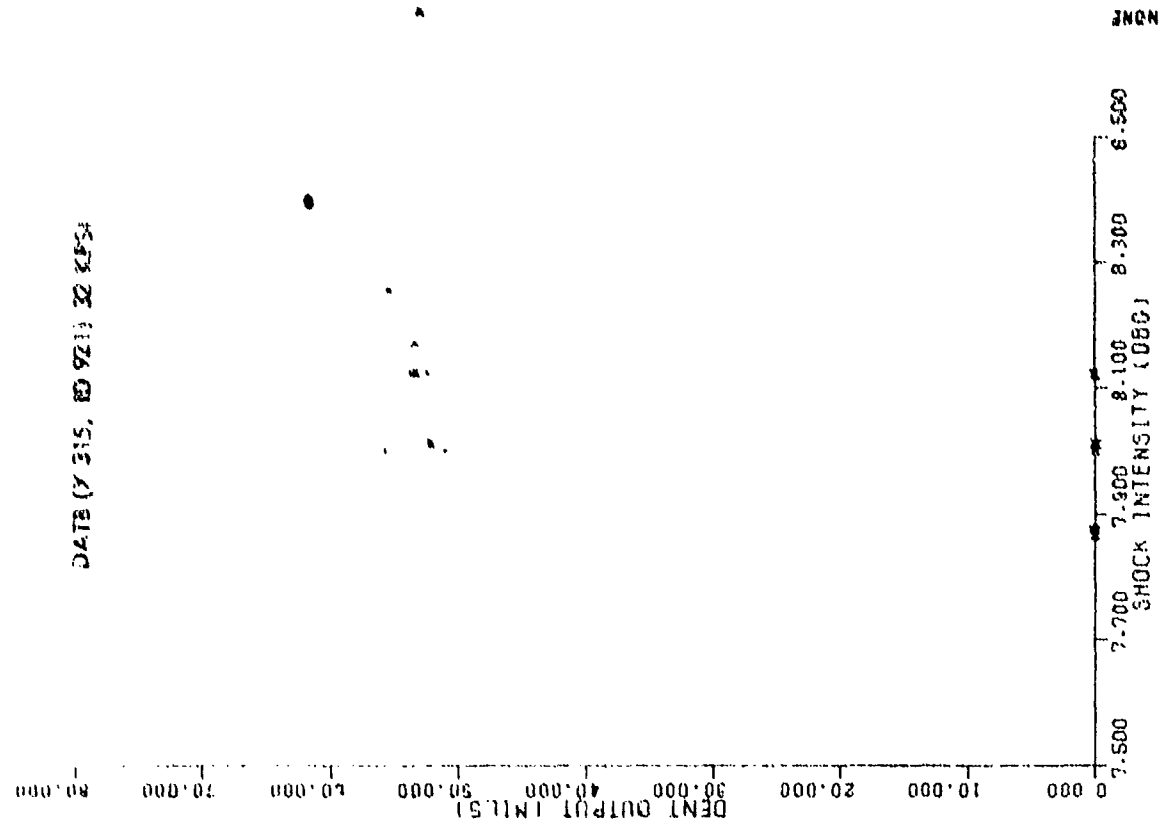
LOADING PRESSURE (PSI)	DENSITY (GM/CM³)		GROUP I DATA				AVERAGE GROUP I, II & III DATA				BLOCK HARDNESS DATA (ROCKWELL B)	
			OBSERVED DENT DATA (MILS)		CORRECTED DENT DATA (MILS)		OBSERVED DENT DATA (MILS)		CORRECTED DENT DATA (MILS)			
	AVG.	S	AVG.	S	AVG.	S	AVG.	S	AVG.	S	AVG.	S
4,000	1.257	0.0066	41.4	1.57	42.6	1.49					84.8	1.60
8,000	1.384	0.0028	40.3	3.51	42.2	3.44					85.7	1.55
16,000	1.530	0.0047	49.2	2.54	49.4	3.84					83.3	1.99
32,000	1.663	0.0024	50.9	4.91	52.5	6.43					85.4	2.88
64,000	1.771	0.0041	53.2	2.20	53.7	2.31					83.7	1.72

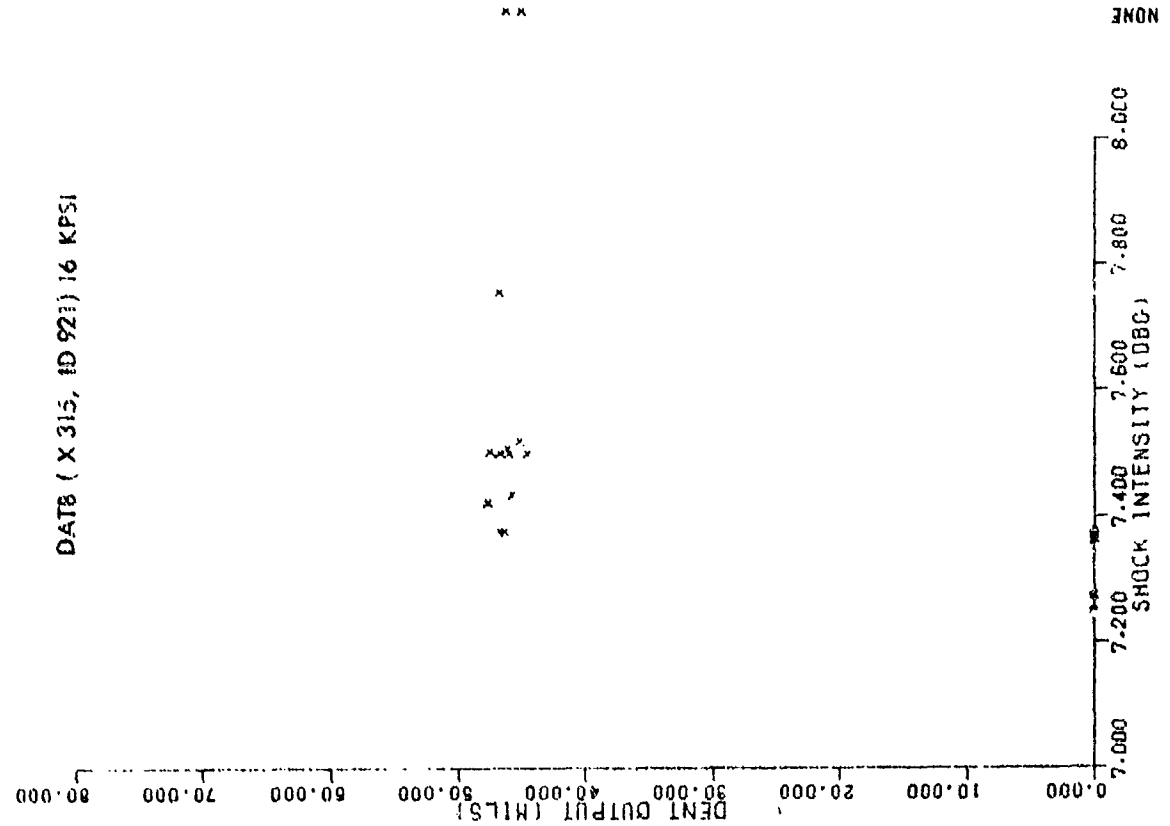
NOTES:

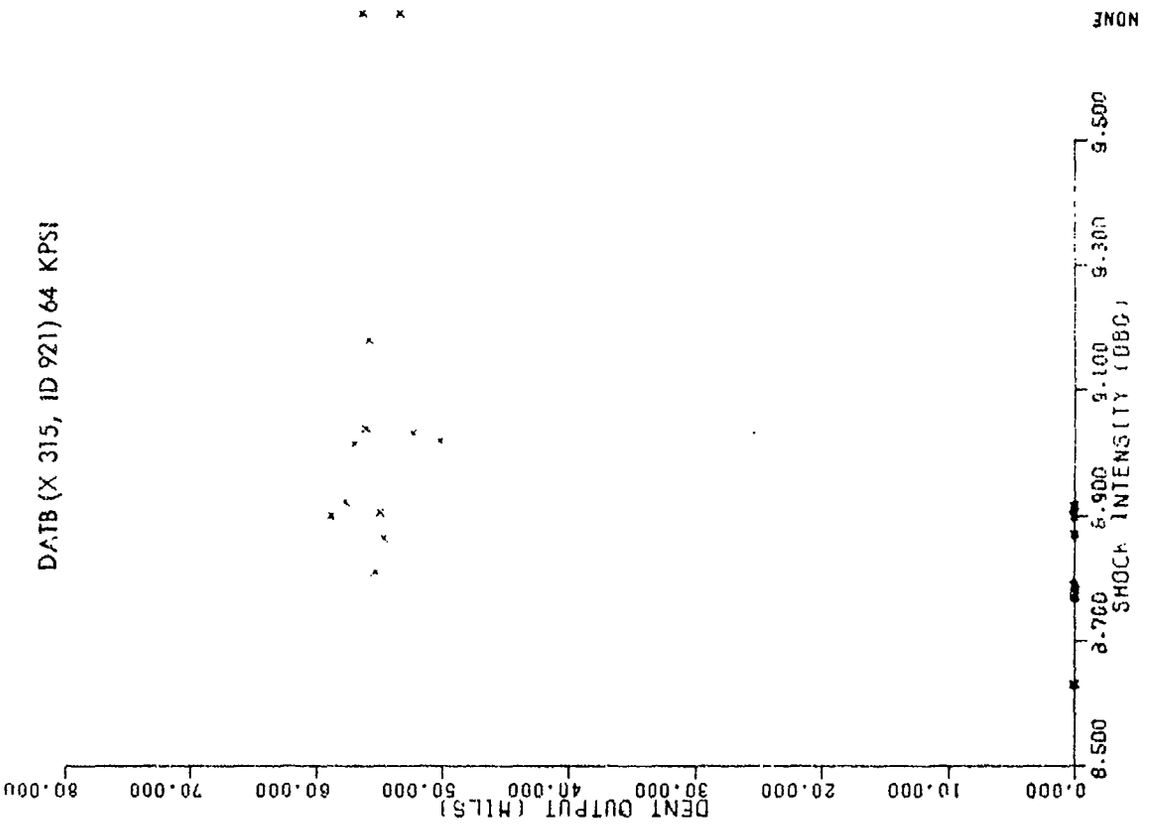



DATB (X 315, ID 921) 8 KPSI
NONE
SHOCK INTENSITY (DBC)
6.500
6.700
6.900
7.100
7.300
7.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


DATB (X 315, ID 921) 4 KPSI
NONE
SHOCK INTENSITY (DBC)
6.500
6.700
6.900
7.100
7.300
7.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


DATA (X 315, ID 921) 32 KPSI
NONE
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (DBG)
7.500
7.700
7.900
8.100
8.300
8.500

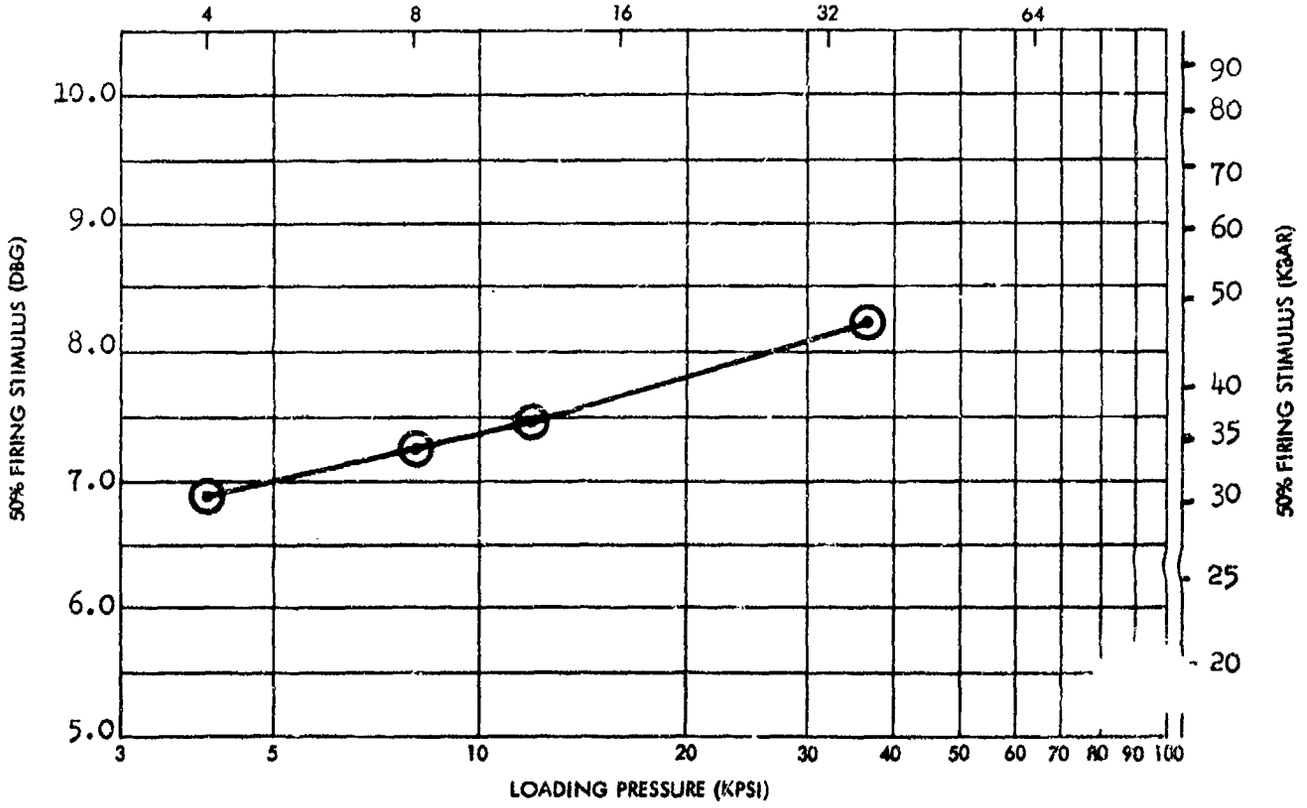

DATA (X 315, ID 921) 16 KPSI
NONE
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (DBG)
7.000
7.200
7.400
7.600
7.800
8.000


DATB (X 315, ID 921) 64 KPSI
NONE
SHOCK INTENSITY (GPa)
8.500
8.700
8.900
9.100
9.300
9.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

EXPLOSIVE	DATB	X NO.	331	Date of Test
TMD	1.84	I. D. NO.	-	12/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4.08	1.231	0.0088	66.9	6.889	0.0879	0.0493	20	
8	1.339	0.0108	72.8	7.240	0.0012	0.0014	20	(1)
16.50	1.442	0.0039	78.4	7.476	0.0254	0.0226	20	
37.00	1.701	0.0065	92.4	8.236	0.1074	0.0605	20	

(1) Date of Test - 2/65



SMALL SCALE GAP TEST (SSGT) DATA
DATB

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: 331 ID: Z NO.: - SSGT LOAD ORDER NO.: 998 & 1015

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 2/27/61 LOT NO.: HOL SR 4-61

INITIAL QUANTITY: 150 pounds BATCH NO.: 86-328-2

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H = cm

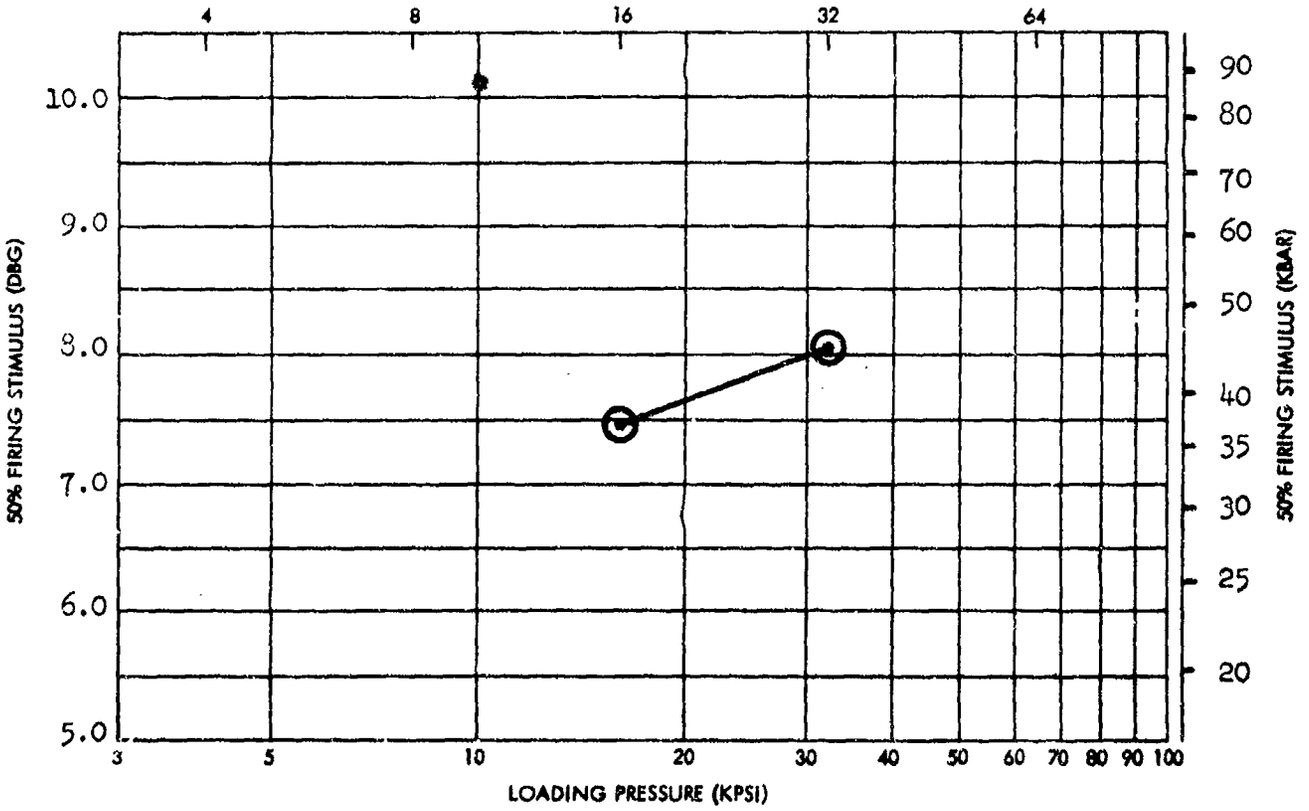
s = log units

n =

Remarks
Average particle size 8μ

EXPLOSIVE	DATB	X NO.	331	Date of Test
TMD	1.84	I. D. NO.	920	11/67

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
16	1.514	0.0048	82.3	7.477	0.0671	0.0378	20	
32	1.662	0.0054	90.3	8.049	0.1165	0.0597	20	



SMALL SCALE GAP TEST (SSGT) DATA
DATB

Dlel

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: 331 ID: 920 Z NO.: SSGT LOAD ORDER NO.: 1209

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 2/27/61 LOT NO.: HOL SR 4-61

INITIAL QUANTITY: 150 pounds BATCH NO.: 86-328-2

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

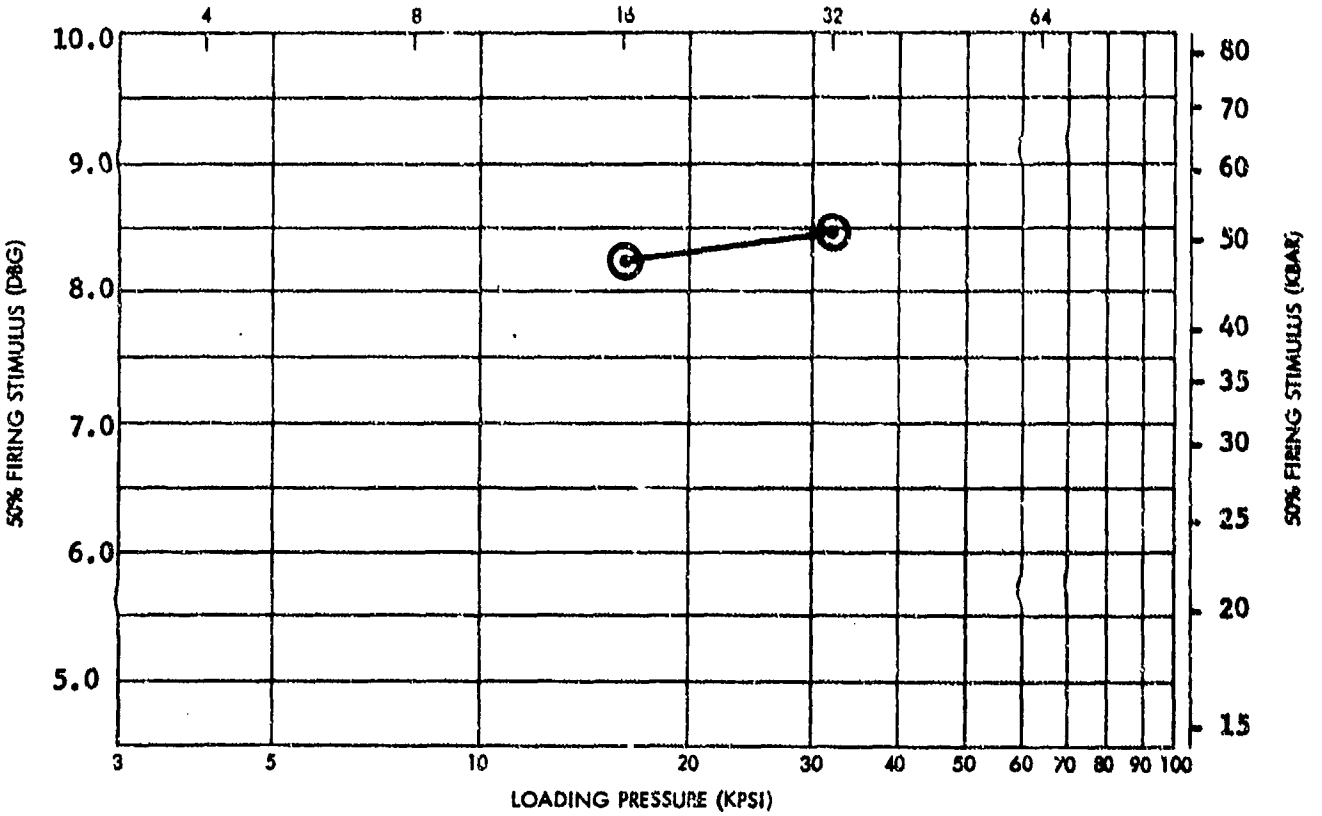
s = log units

n =

Remarks
Average particle size 8μ.

EXPLOSIVE	DATB	X NO.	397	Date of Test
TMD	1.84	I. D. NO.	922	9/68

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	s	s_m	N	
16	1.655	0.0039	89.9	8.227	0.0610	0.0361	20	
32	1.738	0.0029	94.5	8.486	0.0017	0.0004	20	



SMALL SCALE GAP TEST (SSGT) DATA
DATB

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB

X NO.: 397 ID: 922 S NO.: SSGT LOAD ORDER NO.: 1210

SOURCE:

CHEMICAL NAME: 1,3 - Diamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 6/29/62 LOT NO.: HOL SR-228-61

INITIAL QUANTITY: 105 pounds ($3020) DATCH NO.: 86-425*

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ℍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℍ = cm

s = log units

n =

Remarks
*Special 300μ needles

100 Gram Sieve Analysis, 1 Hour**

Mesh Size Through	On	Amount (%)
	40	6.0
40	60	16.0
60	100	32.8
100	170	30.7
170	270	10.2
270	325	2.8
325	PAN	1.5

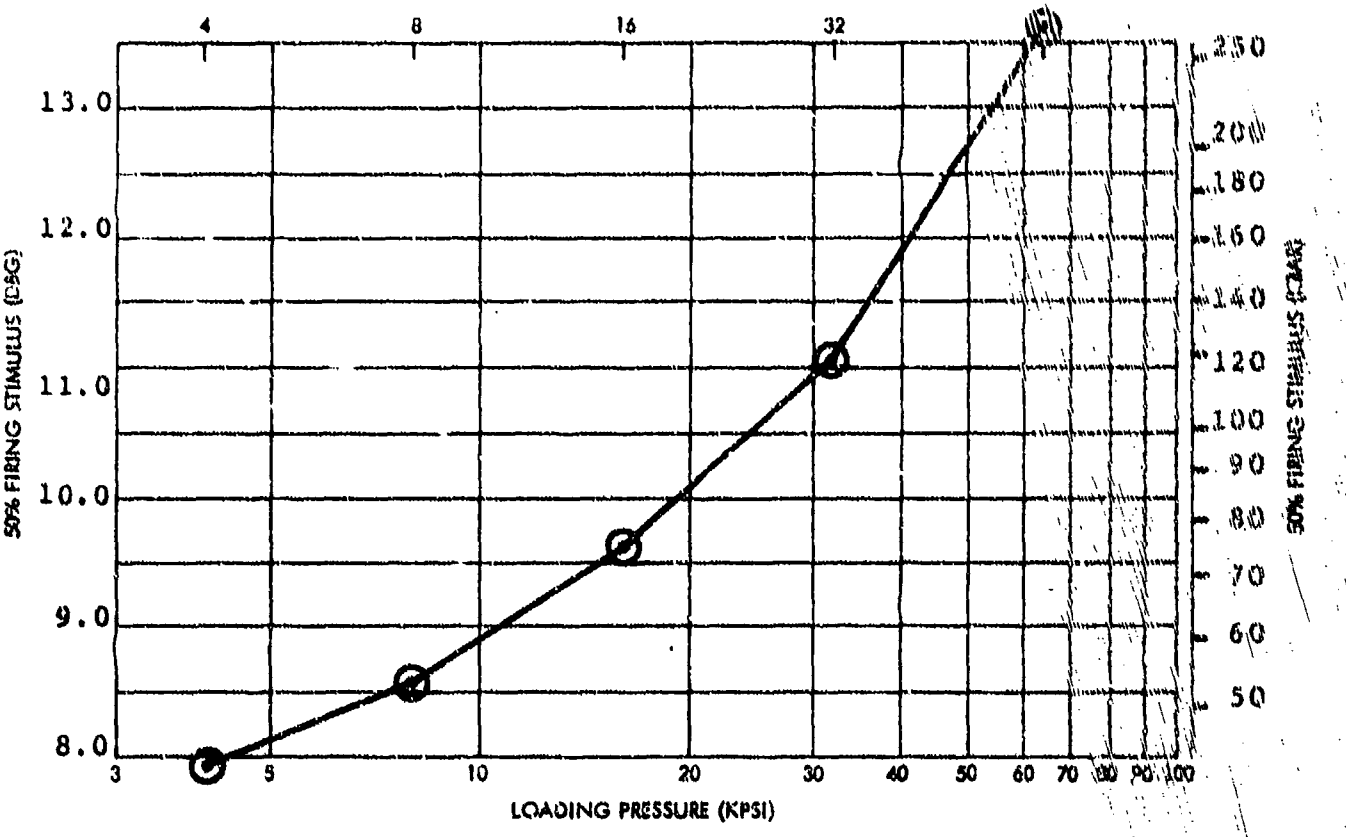
(8/13/62)

**Assumed that this notation indicates sieve time.

EXPLOSIVE	TATB	X NO.	935	Date of Test
TMD	1.93	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	σ		AVG.	σ	σm	N	
4	1.519	0.010	78.7	7.918	0.0291	0.0316	20	(1)
8	1.645	0.008	85.2	8.573	0.0657	0.0390	20	(1)
16	1.762	0.005	91.3	9.626	0.0596	0.0358	20	(1)
32	1.840	0.001	95.3	11.091	0.0599	0.0415	20	(1)
64	1.887	0.004	97.8	13.606	0.2150	0.1277	20	(1)

(1) Material loaded under vacuum.



SMALL SCALE GAP TEST (SSGT) DATA
TATB

D2a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TATB

X NO.: 335 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 1,3,5 - Triamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 4/20/61 LOT NO.: *

INITIAL QUANTITY: 252 grams BATCH NO.:

MANUFACTURED BY:
NOL: WC/ED Divisions
(F. Taylor, C. Randall)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

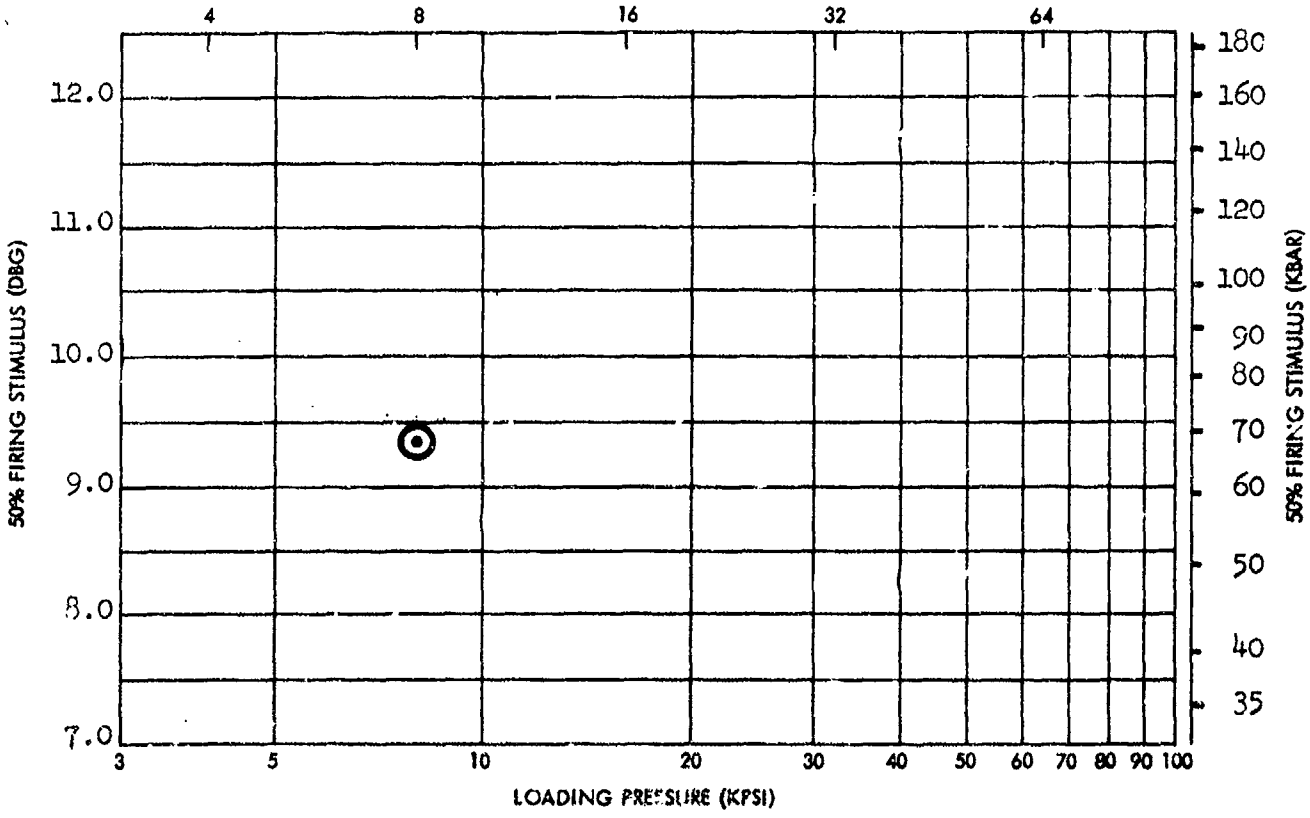
Remarks
*Lot No. 16-6113 mixed
41-6113

4 Sep 1973

EXPLOSIVE	TATB	X NO.	406	Date of Test 2/65
TMD	1.93	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.727	0.0025	89.5	9.352	-	-	20	(1)

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
TATB

D2b1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TATB

X NO.: 406 ID: Z NO.: SSGT LOAD ORDER NO.: 1012

SOURCE:

CHEMICAL NAME: 1,3,5 - Triamino-2,4,6 - trinitrobenzene

DATE RECEIVED: 9/62 LOT NO.:

INITIAL QUANTITY: 200 pounds BATCH NO.:

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{H}$ = cm

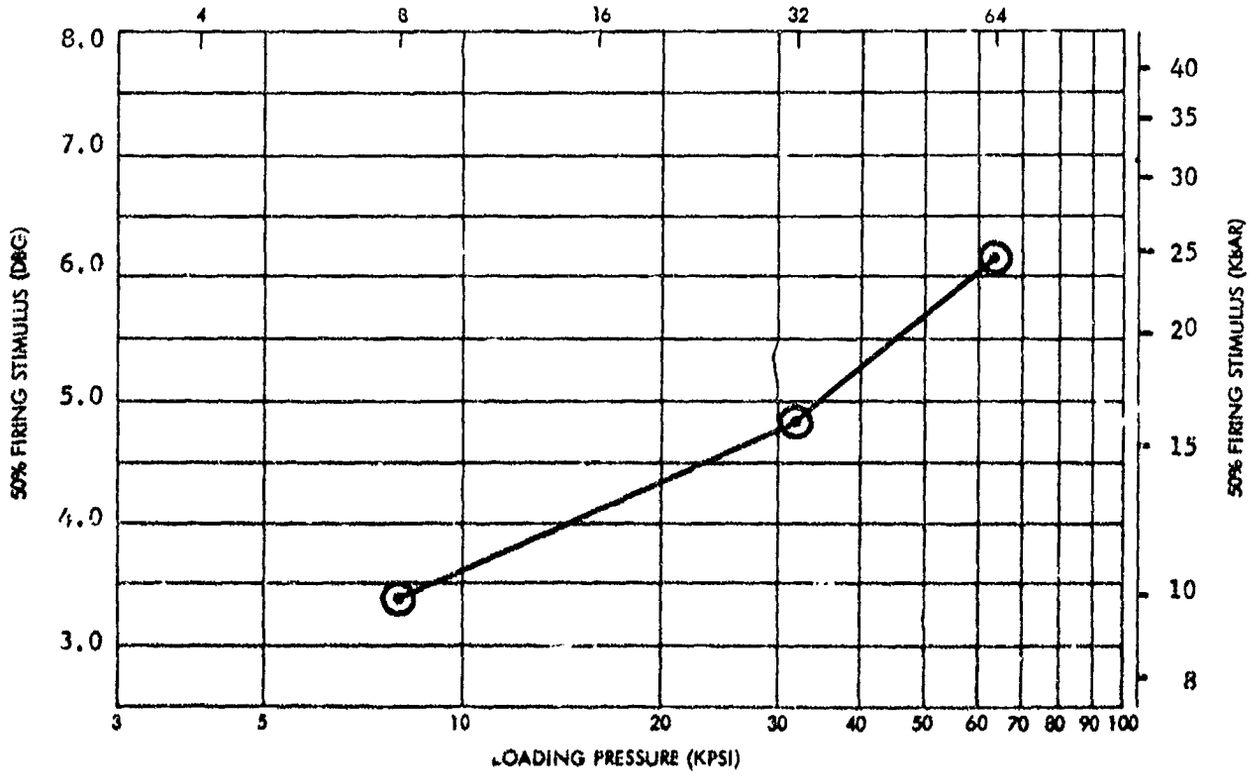
s = log units

n =

Remarks

EXPLOSIVE	HNAB	X NO.	511, 512	Date of Test
TMD	-	I. D. NO.	-	3/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.476	0.0060	-	3.486	0.0142	0.0348	18	
32	1.671	0.0051	-	4.848	0.0189	0.0318	12	
64	1.766	0.0059	-	6.182	0.0611	0.0363	18	



SMALL SCALE GAP TEST (SSGT) DATA
HNAB

D3a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNAB*

X NO.: 511,512ID: Z NO.: 606 SSGT LOAD ORDER NO.: 1023 - 1024

SOURCE: Lockheed Missile & Space Company
Santa Cruz Test Base

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitroazobenzene

DATE RECEIVED: 12/9/64 LOT NO.:

INITIAL QUANTITY: 1/2 pound each BATCH NO.:

MANUFACTURED BY:

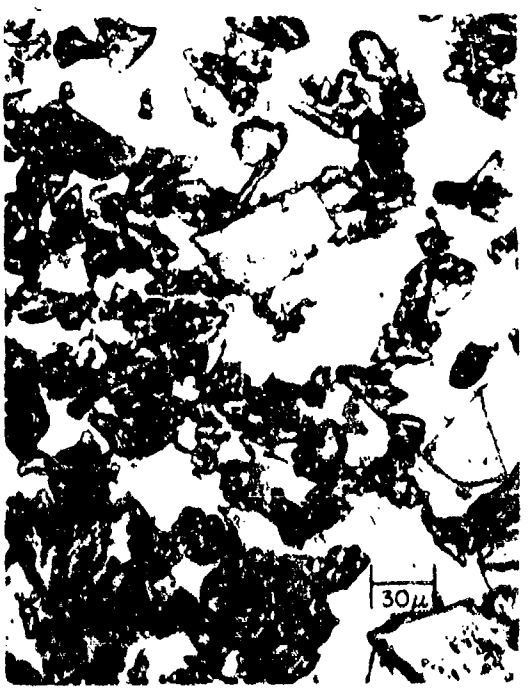
IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 4/9/65

$\bar{x}$ = 32 cm

s = 0.19 log units

n = 25

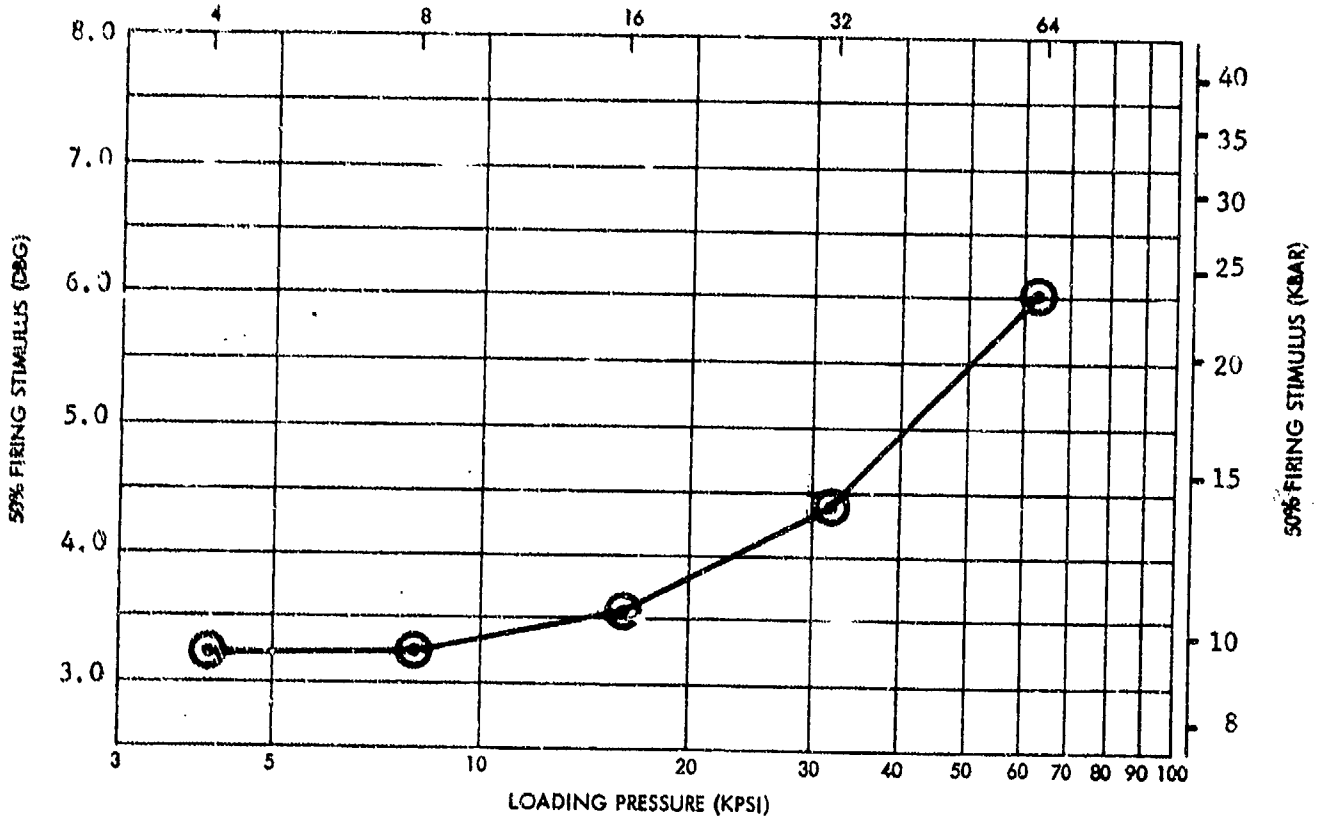
Remarks
*Data papers in sample box:
"HNAB, coarse grad , lab sample under alcohol,
X511 - Lot X-7
X512 - Lot X-6."



EXPLOSIVE	HNAB	X NO.	518 (2)	Date of Test
TMD	--	I. D. NO.	-	3/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	J	s_m	N	
4	1.383	0.0066	--	3.244	0.0051	0.0034	23	
8	1.480	0.0039	--	3.251	-	-	23	(1)
16	1.582	0.0133	--	3.549	0.0554	0.0304	23	
32	1.687	0.0030	--	4.382	0.0574	0.0502	23	
64	1.774	0.0054	--	6.003	0.0512	0.0292	23	

(1) No mixed response zone
(2) HNAB, XNO 518, KSW Grade.



SMALL SCALE GAP TEST (SSGT) DATA
HNAB

CHEMICAL DATA

EXPLOSIVE NAME: HNAB (EBW Grade)*

X NO.: 518 ID: Z NO.: 634 SSGT LOAD ORDER NO.: 1017-1021

SOURCE: Lockheed Missile & Space Company, Santa Cruz Test Base
NOW 63-0050-C

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitroazobenzene

DATE RECEIVED: 3/19/65 LOT NO.: 8

INITIAL QUANTITY: 1/2 pound BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY (ℍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℍ = cm

s = log units

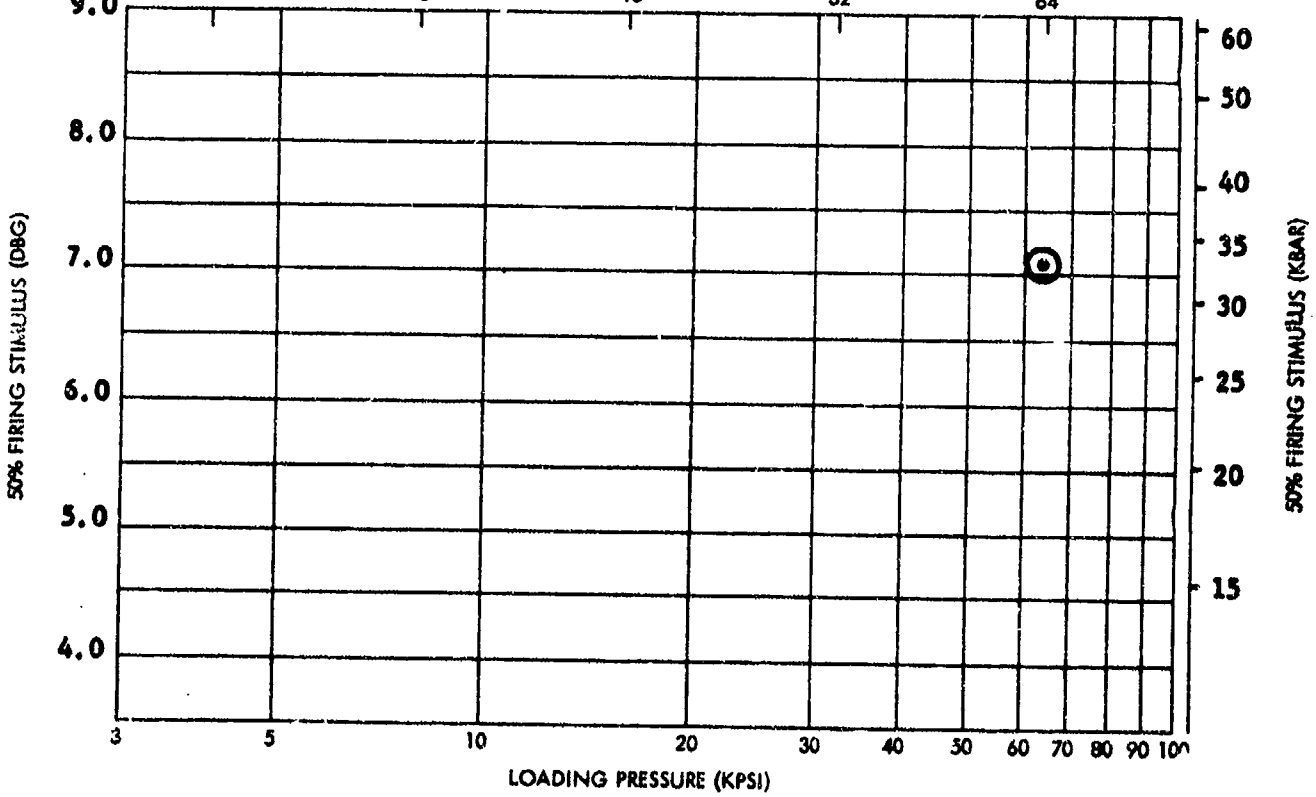
n =

Remarks

*Under Ethanol - water

EXPLOSIVE	DIPAM	X NO.	346	Date of Test
TMD	1.79	I. D. NO.	-	9/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
64	1.750	0.0128	97.8	7.061	.1255	0.0625	23	



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

D4a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 346 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: 1/31/62 LOT NO.: NOL Notebook 96-5872-pg 81 Item 3

INITIAL QUANTITY: 300 grams BATCH NO.:

MANUFACTURED BY:

NOL: WO Division
(Dr. M. Kamlet)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

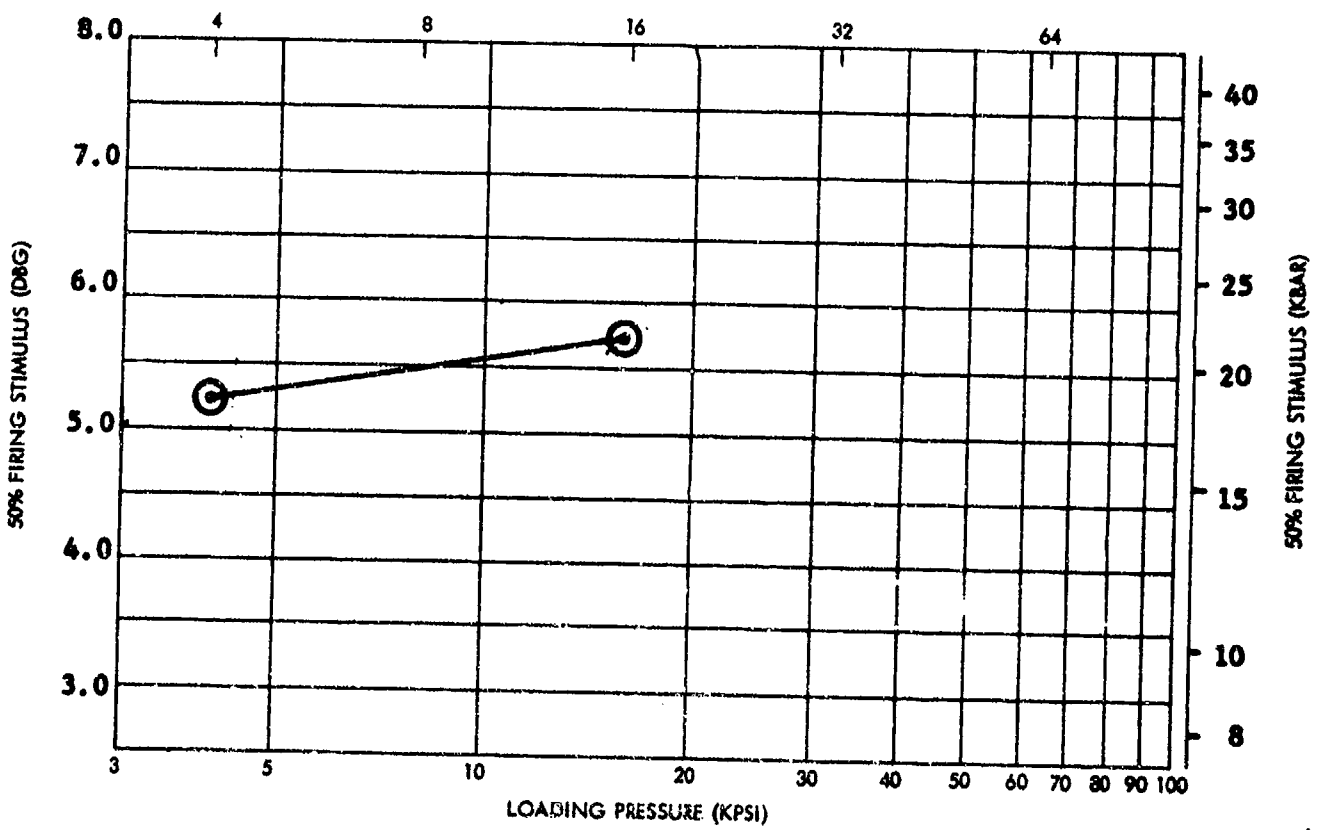
n =

Remarks

EXPLOSIVE	DIPAM	X NO.	402
TMD	1.79	I. D. NO.	-

Date of Test 9/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.216	0.0077	67.9	5.233	0.0485	0.0281	23	
16	1.461	0.0073	81.6	5.730	0.0168	0.0150	23	



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 402 ID: Z NO.: 429 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: 8/1/62 LOT NO.:

INITIAL QUANTITY: 3 pounds BATCH NO.:

MANUFACTURED BY:
NOL: WO Division

IMPACT SENSITIVITY (ẍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẍ = cm

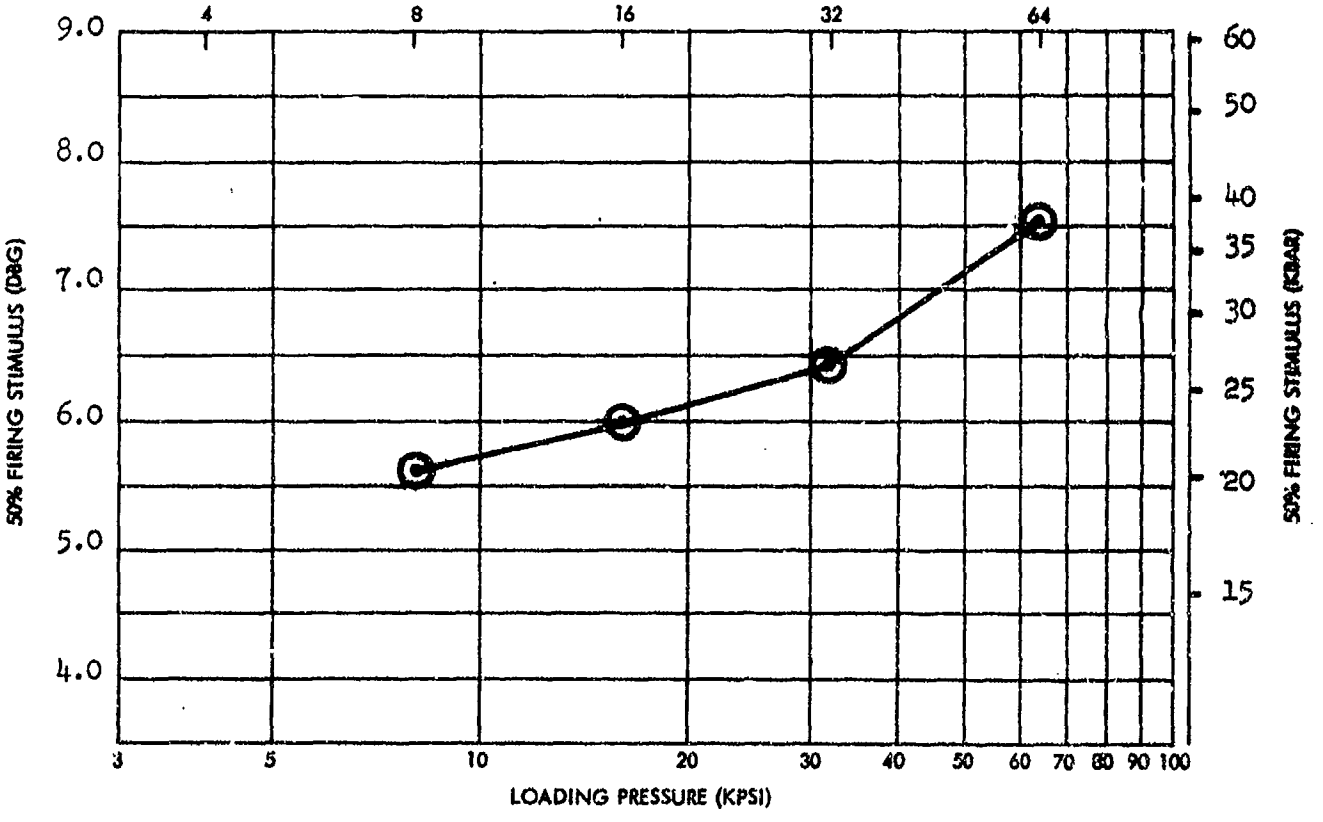
s = log units

n =

Remarks

EXPLOSIVE	DIPAM	X NO.	428	Date of Test
TMD	1.79	I. D. NO.	-	5/63

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.307	0.0553	73.0	5.619	0.0788	0.0394	23	
16	1.478	0.0228	82.6	5.988	0.0208	0.0132	23	
32	1.627	0.0230	90.9	6.424	0.0365	0.0234	23	
64	1.784	0.0037	99.7	7.539	0.0808	0.0419	23	



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 428 ID: S NO.: 475 SSGT LOAD ORDER NO.: 1033

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: 7/18/63 LOT NO.: 251-65-1A-2A

INITIAL QUANTITY: 1 pound BATCH NO.:

MANUFACTURED BY:

American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (# or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{X}$ = 95 cm

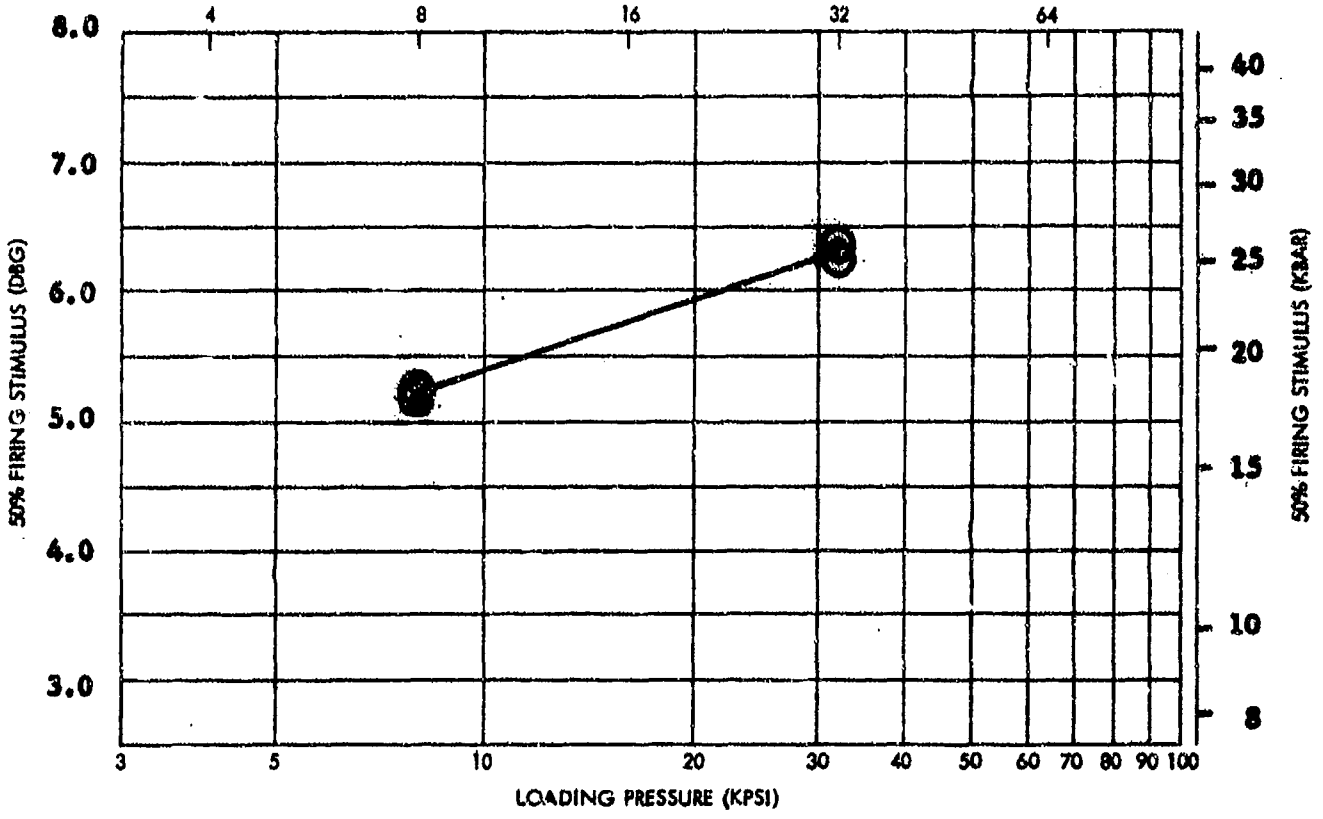
s = 0.11 log units

n = 50

Remarks

EXPLOSIVE	DIPAM	X NO.	452, 453	Date of Test
%MD	1.79	I. D. NO.	"	8/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	σ	% TMD	SENSITIVITY (DBG) AVG.	σ	σ_m	N	REMARKS
8	1.356	0.0257	75.8	3.181	0.0435	0.0"a1	20	X No. 452
32	1.674	0.0053	93.5	6.236	0.0338	0.0228	20	X No. 452
8	1.394	0.0362	77.9	3.256	0.0757	0.0646	20	X No. 453
32	1.662	0.0065	92.8	6.358	0.0136	0.0216	20	X No. 453



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

D4d1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 452 ID: Z NO.: SSGT LOAD ORDER NO.: 973

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: LOT NO.: NOL Notebook 96-6894 pg 87 pg 92

INITIAL QUANTITY: 270 grams BATCH NO.:

MANUFACTURED BY:

NOL: WC Division
Bldg 310
(Dr. J. Dacons)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 129 cm

s =0.07 log units

n = 50

EXPLOSIVE NAME: DIPAM

X NO.: 453* ID: Z NO.: SSGT LOAD ORDER NO.: 974

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WC Division
Bldg 310
(Dr. J. Dacons)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 114 cm

s =0.09 log units

n =

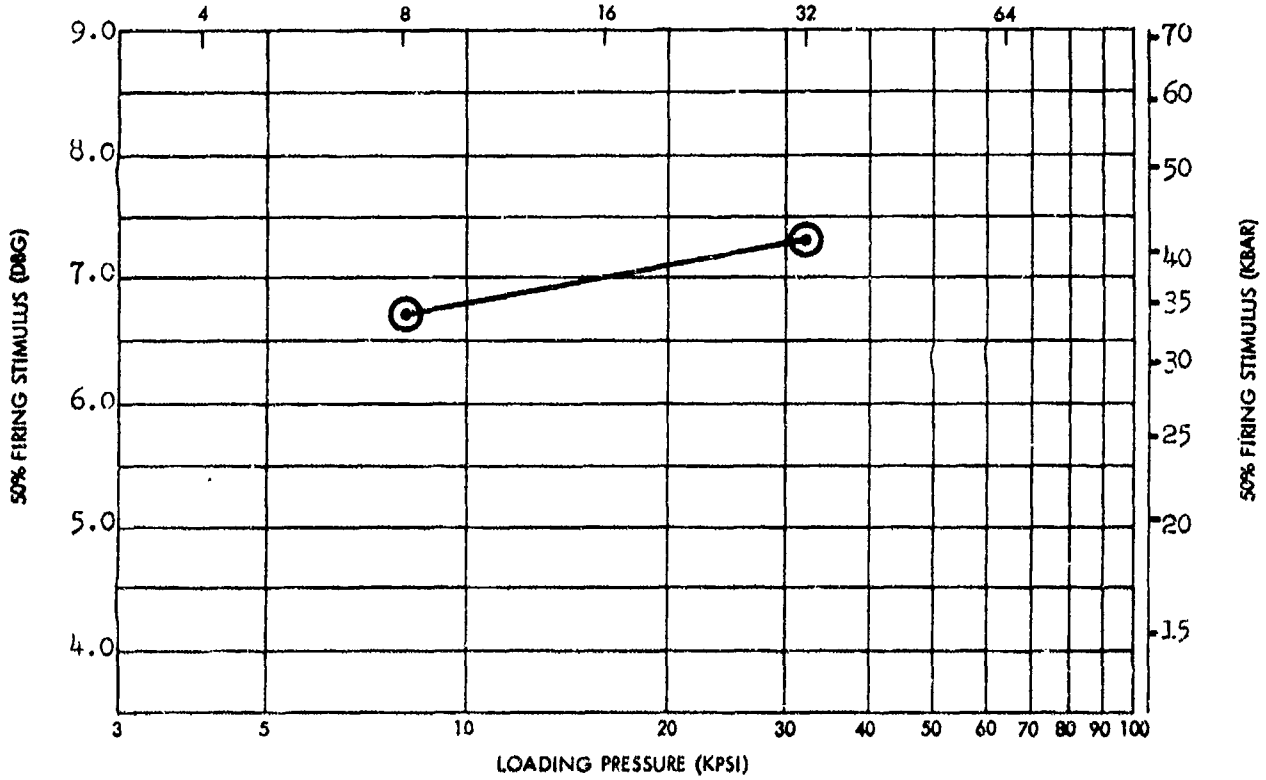
Remarks

*Special run: particle size above 105μ (Fines removed by screening)

EXPLOSIVE	DIPAM	X NO.	491	Date of Test 1/65
TMD	1.79	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.290	0.0164	**72.1**	6.704	0.2693	0.1584	18	(1)
32	1.608	0.0125	**89.8**	7.297	0.1170	0.0672	18	(1)

(1) **Tested** at -315°F



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

D4e1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 491 ID: Z NO.: SSGT LOAD ORDER NO.: 1111

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: LOT NO.: 251-67

INITIAL QUANTITY: 5 pounds BATCH NO.:

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẋ = cm

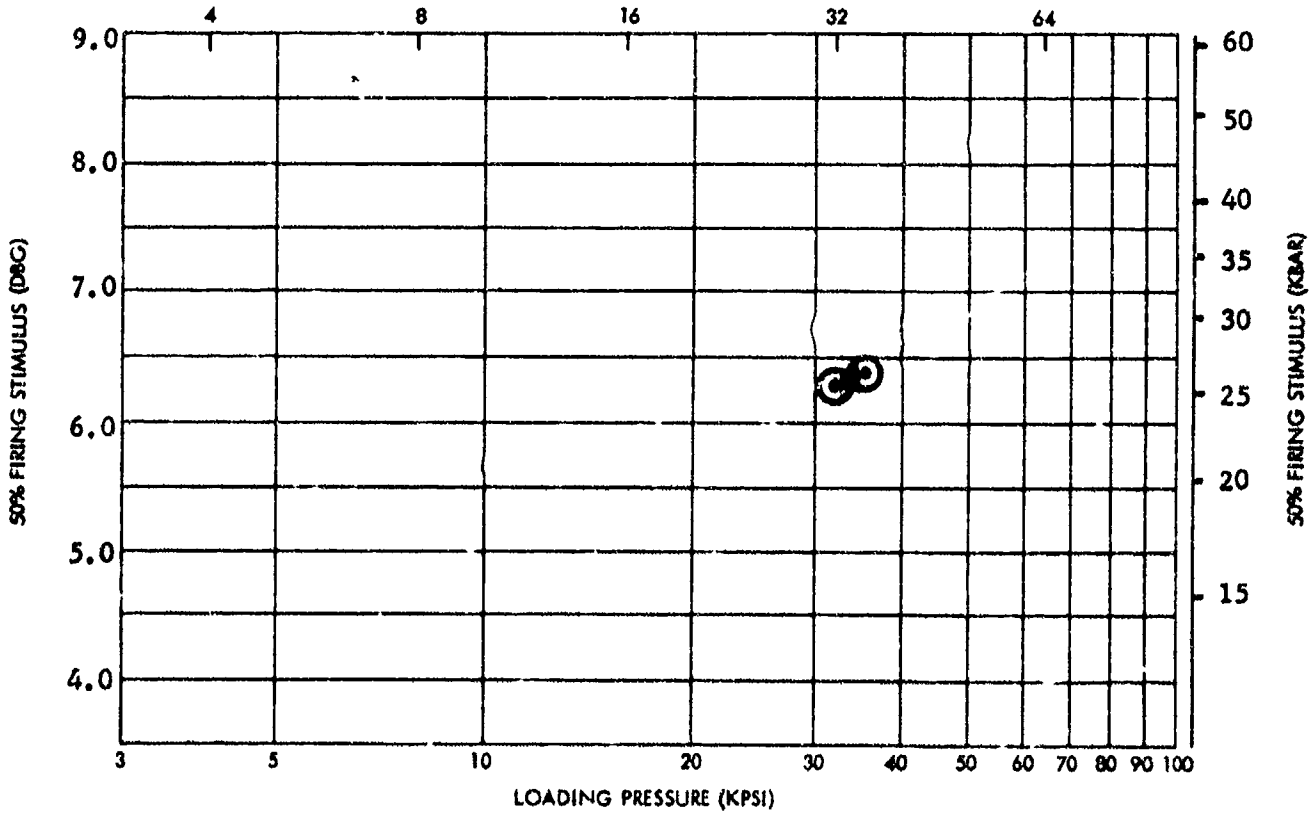
s = log units

n =

Remarks

EXPLOSIVE	DIPAM	X NO.	546	Date of Test
TMD	1.79	I. D. NO.	-	10/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.627	0.0062	90.9	6.312	0.0290	0.0216	20	
35	1.642	0.0057	91.7	6.372	0.0050	0.0040	20	



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 546 ID: Z NO.: 665 SSGT LOAD ORDER NO.: 1088

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: 10/7/65 LOT NO.: 8999-1

INITIAL QUANTITY: 2 pounds BATCH NO.:

MANUFACTURED BY:
Chemtronics (formerly AMCEL)
Bee Tree Plant
Swannanoa, N. C.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

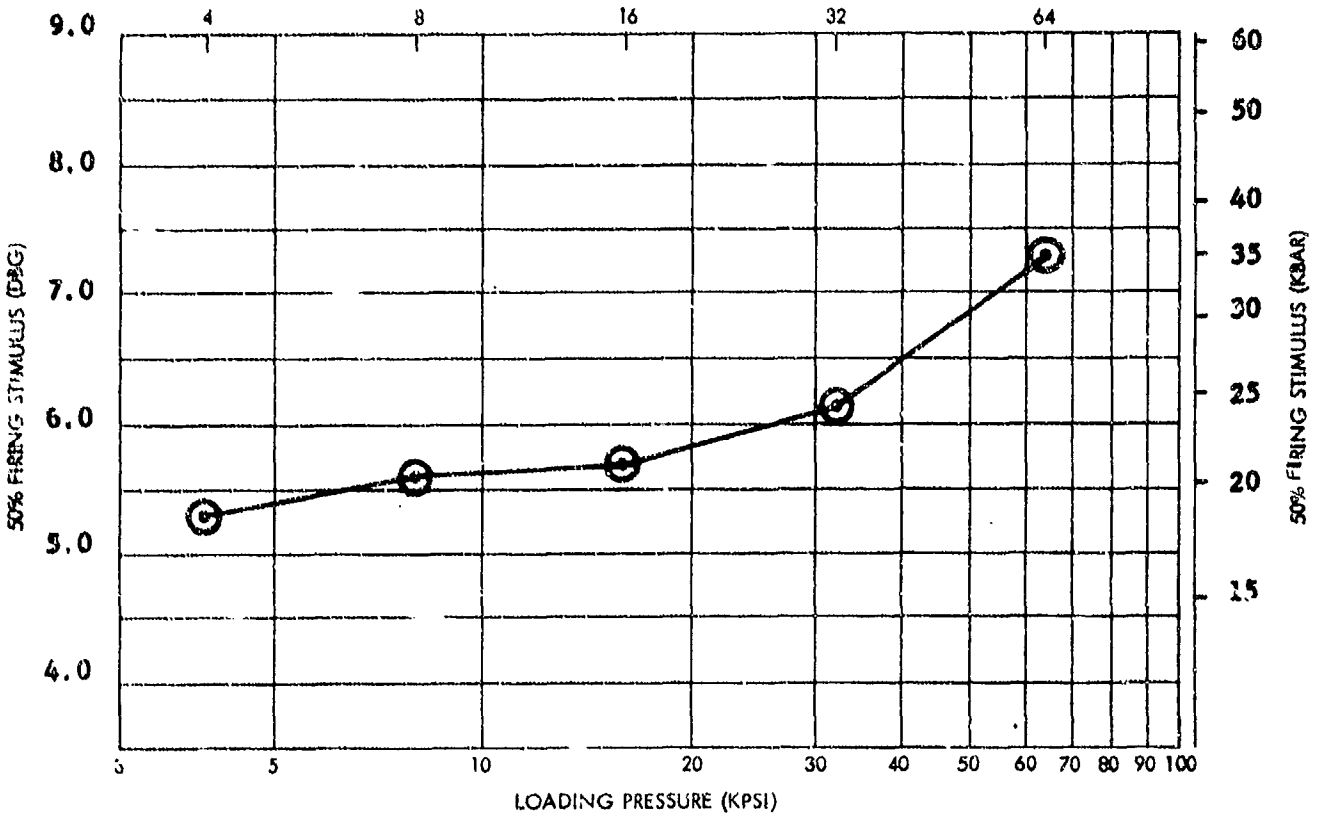
n =

Remarks

4 Sep 1973

EXPLOSIVE	DIPAM	X NO.	549	Date of Test
TMD	1.79	I. D. NO.	-	12/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	s	s_m	N	
4	1.205	0.0362	67.3	5.292	0.3246	0.1757	18	
8	1.348	0.0174	75.3	5.547	0.0477	0.0317	18	
16	1.475	0.0130	82.4	5.678	0.0414	0.0280	18	
32	1.638	0.0098	91.5	6.141	0.0265	0.0206	18	
64	1.774	0.0040	99.1	7.295	0.0437	0.0298	18	



SMALL SCALE GAP TEST (SSGT) DATA
DIPAM

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DIPAM

X NO.: 549 ID: Z NO.: 671 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 3,3' - Diamino-2,2',4,4',6,6' - hexanitrobiphenyl

DATE RECEIVED: 10/28/65 LOT NO.: 8999-18 8999-21

INITIAL QUANTITY: 8 pounds BATCH NO.:

MANUFACTURED BY:

Chemtronics
(formerly Northrup Carolina,Inc.)
Bee Tree Plant
Swannanoa, N. C.

IMPACT SENSITIVITY (ẍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẍ = cm

s = log units

n =

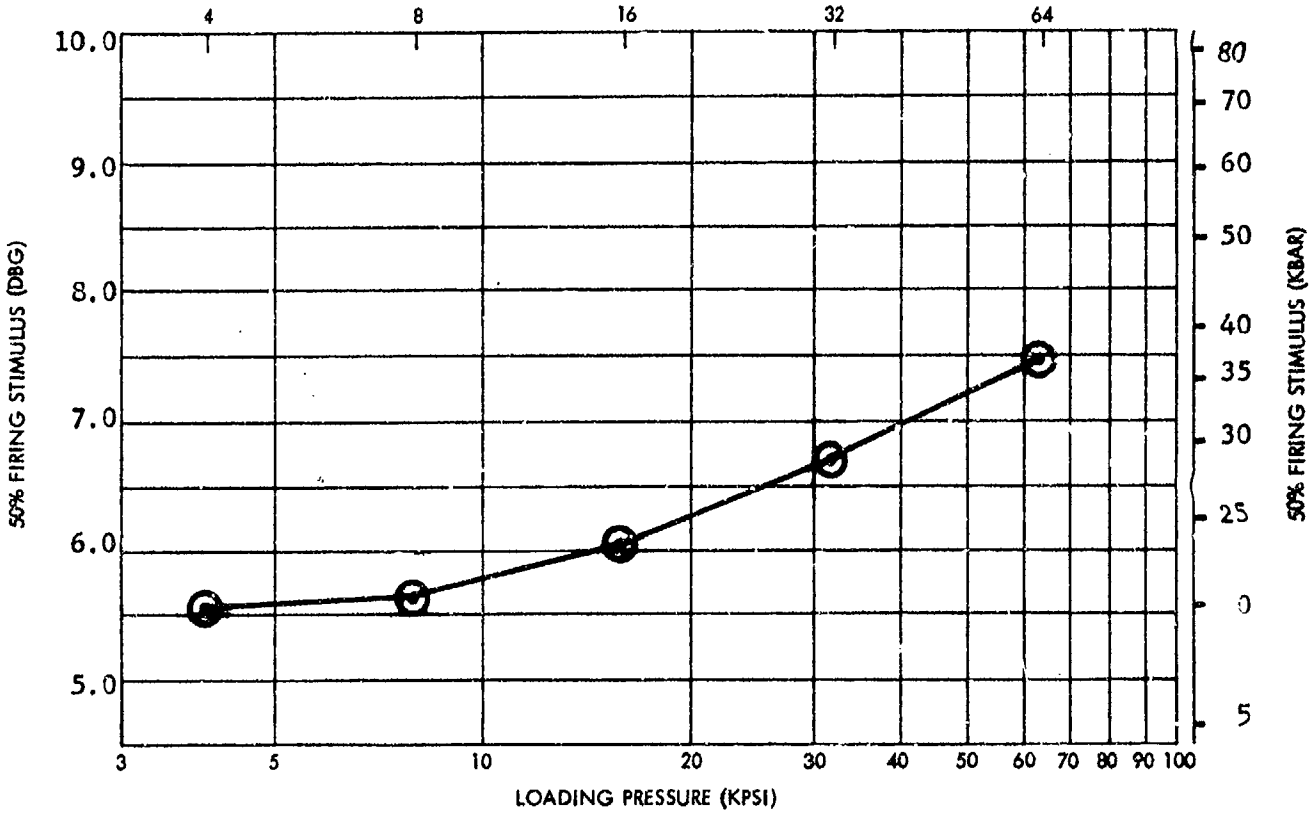
Remarks

EXPLOSIVE	TACOT-Z	X NO.	330
TMD	1.85	I. D. NO.	-

Date of Test 2/61

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.162	0.0139	62.8	5.562	0.0773	0.0434	20	
8	1.281	0.0100	69.2	5.656	0.0911	0.0490	20	
16	1.434	0.0074	77.5	6.050	-	-	20	(1)
32	1.593	0.0046	86.1	6.705	0.0788	0.0444	20	
64	1.698	0.0100	91.8	7.487	0.1520	0.0932	20	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
TACOT-Z

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TACOT-Z

X NO.: 330 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:**

SOURCE:

CHEMICAL NAME: Tetranitrodibenzo -1,3a,4,6a -tetraazapentalene

DATE RECEIVED: 1/26/61 **LOT NO.:**

INITIAL QUANTITY: 5 pounds **BATCH NO.:**

MANUFACTURED BY:

E. I. DuPont De Nemours & Co.
Wilmington, Del.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

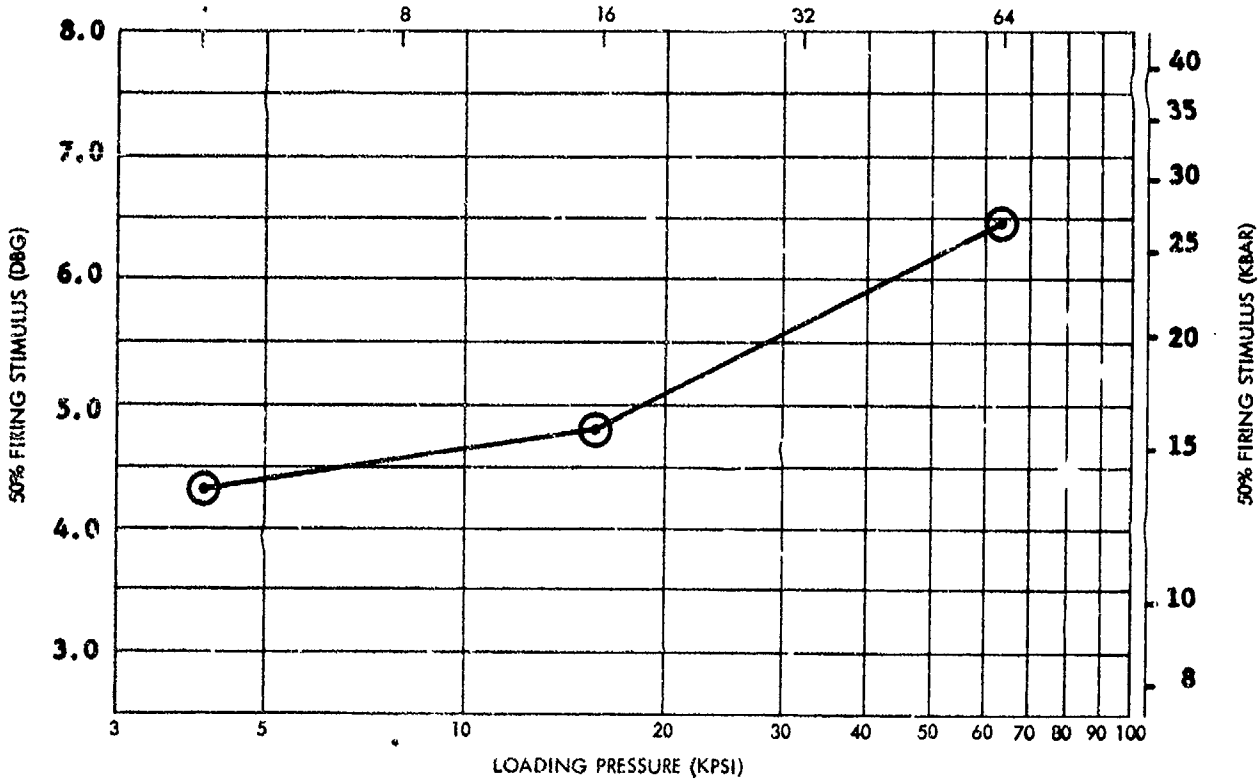
n =

Remarks

EXPLOSIVE	HNS-R (1)	X NO.	401	Date of Test
TMD	1.74	I. D. NO.	--	9/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	$\bar{0}$	s_m	N	
4	1.339	0.0052	77.0	4.332	0.0070	0.0076	23	
16	1.524	0.0049	87.6	4.833	0.0203	0.0235	23	
64	1.707	0.0043	98.1	6.458	0.0351	0.0234	23	

(1) An HNS recrystallized slowly from HNS-I; see NOLTR 66-94



SMALL SCALE GAP TEST (SSGT) DATA
HNS-R

D6a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-R (1)

X NO.: 401 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 8/1/62 LOT NO.:

INITIAL QUANTITY: 3 pounds BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

Remarks

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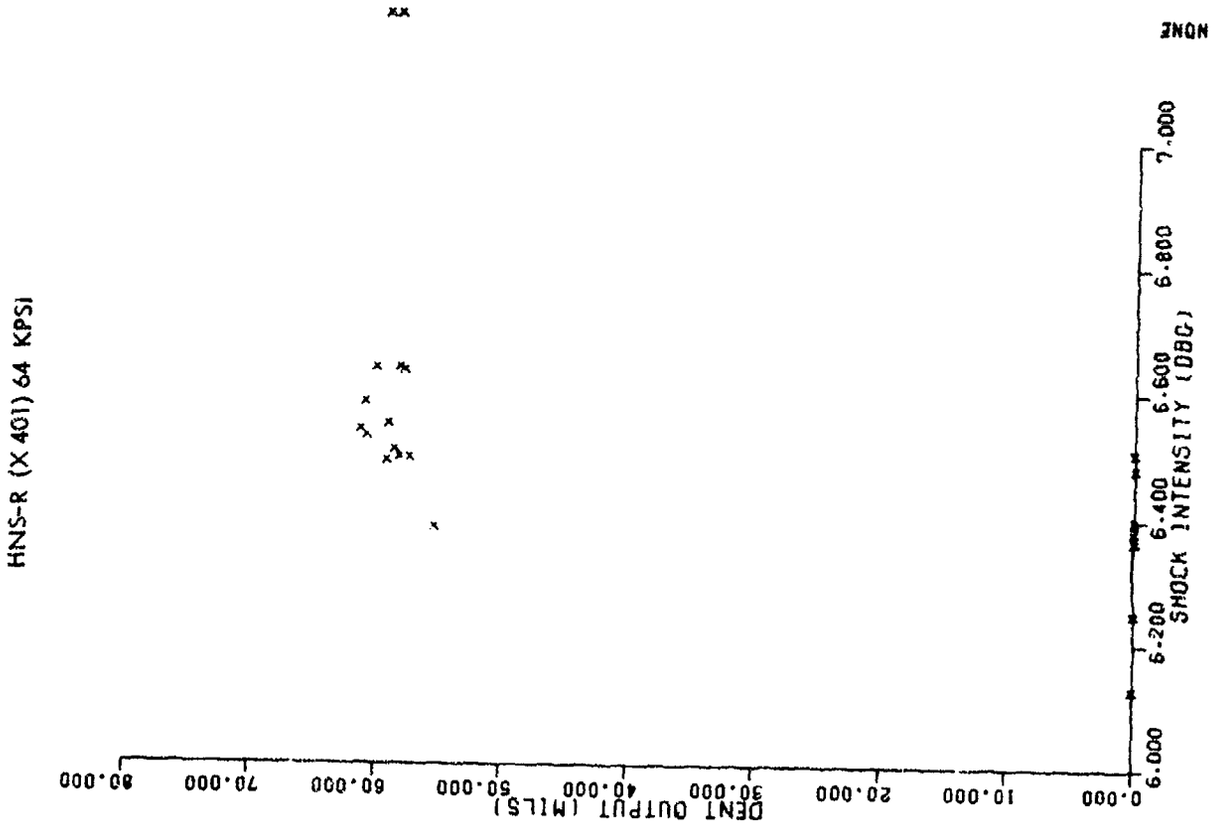
HNS-R (X 401) 4 KPSI
SHOCK INTENSITY (DBC)
DENT OUTPUT (MILS)
NONE
4.500
4.700
4.900
5.100
5.300
5.500
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

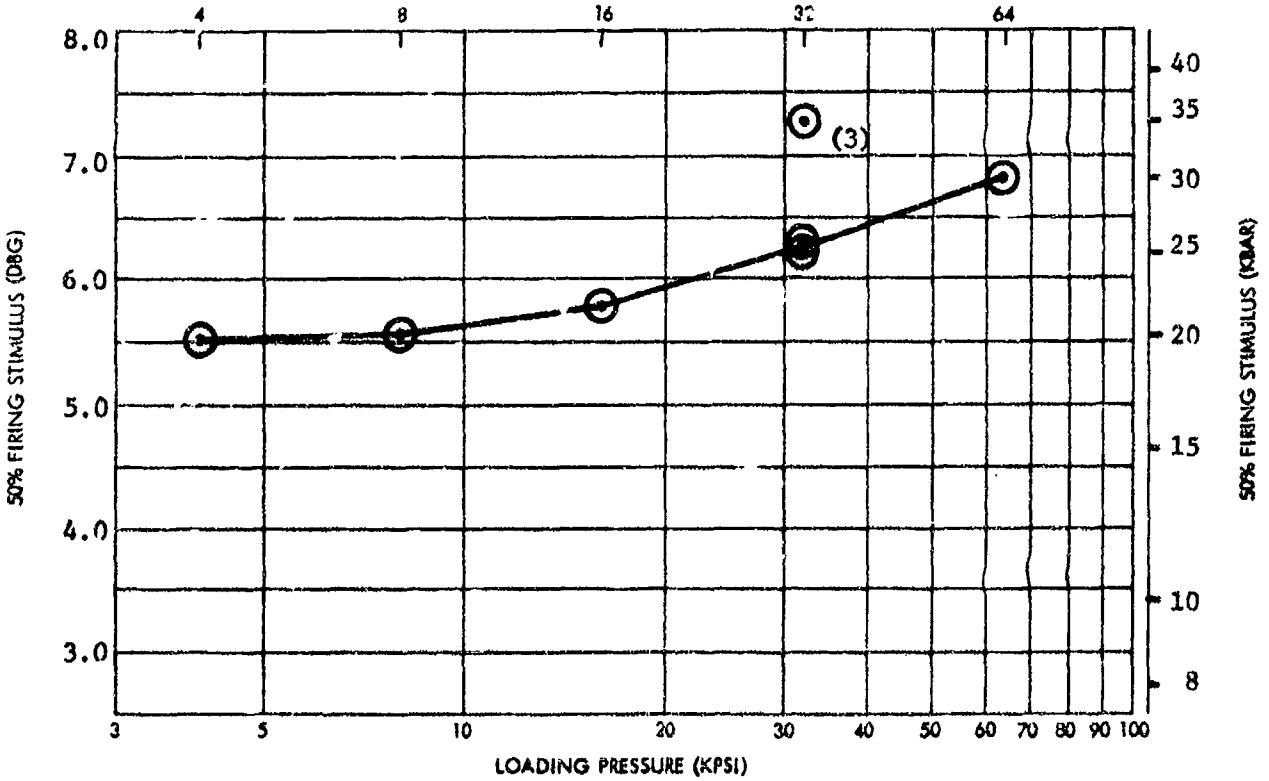
HNS-R (X 401) 16 KPSI
SHOCK INTENSITY (DBC)
DENT OUTPUT (MILS)
NONE
4.000
4.200
4.400
4.600
4.800
5.000
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


HNS-R (X 401) 64 KPSI
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (DBC)
6.000
6.200
6.400
6.600
6.800
7.000
NONE

EXPLOSIVE	HNS-I	X NO.	498	Date of Test
TMD	1.74	I. D. NO.	--	9/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.116	0.0136	64.1	5.507	0.0536	0.0322	20	
8	1.226	0.0122	70.5	5.561	--	--	20	(1)
16	1.377	0.0067	79.1	5.779	0.0161	0.0198	20	
32	1.537	0.0083	88.3	6.263	0.0240	0.0191	20	
32	1.542	0.0088	88.6	6.322	--	--	20	(1) (2)
32	1.541	0.0049	88.6	7.368	0.0167	0.0208	20	(3)
64	1.669	0.0034	95.9	6.820	0.0266	0.0224	20	

(1) No mixed response zone
(2) Date of test - 10/65
(3) Tested at -65°F



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I

D7a1 4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I

X NO.: 498 ID: Z NO.: SSGT LOAD ORDER NO.: 962, 1089

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 8/5/64 LOT NO.: 333-544 333-545 333-546 333-547

INITIAL QUANTITY: 21 pounds BATCH NO.:

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 47 cm

s = 0.14 log units

n = 25

Remarks

Dried 24 hours @ 150°C, Air oven
Particle size 99.7% through 325 mesh

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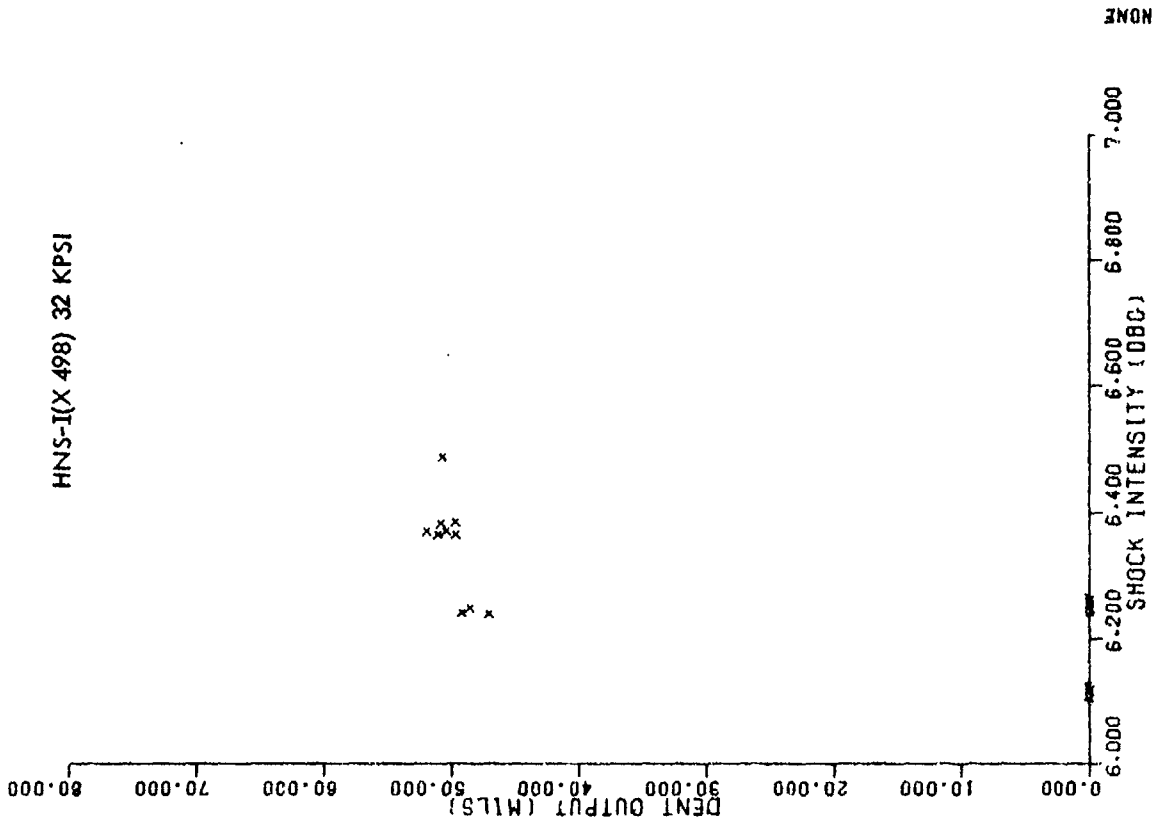
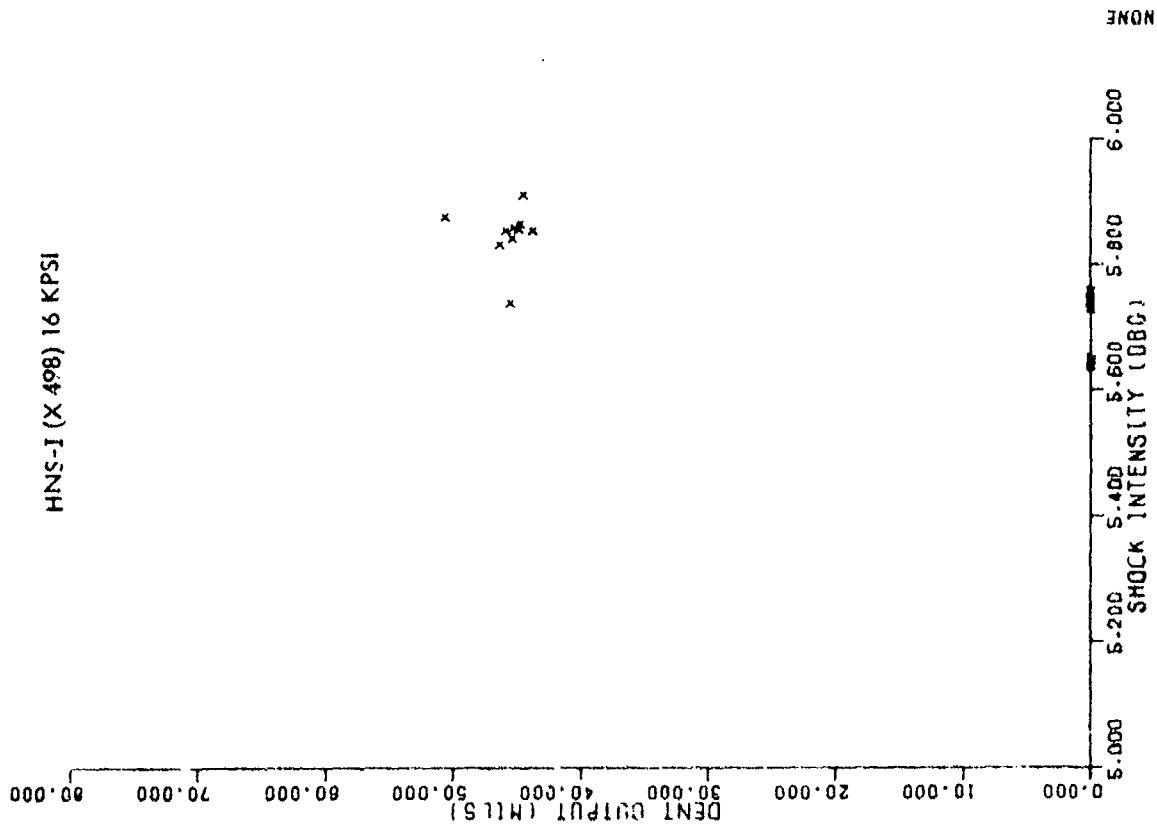
NONE
HNS-I (X 498) 8 KPSI
SHOCK INTENSITY (DBC)
5.000
5.200
5.400
5.600
5.800
6.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

NONE
HNS-I (X 498) 4 KPSI
SHOCK INTENSITY (DBC)
5.000
5.200
5.400
5.600
5.800
6.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


HNS-I(X 498) 32 KPSI
NONE
SHOCK INTENSITY (DBC)
6.000
6.200
6.400
6.600
6.800
7.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

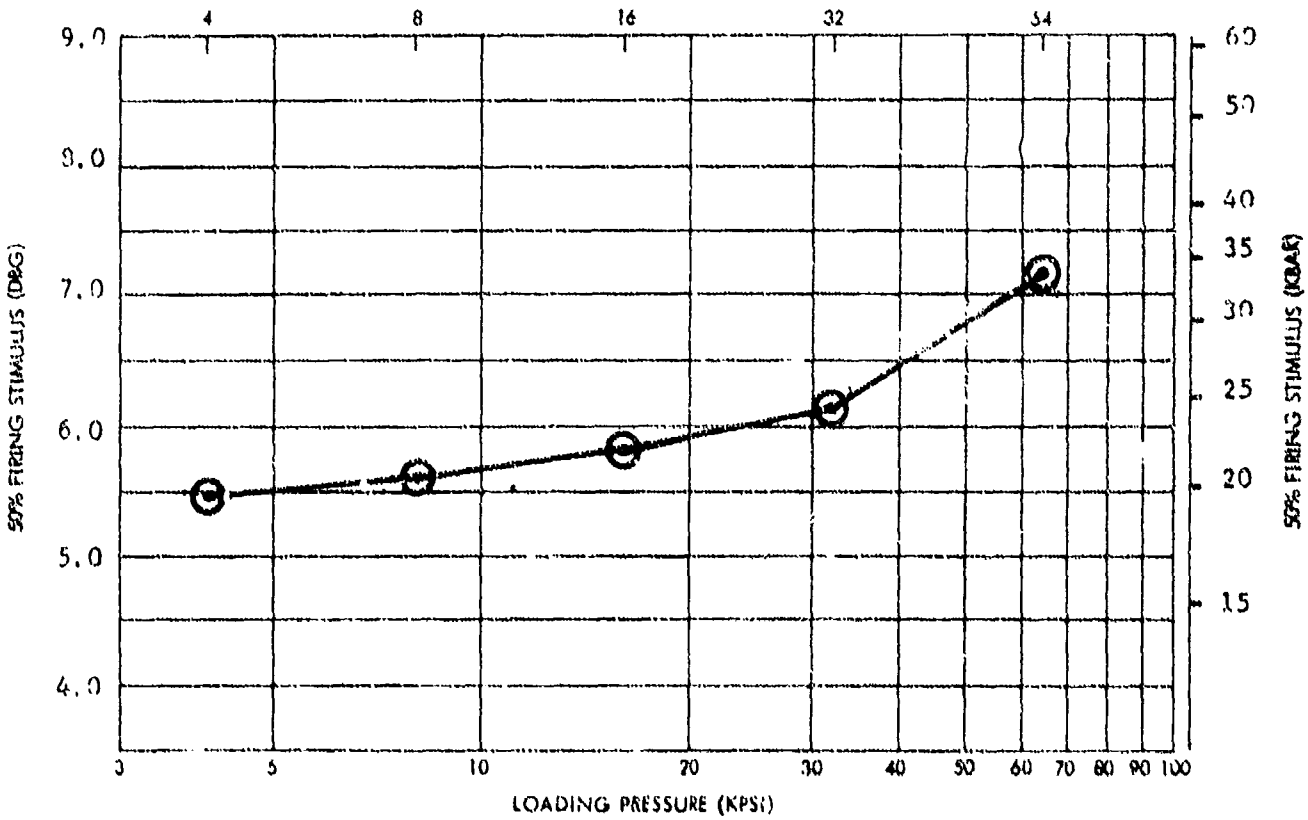

HNS-I (X 498) 16 KPSI
NONE
SHOCK INTENSITY (DBC)
5.000
5.200
5.400
5.600
5.800
6.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

NONE
7.500
7.200
6.900
6.600
6.300
SHOCK INTENSITY (GBG)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
PERCENT OUTPUT (MILS)

EXPLOSIVE	HNS-I	X NO.	534	Date of Test 6/65
TMD	1.74	I. D. NO.	"	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.156	0.0071	66.4	5.441	-	-	20	(1)
8	1.267	0.0128	72.8	5.620	0.0069	0.0184	20	
16	1.404	0.0100	80.7	5.850	0.0530	0.0315	20	
32	1.529	0.0065	87.9	6.123	**0.0076**	**0.0137**	20	
64	1.682	0.0026	96.7	7.173	0.0389	0.0256	20	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I

X NO.: 534 ID: Z NO.: 655 SSGT LOAD ORDER NO.: 1067

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 6/24/65 LOT NO.: 333-72

INITIAL QUANTITY: 1 pound BATCH NO.:

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 7/7/65

$\bar{x}$ = 55 cm

s = 0.11log units

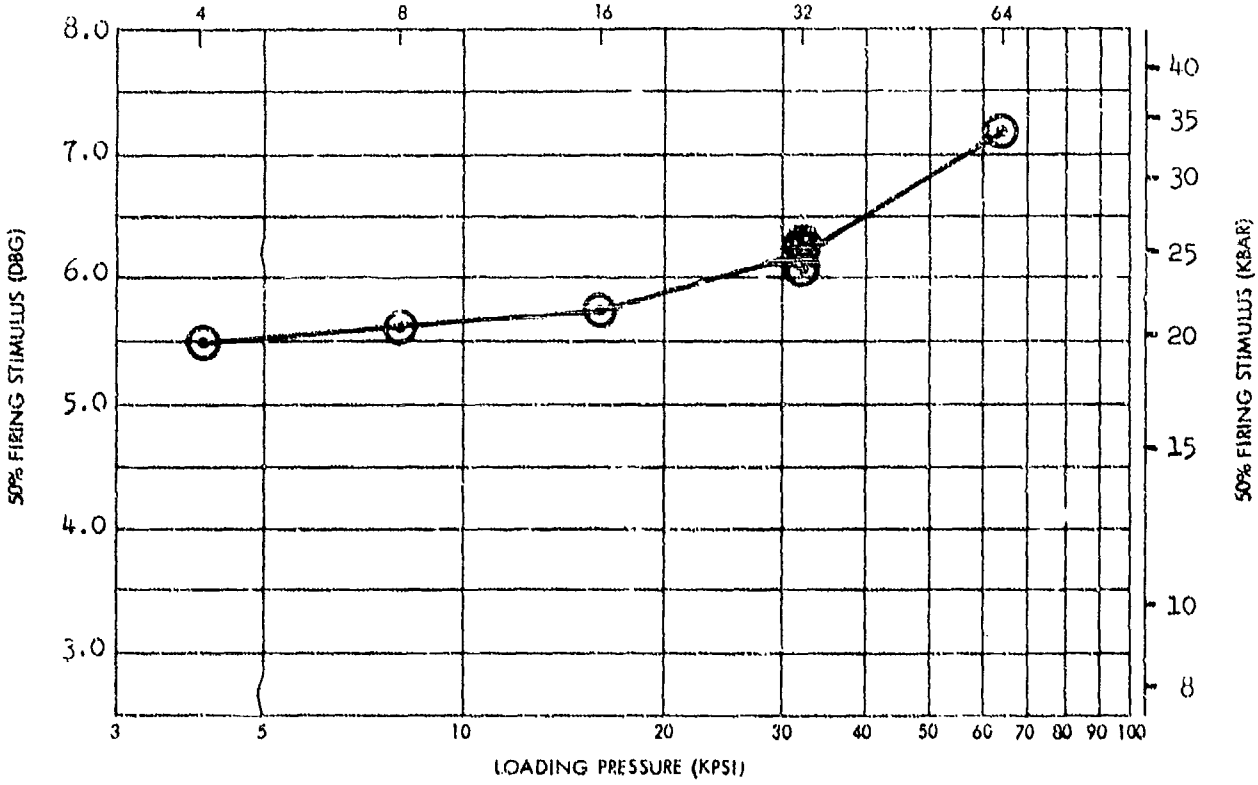
n =

Remarks

EXPLOSIVE	HNS-I	X NO.	537	Date of Test
TMD	1.74	I. D. NO.	-	10/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.144	0.0109	65.7	5.483	0.0231	**0.0198**	20	
8	1.259	0.0102	72.4	5.615	0.0140	0.0267	20	
16	1.409	0.0059	81.0	5.735	0.0257	0.0174	20	
32	1.555	0.0056	89.4	6.234	**0.0226**	**0.0171**	20	
32	1.539	0.0045	88.4	6.058	0.0360	0.0269	18	(1)
32	1.546	0.0069	88.9	6.263	0.1345	0.0692	21	(1)
64	1.681	0.0033	96.6	7.173	0.0408	0.0267	20	

(1) Date of Test - 5/66



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I

D7c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I

X NO.: 537 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 1090, 1091, 1123

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 6/1/65 **LOT NO.:** 333-72

INITIAL QUANTITY: 25 pounds **BATCH NO.:**

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (Z or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

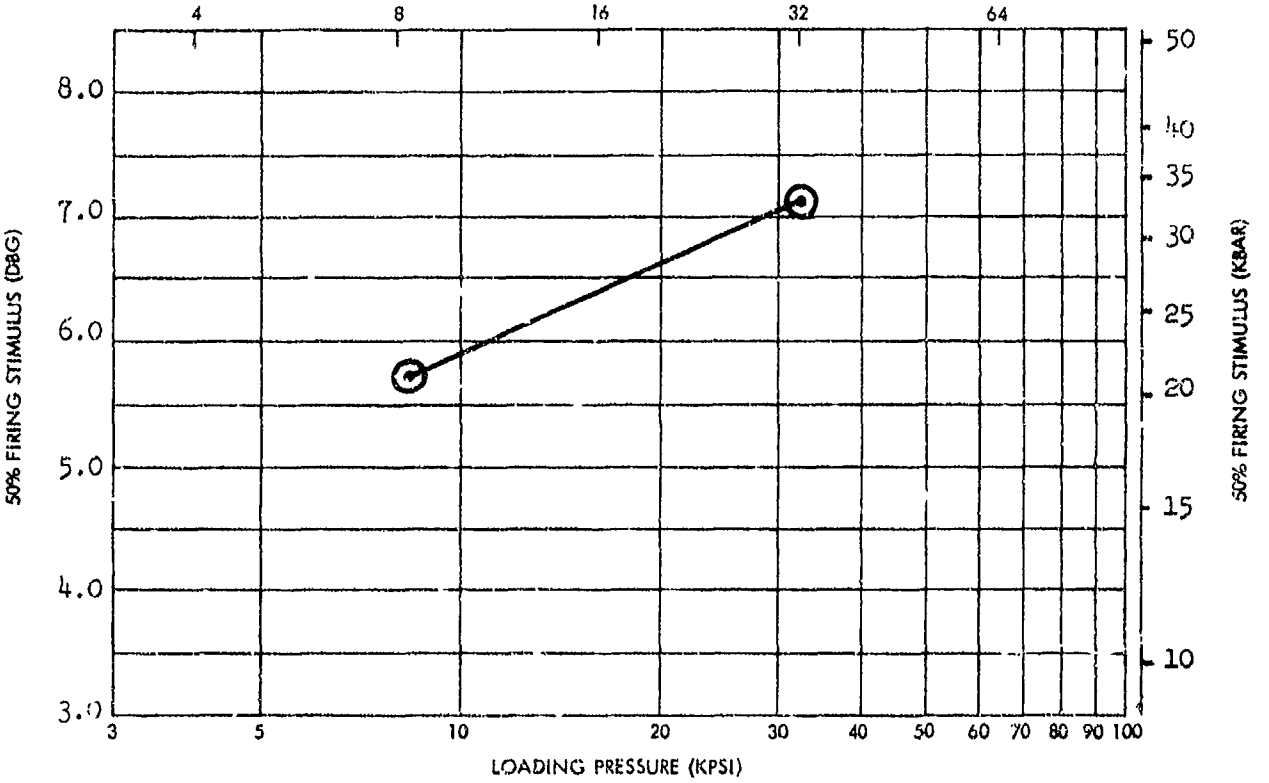
n =

Remarks
Same as X 534

EXPLOSIVE	HNS-I	X NO.	537	Date of Test 1/65
YMD	1.74	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.236	0.0136	71.0	5.724	0.1075	0.0622	19	(1)
32	1.535	0.0041	88.2	7.126	0.2234	0.1385	17	(1)

(1) Tested at - 315°F



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I

D7d1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I

X NO.: 537 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 1110

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 6/1/65 **LOT NO.:** 333-72

INITIAL QUANTITY: 25 pounds **BATCH NO.:**

MANUFACTURED BY:
American Cyanamide
New Castle, Penn.

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẋ = cm

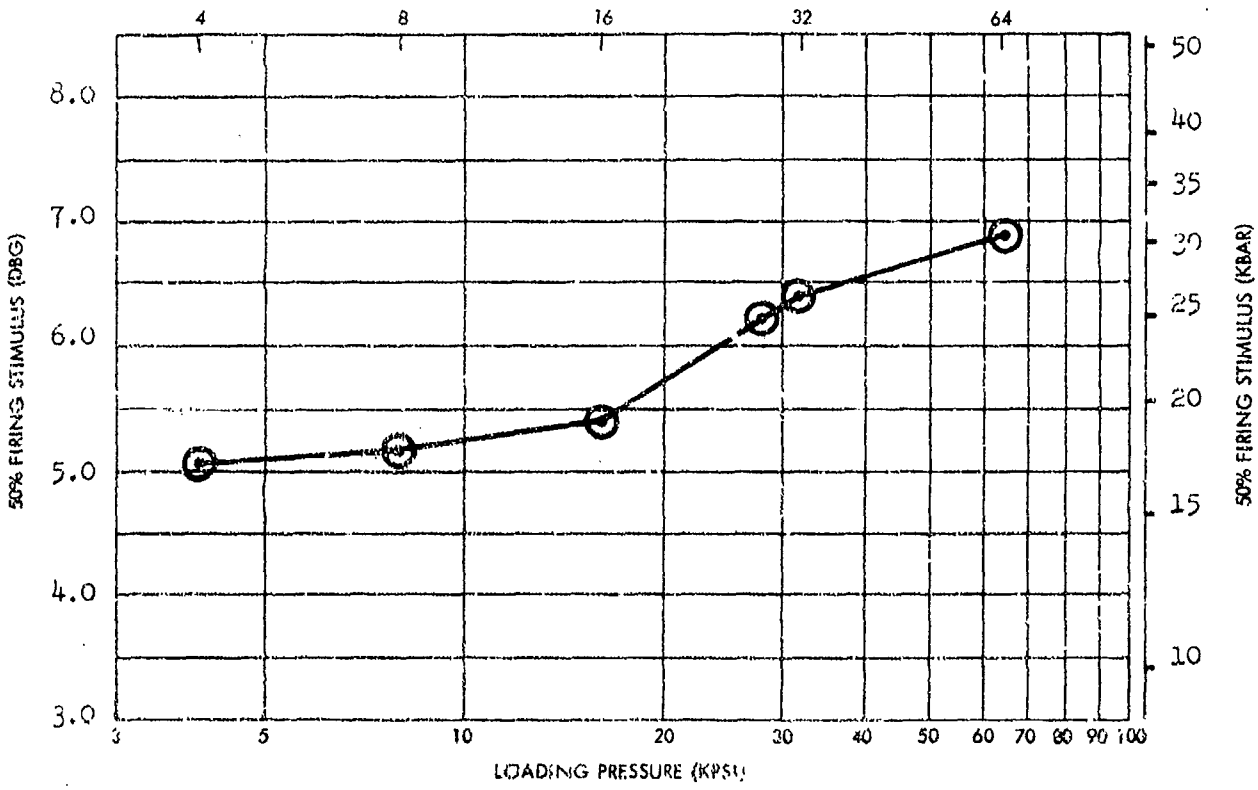
s = log units

n =

Remarks
Same as X 53[illegible]

EXPLOSIVE	HNS-I (B)	X NO.	539	Date of Test
TMD	1.74	I. D. NO.	-	8/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.192	0.0134	68.5	5.058	0.0324	0.0260	20	
8	1.298	0.0103	74.6	5.177	0.0727	0.0423	20	
16	1.439	0.0067	82.7	5.382	0.0271	0.0133	20	
28	1.527	0.0043	87.8	6.202	0.0496	0.0312	20	
32	1.590	0.0084	91.4	6.399	0.0332	0.0239	20	
64	1.691	0.0026	97.1	6.900	0.0536	0.0338	20	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I (B)

D7e1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I (B)*

X NO.: 539 ID: Z NO.: 664 SSGT LOAD ORDER NO.: 1075
1076
1085

SOURCE: B310

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 8/3/65 LOT NO.: 8995-29

INITIAL QUANTITY: 1 pound BATCH NO.:

MANUFACTURED BY:

Chemtronics (formerly AMCEL)
Bee Tree Plant
Swannanoa, N. C.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

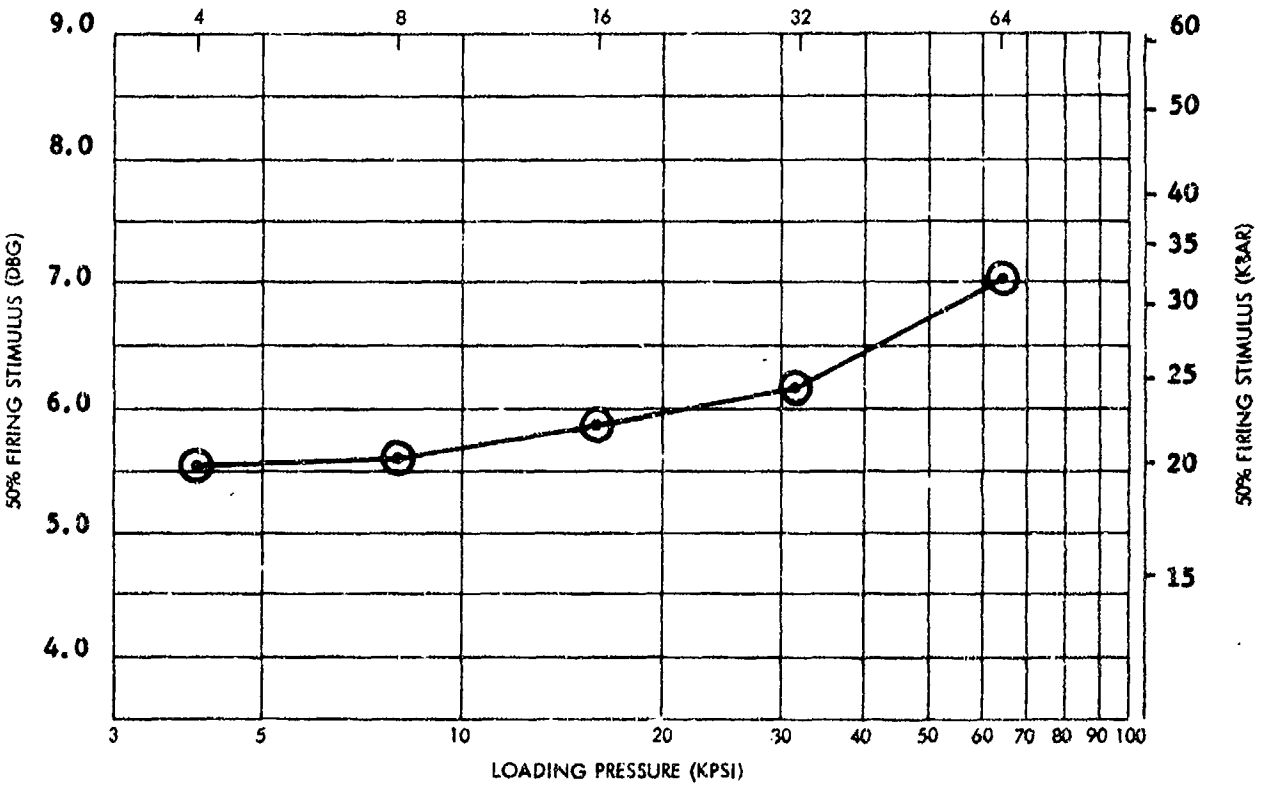
n =

Remarks
*The "B" signifies that this particular lot of explosive has been subjected to the SSGT Sensitivity Test of WS 5003 and has passed.

EXPLOSIVE	HNS-I (B)	X NO.	565	Date of Test
TMD	1.74	I. D. NO.	-	5/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.122	0.0204	64.5	5.556	-	-	18	(1)
8	1.237	0.0176	71.1	5.627	-	-	18	(1)
16	1.378	0.0184	79.2	5.856	0.0179	0.0416	18	
32	1.519	0.0101	87.3	6.235	0.0292	0.0192	18	
64	1.662	0.0029	95.5	7.003	0.0194	0.0167	18	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I (B)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I (B)*

X NO.: 565 ID: Z NO.: SSGT LOAD ORDER NO.: 1125

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 4/27/66 LOT NO.:

INITIAL QUANTITY: 25 pounds BATCH NO.:

MANUFACTURED BY:

Chemtronics
(formerly Northrup Carolina,Inc.)
Bee Tree Plant
Swannanoa, N. C.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

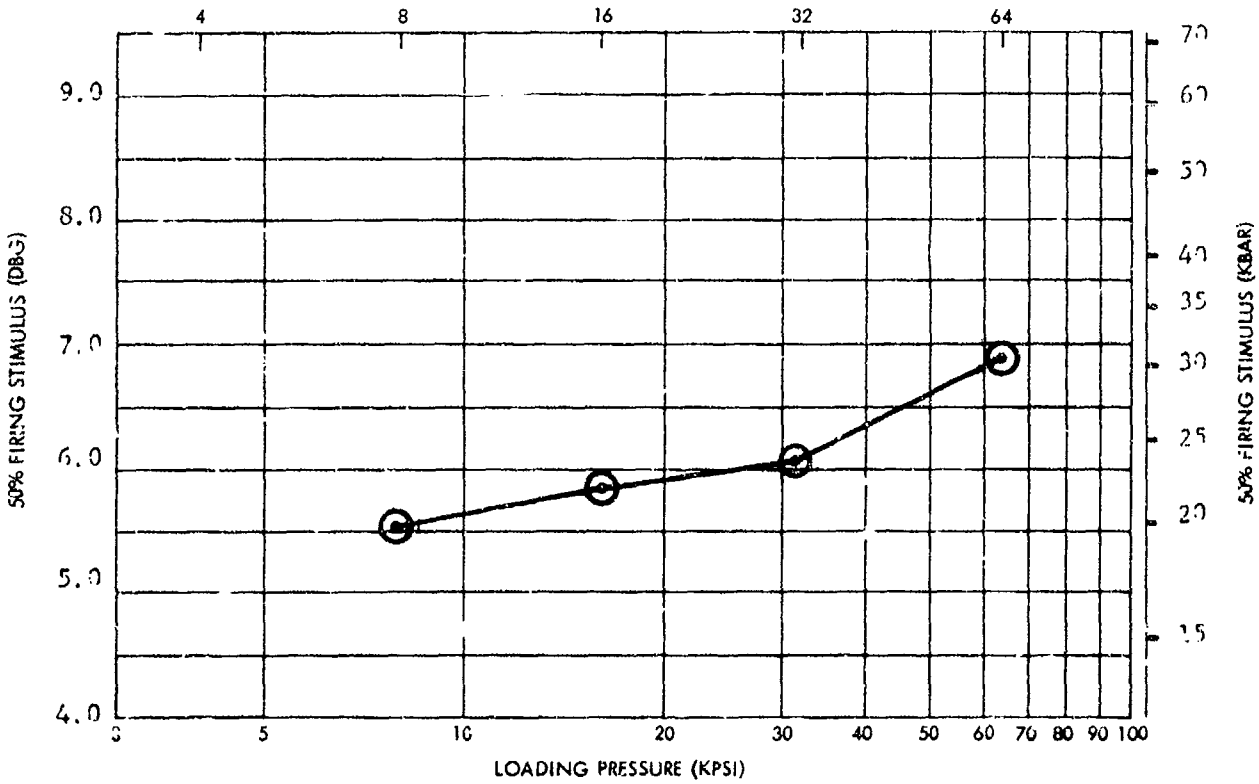
Remarks

*The "B" signifies that this particular lot of explosive has been subjected to the SSGT Sensitivity Test of WS 5003 and has passed.

EXPLOSIVE	HNS-I(B)	X NO.	705	Date of Test
TMD	1.74	I. D. NO.	1071	7/69

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.351	0.0067	77.6	5.541	0.0654	0.0411	20	
16	1.458	0.0044	83.8	5.856	0.0920	0.0511	20	
32	1.586	0.0042	91.1	6.057	-	-	7	(1)
64	1.694	0.0060	97.4	6.903	0.0259	0.0225	18	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-1 (B)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I (B)*

X NO.: 705 ID: 1071 Z NO.: SSGT LOAD ORDER NO.: 1272

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 7/16/69 LOT NO.: 4333

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:
Chemtronics
(formerly Northrup Carolina, Inc.)
Bee Tree Plant
Swannanoa, N. C.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

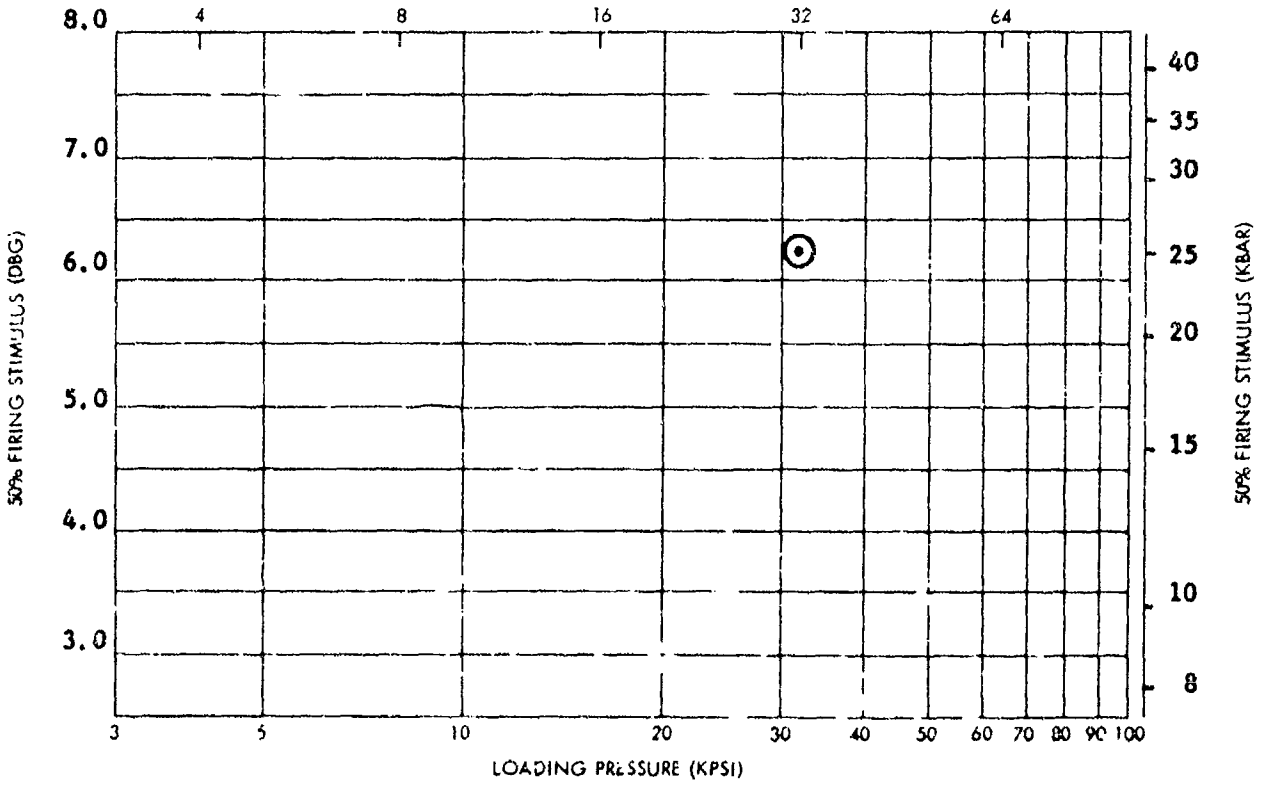
n =

Remarks

*The "B" signifies that this particular lot of explosive has been subjected to the SSGT Sensitivity Test of WS 5003 and passed.

EXPLOSIVE	HNS-I	X NO.	716	Date of Test
TMD	1.74	I. D. NO.	2090	7/69

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.546	0.0039	88.9	6.245	0.0249	0.0190	25	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I

X NO.: 716 ID: 1090 Z NO.: SSGT LOAD ORDER NO.: 1273

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 8/26/69 LOT NO.: DEL-310-25

INITIAL QUANTITY: 150 grams BATCH NO.:

MANUFACTURED BY:

Del Mar Lab
Los Angeles, Calif.

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H = cm

s = log units

n =

Remarks

D 7 h 2

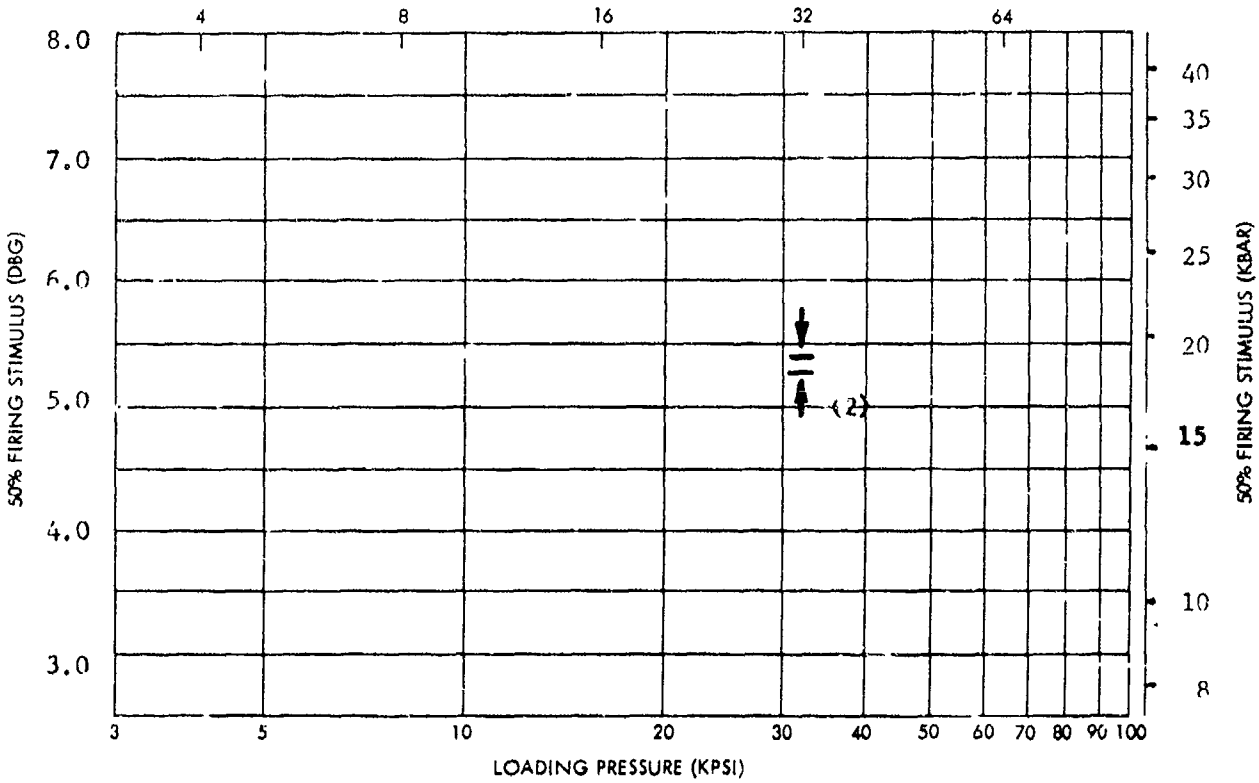
4 Sep 1973

EXPLOSIVE	HNS-II	X NO.	-	Date of Test
TMD	1.74	I. D. NO.	See Remarks	12/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.629	0.0034	93.6	5.386	-	-	10	Z612; (1)
32	1.639	0.0038	94.2	**5.351**	-	-	9	**Z613; (1)**
32	1.639	0.0034	94.2	5.295	0.0206	0.0287	10	Z614
32	1.644	0.0044	94.5	**5.340**	-	-	10	Z615; (1)
32	1.623	0.0025	93.3	5.412	0.0147	0.0314	10	Z616
32	1.635	0.0027	94.0	5.312	-	-	10	Z618; (1)

(1) No mixed response zone.

(2) Range indicated gives minimum and maximum sensitivity value observed from above table.



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II

X NO.: ID: Z NO.: * SSGT LOAD ORDER NO.: 1001-1006

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:
NOL: WO Division

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks
*Z 612-HNS 6980-52**
46.6 grams

Z 613-HNS 6980-51**
36.0 grams

Z 614-HNS 6980-50**
45.9 grams

Z 615-HNS 6980-49**
24.8 grams

Z 616-HNS 6980-47**
29.5 grams

Z 618-Mixture of 4 grams each of Z 616, Z 614, Z 613, Z 612

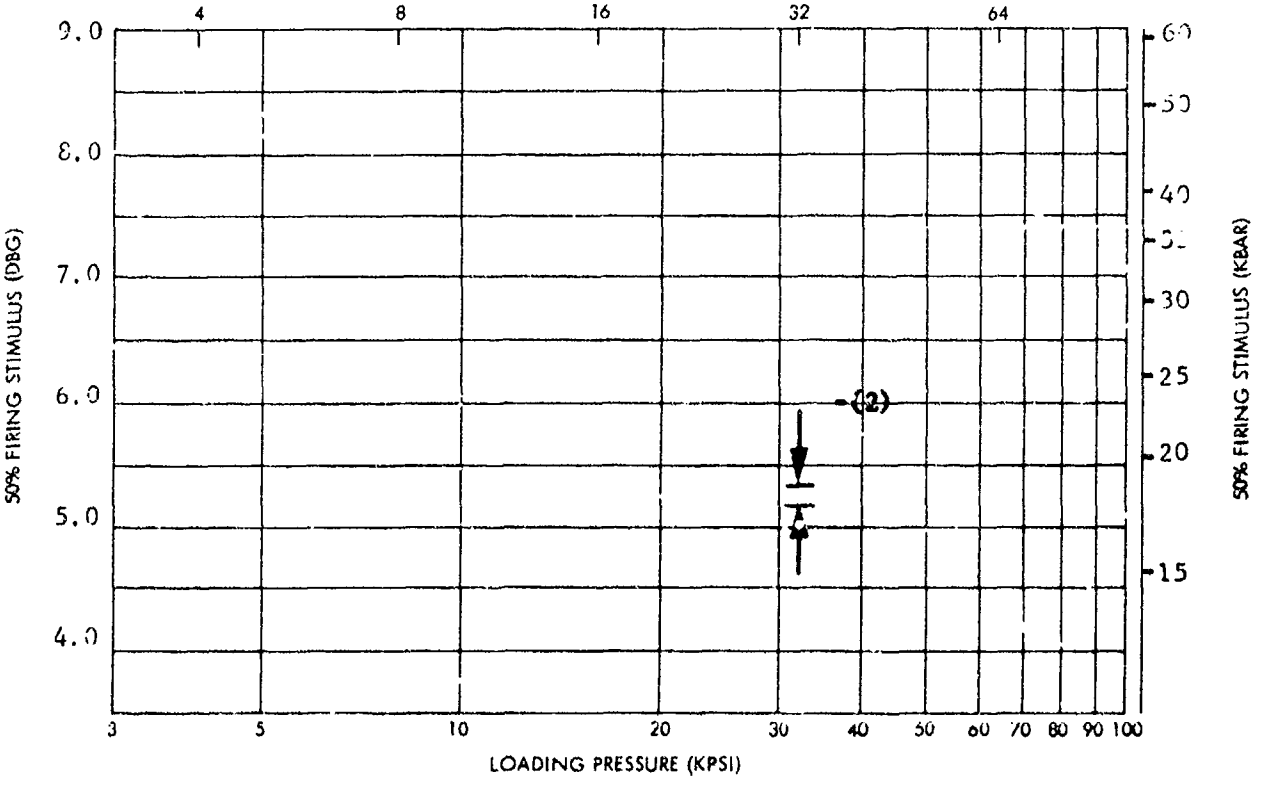
**Identification refers to NOL Project Notebook & Page Number

HNS-II (Z 618)

EXPLOSIVE	HNS-II	X NO.	see remarks	Date of Test
TMD	1.74	I. D. NO.	-	8/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	n	s_m	N	
32	1.624	0.0076	93.3	5.268	0.0634	0.0374	18	Z-No. 710 (3)
32	1.634	0.0060	93.9	5.366	0.0279	0.0209	20	X No. 538
32	1.649	0.0037	94.8	5.269	0.0546	0.0343	18	X No. 567 (3)
32	1.636	0.0042	94.0	5.186	-	-	19	X No. 626; I.D. No. 589, (1)(4)
32	1.630	0.0047	93.7	5.239	0.0251	0.0173	20	I. D. No. 795; #1 (5)
32	1.628	0.0036	93.6	5.230	0.0281	0.0195	23	I. D. No. 795; #2 (5)

(1) No mixed response zone.
(2) Range indicate given minimum and maximum sensitivity value observed from the above table.
(3) Date of test - 10/66
(4) Date of test - 10/67
(5) Date of test - 6/68



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II

X NO.: * ID: * Z NO.: * SSGT LOAD ORDER NO.: 1086
1154
1155

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

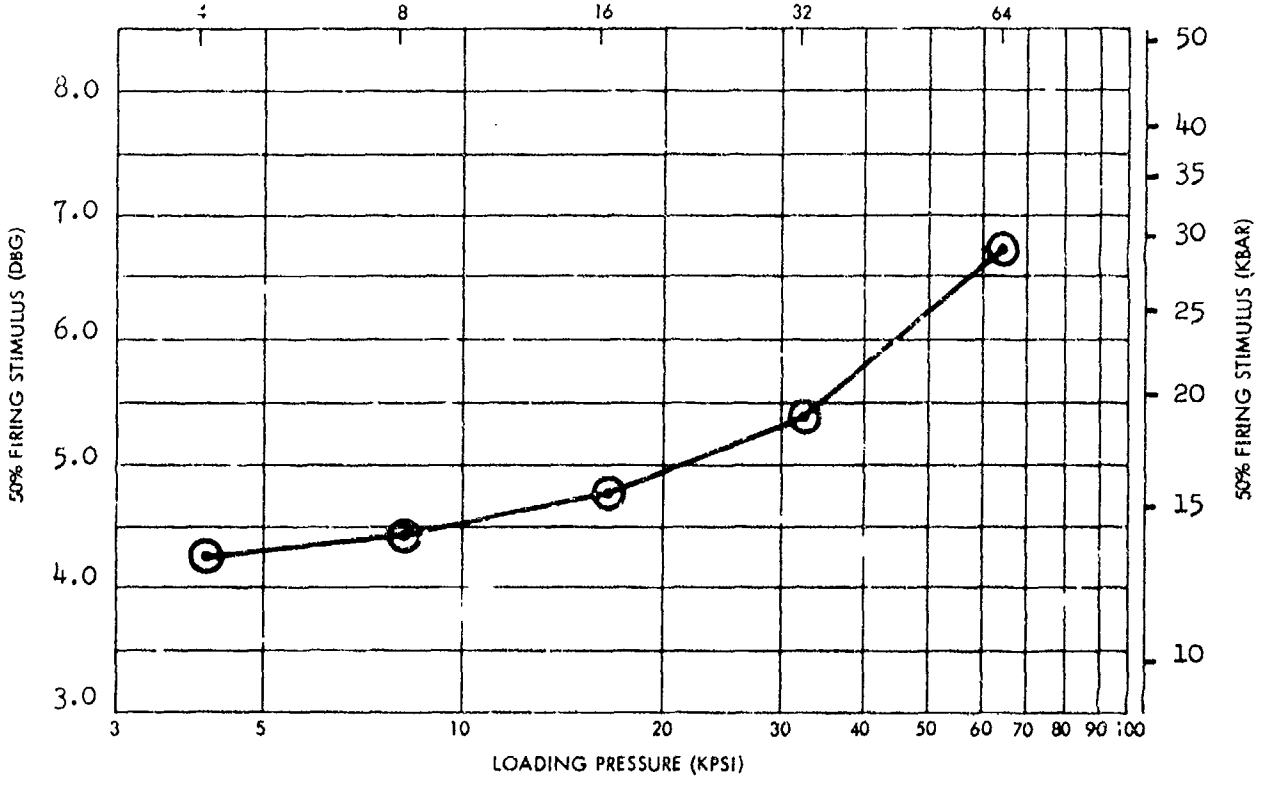
Remarks

*Z-710 (25 grams rec'd 10/12/66)	Explosive Tech. Inc. Fairfield, Calif.	Lot S-24
X-538; Z-661 (90 grams rec'd 7/19/65)	NOL: WO Division (Dr. J. Dacons, F. Taylor)	
X 567 (25 pounds rec'd 4/25/66)	Chemtronics Bee Tree Plant Swannanoa, N. C.	(No. 60921-9060) Lot 11138-8 $\bar{x}$=80 cm, s=0.10 n=25
X 626; ID 589 (5 pounds rec'd 10/17/67)	Chemtronics Bee Tree Plant Swannanoa, N. C.	Lot 11138-18
ID 795 (125 grams rec'd 6/18/68)	Chemtronics Bee Tree Plant Swannanoa, N. C.	Rec'd from Explosive Tech. Inc. (Fairfield, Calif.) Sample for qualification test ETI Lot S-27 Chemtronic Lot 11138-3

EXPLOSIVE	HNS-II	X NO.	528	**Date of Test**
TMD	1.74	I. D. NO.	-	**12/64**

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.322	0.0107	76.0	4.264	0.0084	0.0132	18	
8	1.423	0.0073	81.8	4.444	-	-	18	(1)
16	1.545	0.0044	88.8	4.767	0.0187	0.0243	18	
32	1.644	0.0025	94.5	5.354	0.0168	0.0227	18	
64	1.725	0.0018	99.1	6.684	0.0354	0.0274	18	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II

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NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II

X NO.: 528* ID: Z NO.: 649 SSGT LOAD ORDER NO.: 1007

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 5/24/65 LOT NO.: 96-7481-1

INITIAL QUANTITY: 4 pounds BATCH NO.:

MANUFACTURED BY:
NOL: WO Division

IMPACT SENSITIVITY (50 or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 2/6/65

$\bar{x}$ = 61 cm

s =0.18 log units

n = 50

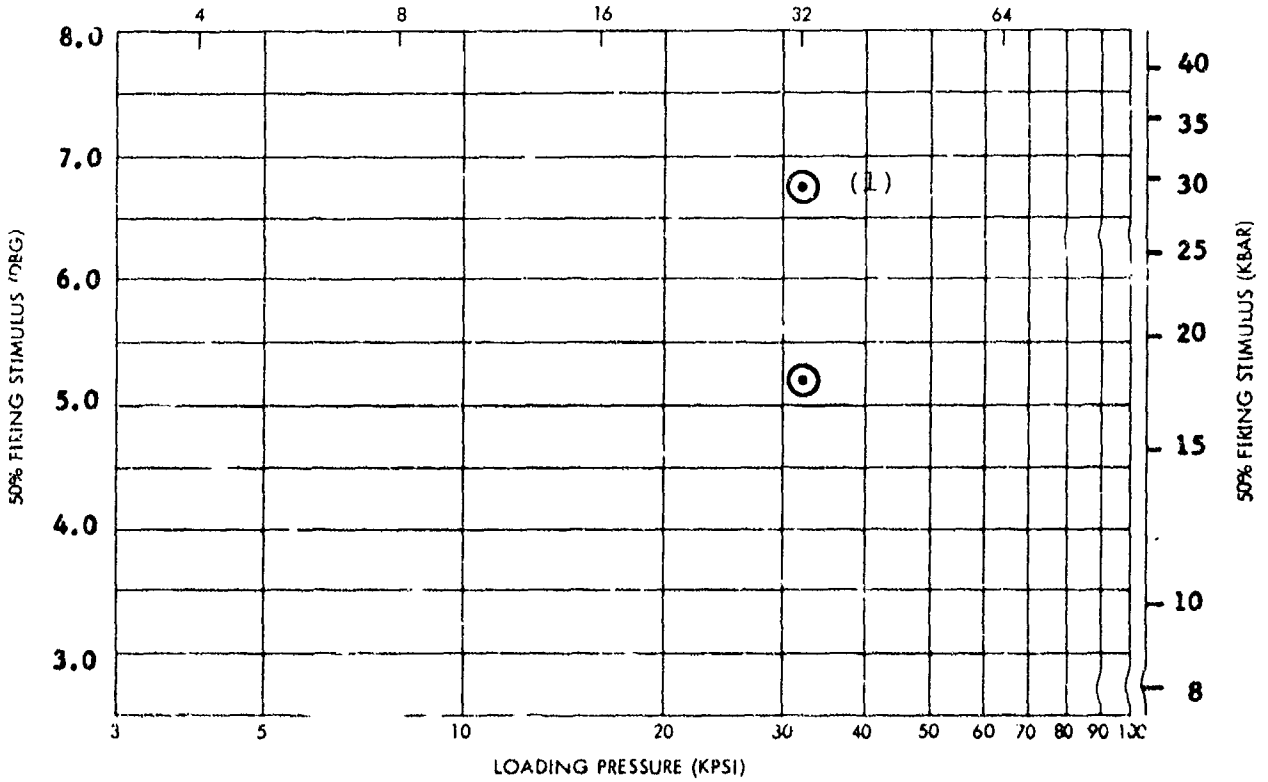
Remarks

*Blend of several bottles

EXPLOSIVE	HNS-II	X NO.	550	Date of Test
TMD	1.74	I. D. NO.	-	2/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.627	0.0041	93.5	5.192	0.0455	0.0258	23	
32	1.627	0.0040	93.5	6.757	0.1761	0.0857	23	(1)

(1) Tested at -315°F



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II

X NO.: 550 ID: Z NO.: 674 SSGT LOAD ORDER NO.: 1099
1113

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: 10/30/65 LOT NO.:

INITIAL QUANTITY: 1/2 pound BATCH NO.:

MANUFACTURED BY:
NOL: WO Division

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

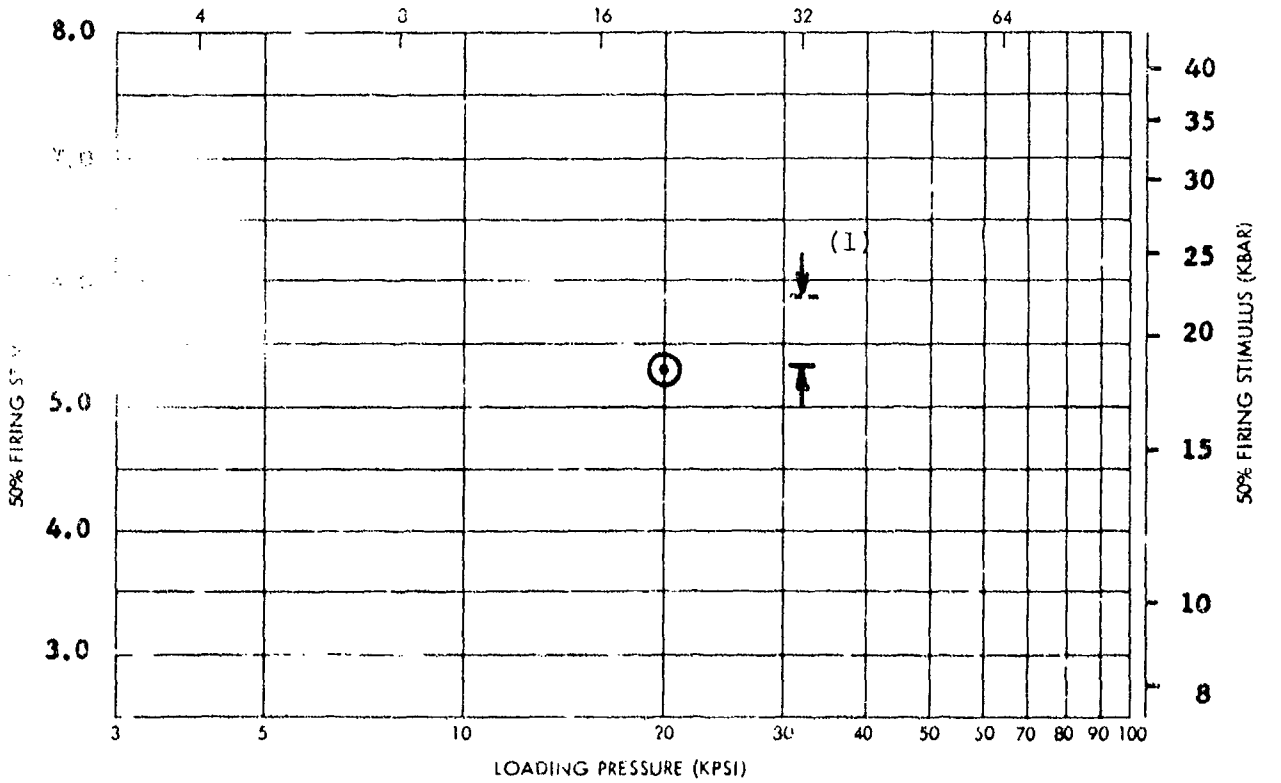
n =

Remarks
HNS-I, recrystallized

EXPLOSIVE	HNS-II	X NO.	See remarks
TMD	1.74	I. D. NO.	See remarks

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	σ	s_m	N	
20	1.632	0.0020	93.8	5.306	0.0102	0.0054	20	Date of Test 1/71 X No. - ; ID 1259
32	1.623	0.0035	93.3	5.412	0.0147	0.0314	10	Date of Test 6/68 X No. - ; ID 795
32	1.671	0.0021	96.0	5.878	0.0015	0.0010	23	Date of Test 1/71 X No. 735; ID 1279
32	1.628	0.0039	93.6	5.322	0.0099	0.0051	20	Date of Test 2/71 X No. 756; ID 1479
32	1.633	0.0021	93.9	5.539	0.0049	0.0029	20	Date of Test 10/71 X No. 766; ID 1542
32	1.646	0.0038	94.6	5.480	0.0350	0.0230	20	Date of Test 11/71 X No. 774; ID 1557

(1) Range indicated gives minimum and maximum sensitivity values observed from above table.



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II

X NO.: * ID: * Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 2,2',4,4',6,6' - Hexanitrostilbene

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

Remarks

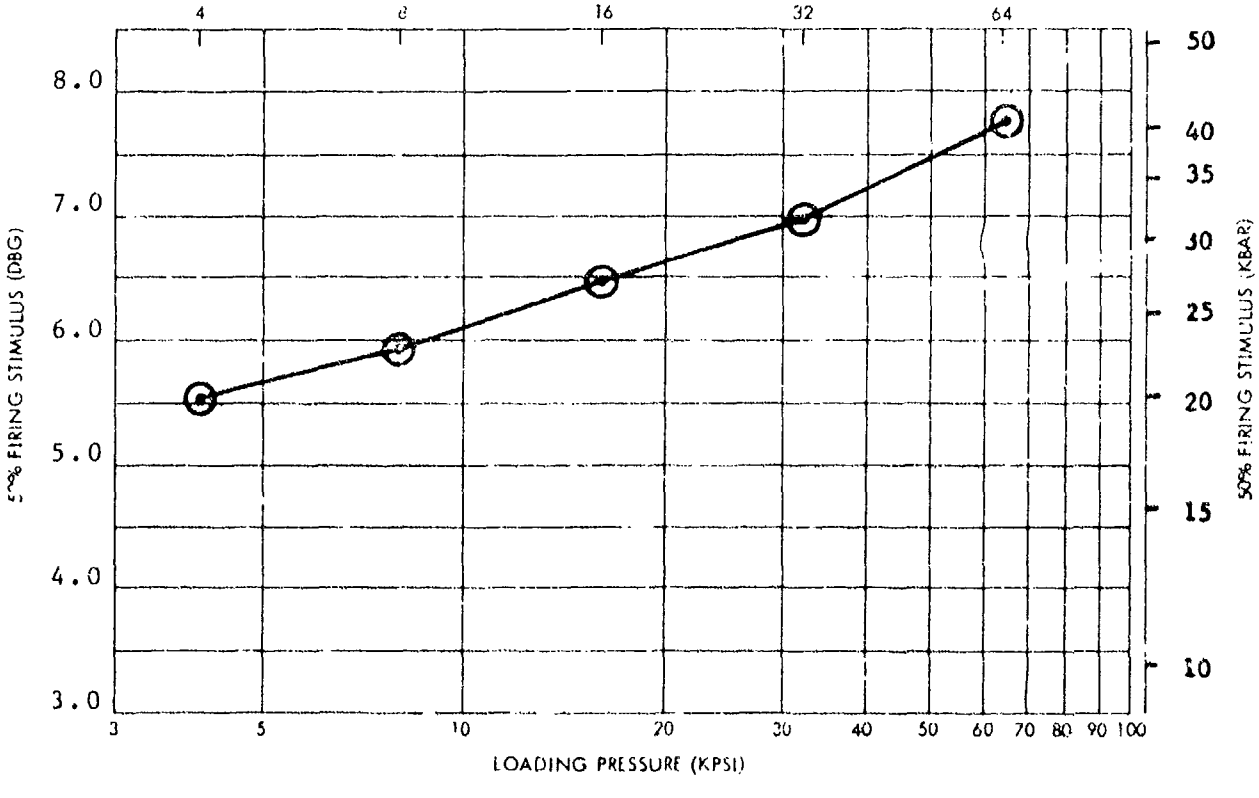
*ID 795

X774; ID 1557 (Composite sample)	Chemtronics Bee Tree Plant Swannanoa, N. C.	(Lot 36-45)
ID 1259 (2 pounds rec'd 5/13/70)	Del Mar Eng. Lab Los Angeles, Calif.	Lot Del-310-135
X735; ID 1279 (14 pounds rec'd 6/10/70)	Ensign-Bickford Co. Simsbury, Conn.	(N60921-70-C-0206) Lot FNB-1
X756; ID 1479 (Composite sample of 100 grams rec'd 3/17/71)	Del Mar Eng. Lab Los Angeles, Calif.	Lot 250-7 (Lot size - 186 pounds)
X766; ID 1542** (Composite sample of 150 grams rec'd 9/9/71)	Chemtronics Bee Tree Plant Swannanoa, N. C.	(Lot 36-44)

**This material failed bulk density test of specification. It was recrystallized giving X774, Lot 36-45.

EXPLOSIVE	PICRAMIDE	X NO.	405	Date of Test
TMD	1.76	I. D. NO.	-	10/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.389	0.0033	78.9	5.549	0.0173	0.0169	20	
8	1.469	0.0037	83.5	5.941	0.0218	0.0183	20	
16	1.562	0.0034	88.8	6.470	0.0173	0.0167	20	
32	1.646	0.0052	93.5	6.985	0.0320	0.0255	20	
64	1.719	0.0028	97.7	7.783	0.0370	0.0324	20	



SMALL SCALE GAP TEST (SSGT) DATA
PICRAMIDE

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PICRAMIDE

X NO.: 405 ID: Z NO.: 432 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 2,4,6 - Trinitroaniline

DATE RECEIVED: 8/23/62 LOT NO.: 694, 734

INITIAL QUANTITY: 300 grams BATCH NO.:

MANUFACTURED BY:
Eastman Organic Chemicals

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

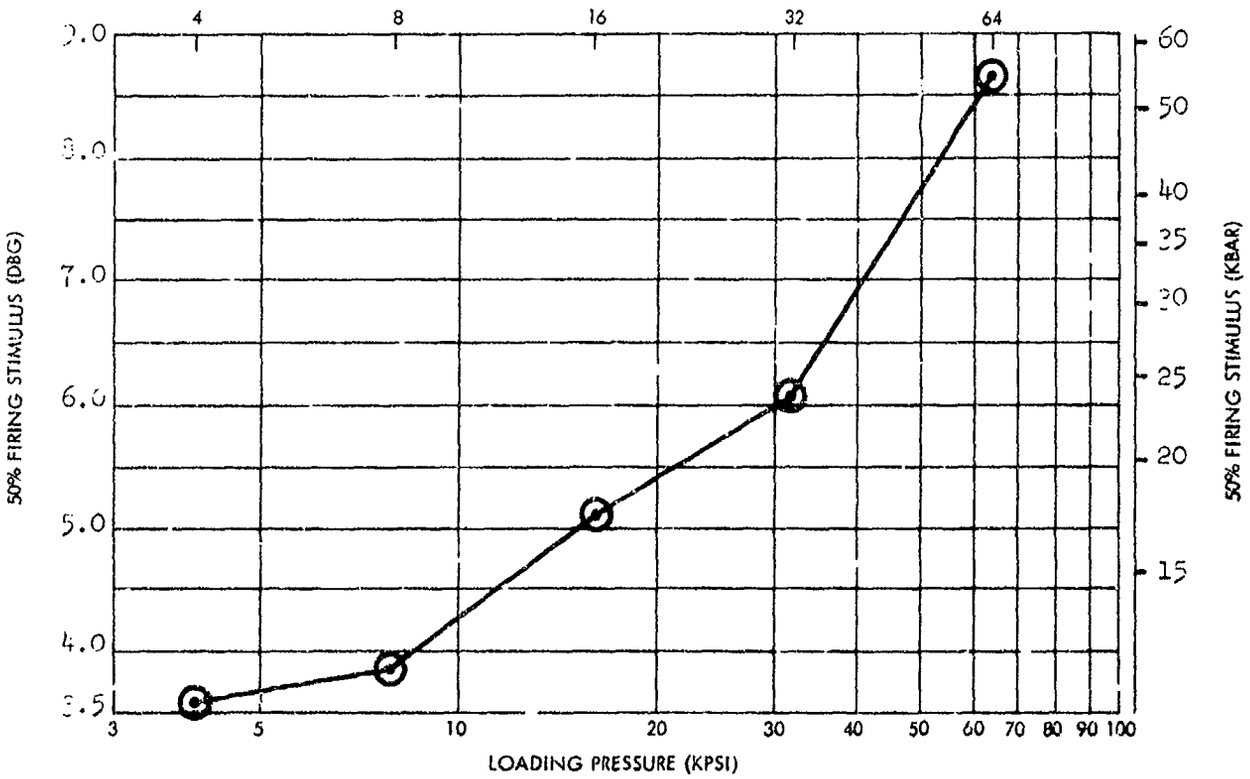
Remarks

EXPLOSIVE	TNB	X NO.	336
TMD	1.69	I. D. NO.	-

Date of Test 5/61

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.239	0.007	73.3	3.587	-	-	19	(1)
8	1.390	0.008	82.2	3.343	0.2588	0.1648	20	
16	1.547	0.005	91.5	5.118	0.0094	0.0075	20	
32	1.647	0.003	97.5	6.102	0.0888	0.0502	20	
64	1.692 (2)	0.003	100.1	8.646	0.1500	0.0925	20	

(1) No mixed response zone
(2) Experimental error



SMALL SCALE GAP TEST (SSGT) DATA
TNB

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4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TNB

X NO.: 336 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: Trinitrobenzene

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

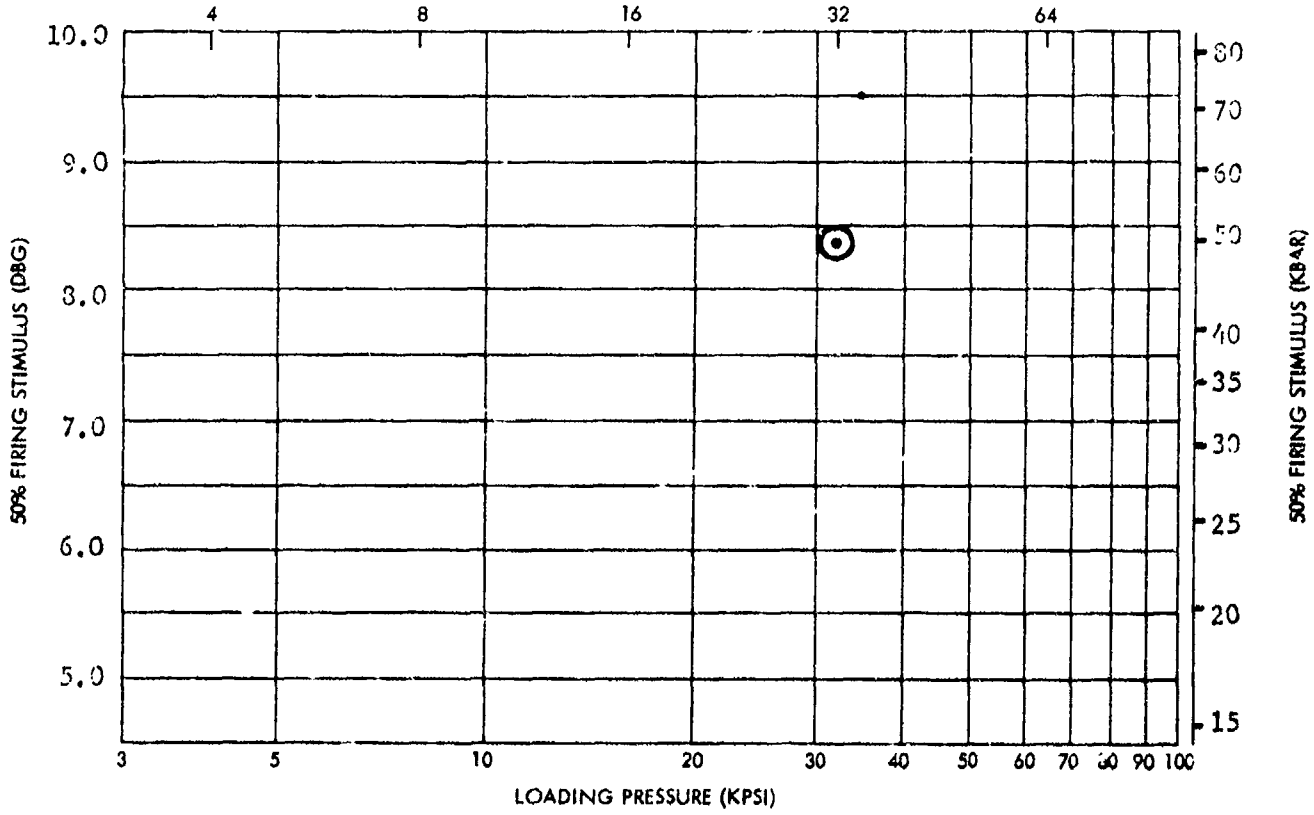
Remarks

No information available

EXPLOSIVE	DATB/BRL (95/5)	X NO.	-
TMD	1.84	I. D. NO.	3271

Date of Test 4/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.685	0.0031	91.6	8.382	0.0399	0.0192	46	



SMALL SCALE GAP TEST (SSGT) DATA
DATB/BRL (95/5)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB/BRL (95/5)*

X NO.: ID: Z NO.: 271 SSGT LOAD ORDER NO.: 659

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

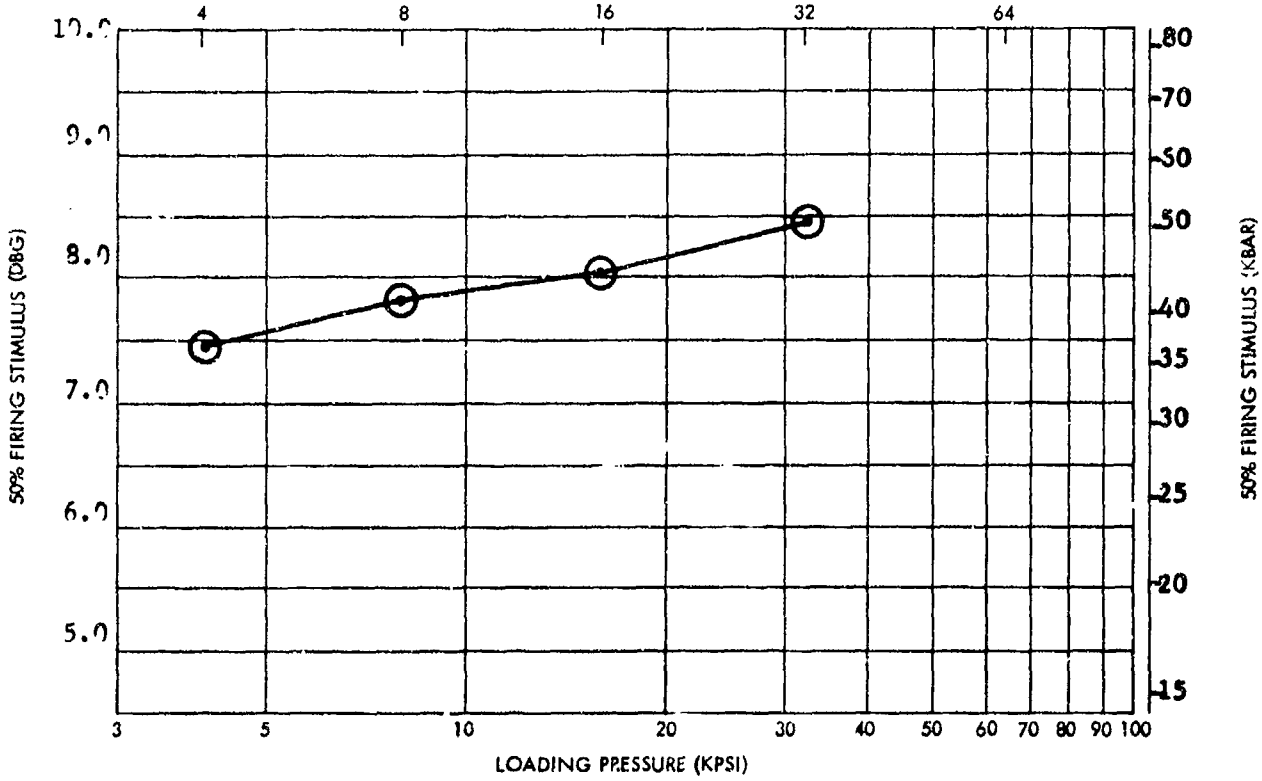
n =

Remarks
*DATB blended with a laminac obtained from Ballistics Research Laboratory (BRL), Aberdeen, Maryland

EXPLOSIVE	DATB/ZYTEL (95/5)	X NO.	322	Date of Test
TMD	1.78 (1)	I. D. NO.	--	10/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.210	0.0072	68.0	7.476	0.0745	0.0612	12	
8	1.366	0.0020	76.7	7.791	--	--	8	(2)
16	1.534	0.0045	86.2	8.052	0.1247	0.0973	10	
32	1.657	0.0028	93.1	8.479	0.0680	0.0646	8	

(1) TMD computed and based on the density of DATB (1.84 gm/cm^3) and Zytel-63 (1.08 gm/cm^3).
(2) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
DATB/ZYTEL (95/5)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB/ZYTEL (95/5)*

X NO.: 322 ID: Z NO.: 366 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/15/60 LOT NO.:

INITIAL QUANTITY: 600 pounds (molding powder) BATCH NO.:

MANUFACTURED BY:

NPP, Indian Head, MD

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

Remarks

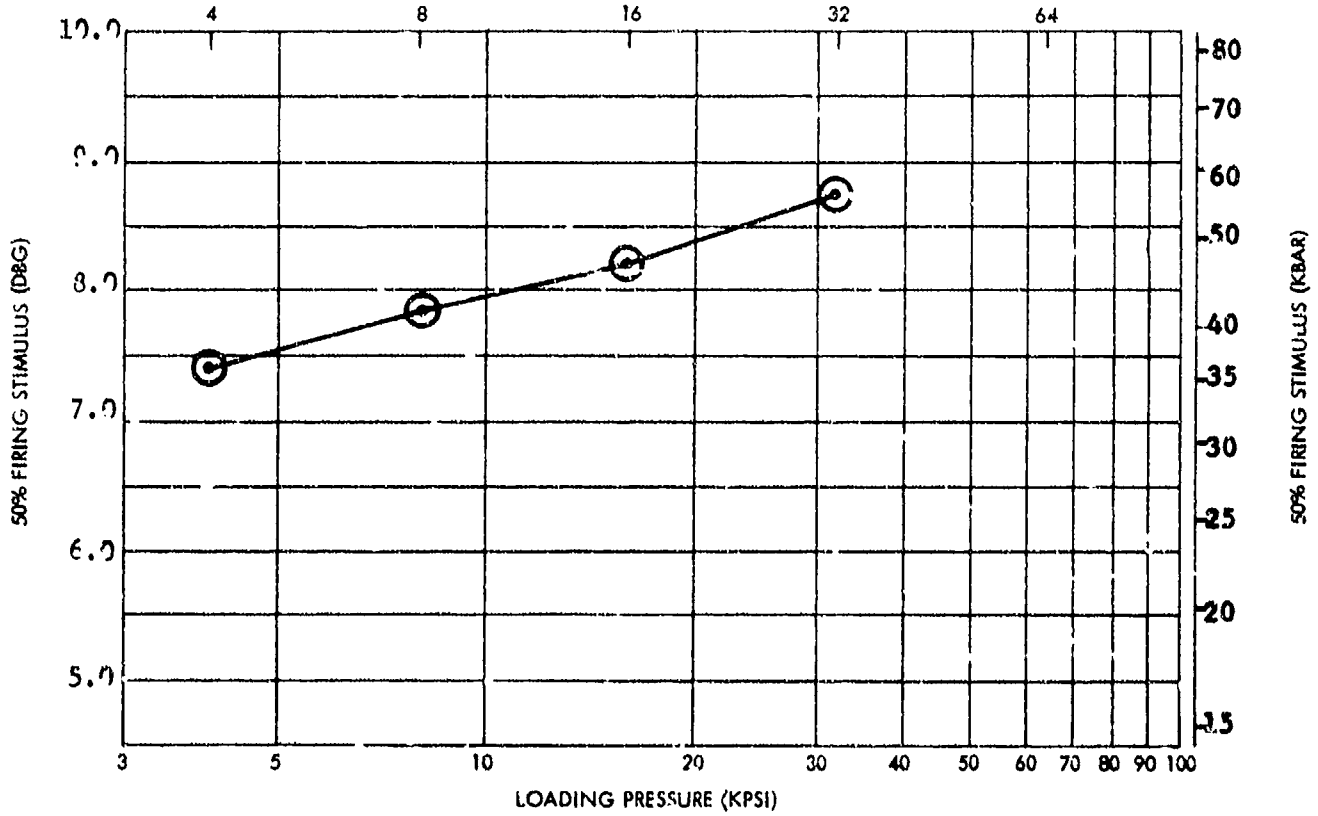
*DATB X No. 315, coated.

	Batch 1	Batch 2
Bulk Density (g/ml)	0.37	0.36
Vacuum Stability (ml/g/hr)	0.14	0.18
Particle size		
(microscopic count, μ)	10.6	10.6
(sub-sieve size, μ)	4.0	4.0
Melting Point (0°C)	286	284
Pressed Density (g/ml)	1.62	1.61
Batch Weight (pounds)	200	400

EXPLOSIVE	DATB/ZYTEL (95/5)	X NO.	327	Date of Test
TMD	1.78 (1)	I. D. NO.	--	12/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.192	0.0110	67.0	7.470	0.0096	0.0108	12	
8	1.358	0.0033	76.3	7.811	--	--	8	(2)
16	1.529	0.0054	85.9	8.200	0.0344	0.0301	10	
32	1.661	0.0023	93.3	8.750	0.0394	0.0499	8	

(1) TMD computed and based on the density of DATB (1.84 gm/cm^3) and Zytel-63 (1.05 gm/cm^3).
(2) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
DATB/ZYTEL (95/5)

CHEMICAL DATA

EXPLOSIVE NAME: DATB/ZYTEL (95/5)

X NO.: 327 ID: Z NO.: 374 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 120 grams BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

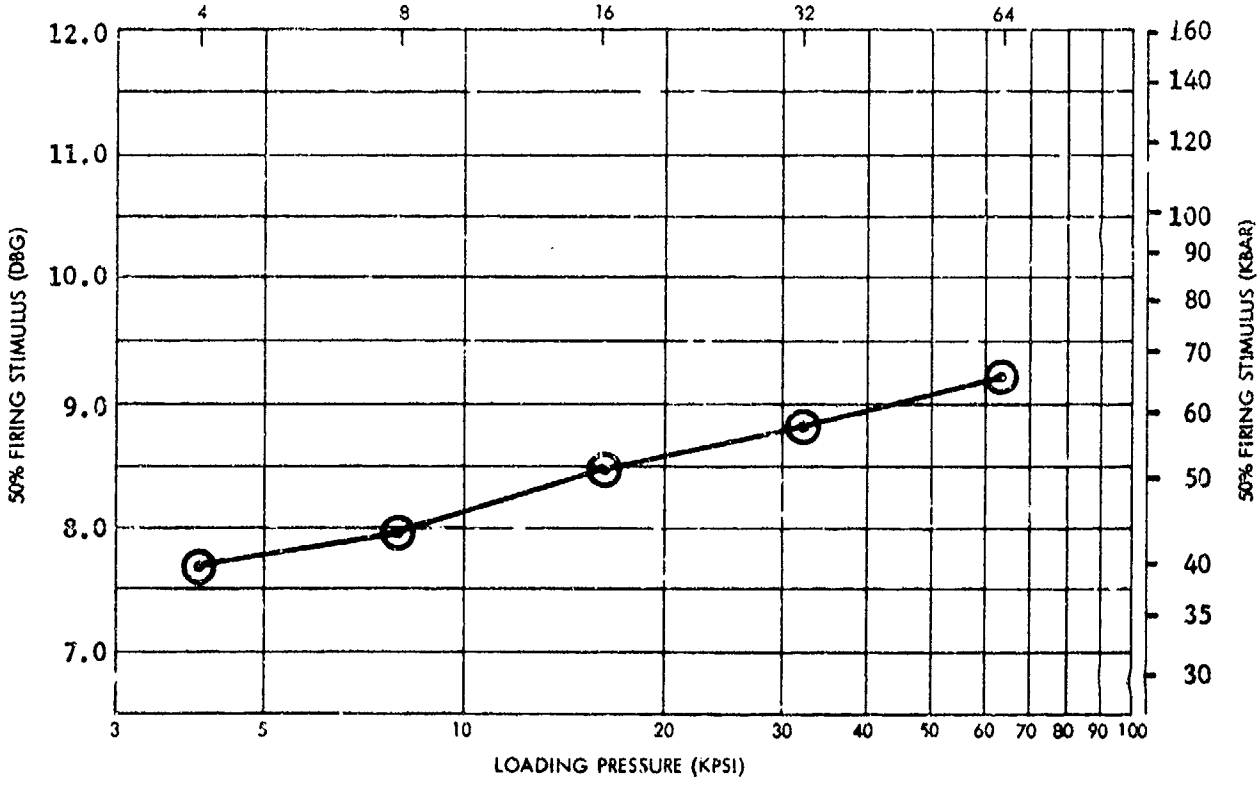
Remarks

EXPLOSIVE	DATB/ZYTEL (90/10)	X NO.	326	Date of Test
TMD	1.72 (1)	I. D. NO.	-	11/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.167	0.0071	67.8	7.712	-	-	10	(2)
8	1.342	0.0125	78.0	7.974	0.0206	0.0229	10	
16	1.512	0.0017	87.9	8.449	0.0404	0.0373	10	
32	1.617	0.0029	94.0	8.815	0.0767	0.0600	10	
64	1.676	0.0020	97.4	9.235	-	-	10	(2)

(1) TMD computed and based on the density of DATB (1.84 gm/cm^3) and Zytel-63 (1.08 gm/cm^3)

(2) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
DATB/ZYTEL (90/10)

E3a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB/ZYTEL (90/10)*

X NO.: 326 ID: Z NO.: SSGT LOAD ORDFR NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:
NOL: WE Division

IMPACT SENSITIVITY (Ī or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

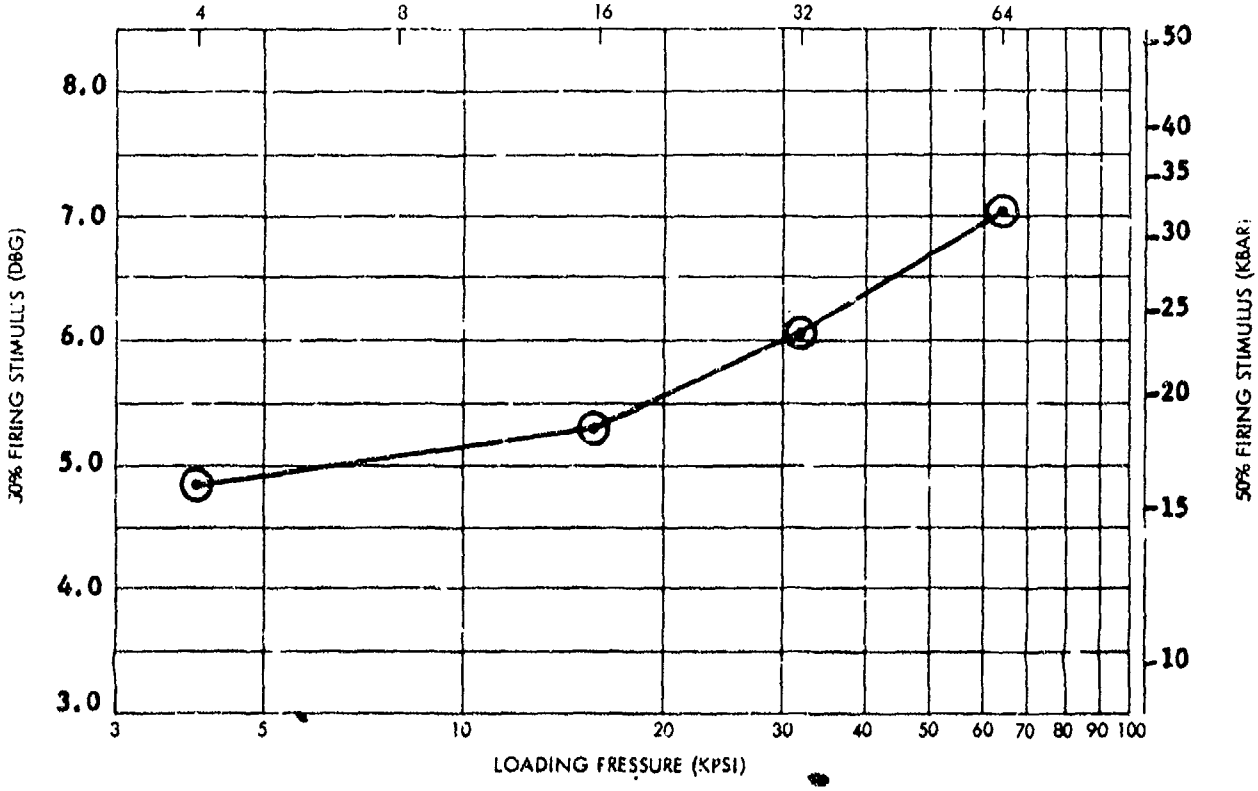
n =

Remarks
*Made from X315 in two 15-pound batches, then blended.

EXPLOSIVE	HNS-I/Teflon-30, (95/5)	X NO.	444	Date of Test 3/64
TMD	1.76	I. D NO.	--	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.410	0.0048	80.1	4.851	0.0028	0.0041	18	
16	1.582	0.0027	89.1	5.334	--	--	18	(1)
32	1.673	0.0036	95.1	6.097	0.0223	0.0200	18	
64	1.729	0.0045	98.2	7.012	0.0259	0.0261	18	

(1) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I/Teflon-30 (95/5)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I/Teflon-30 (95/5)

X NO.: 444 ID: L NO.: SSGT LOAD ORDER NO.: 937 - 940

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/30/63 LOT NO.: 25170-7/HNS/Teflon-30

INITIAL QUANTITY: 100 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
(H. Hellar)

IMPACT SENSITIVITY (ℌ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℌ = cm

s = log units

n =

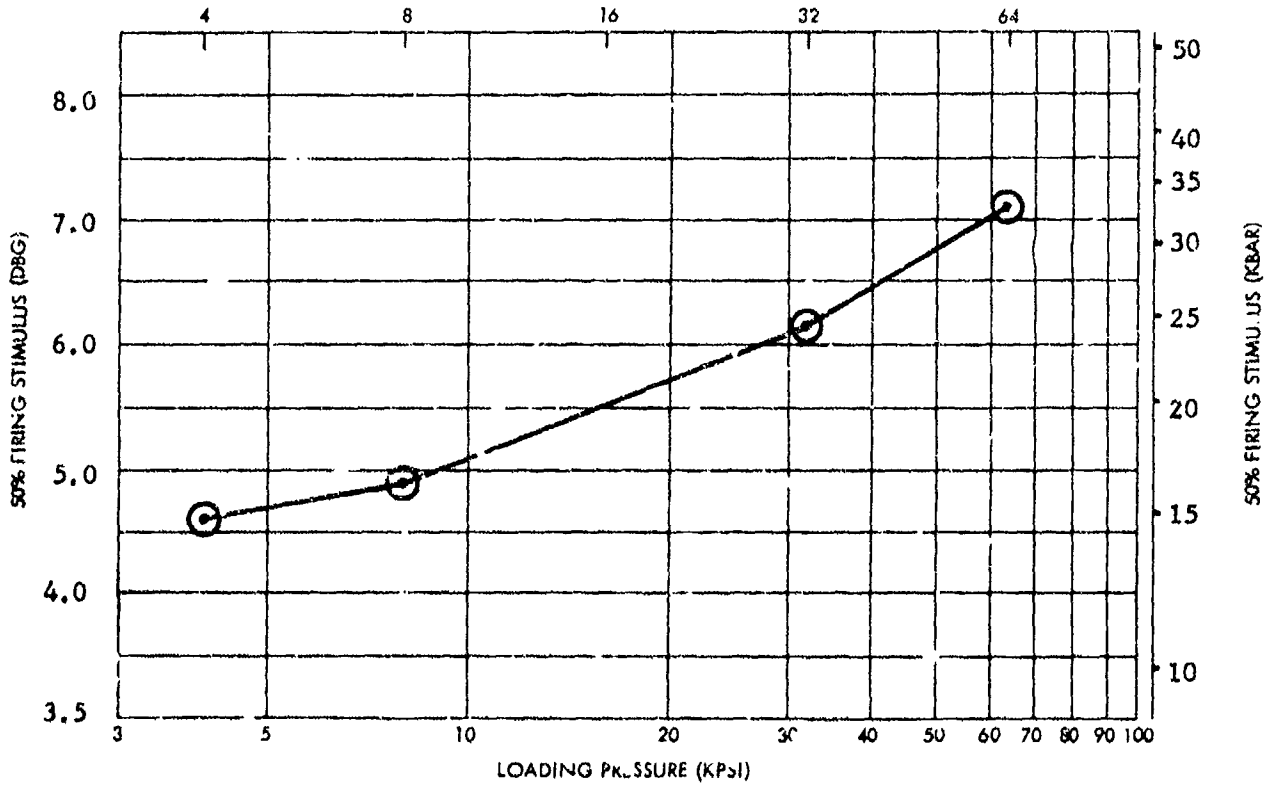
Remarks

HNS-I/TEFLON-30,

EXPLOSIVE	(95/5)	X NO.	467	Date of Test
TMD	1.76	I. D. NO.	-	6/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.431	0.0040	81.3	4.681	0.0586	0.0359	18	(1)
8	1.524	0.0066	86.6	4.895	0.0284	0.0237	18	
32	1.690	0.0021	96.0	6.139	0.0199	0.0233	18	
64	1.745	0.0294	99.1	7.106	0.0857	0.0541	18	

(1) Date of Test - 7/65



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I/TEFLON-30,(95/5)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I*/Teflon-30 (95/5)**

X NO.: 467 ID: Z NO.: 511 SSGT LOAD ORDER NO.: 941 & 964

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 4/2/64 LOT NO.:

INITIAL QUANTITY: 103 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division

IMPACT SENSITIVITY (ℍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 6/14/64

$\bar{H}$ = 65 cm

s =0.12 log units

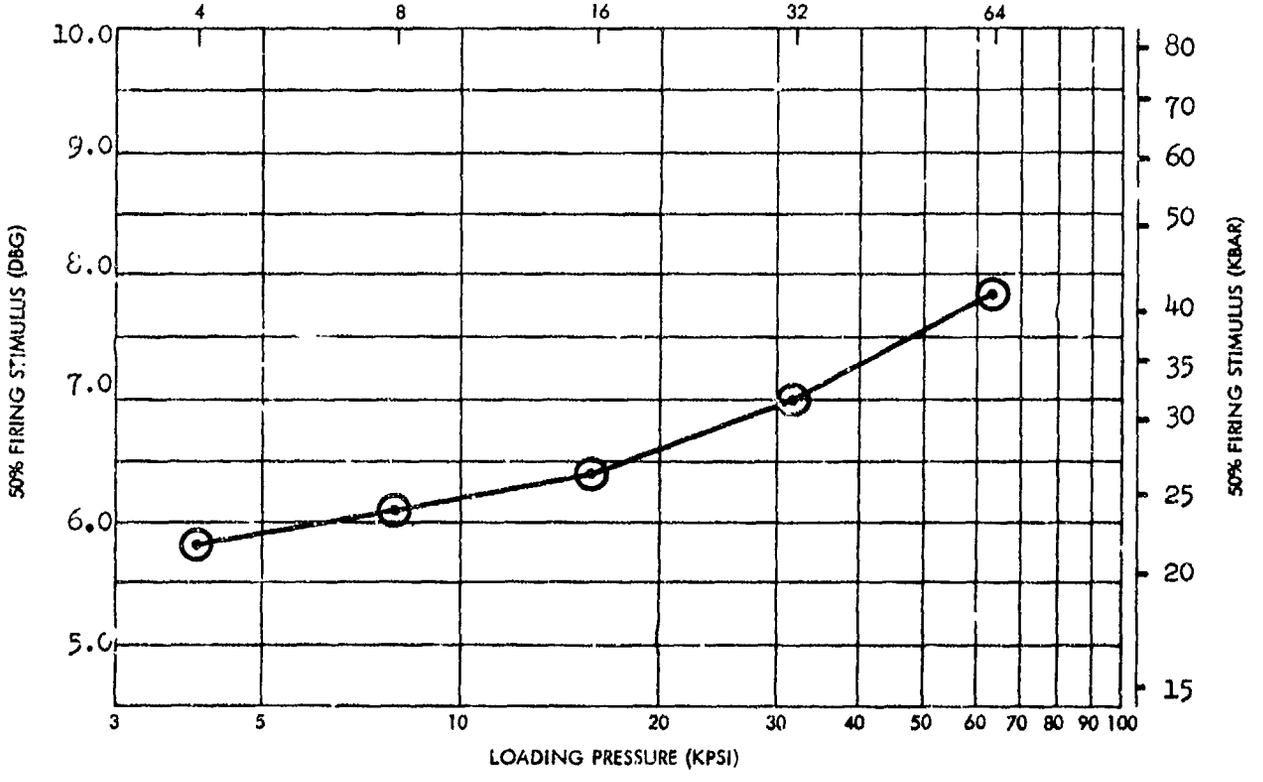
n = 25

Remarks

*HNS-I derived from
HNS-RX420 (needles)
American Cyanamide
NOLW 6705-75
**Blended; dried @ 200°C

EXPLOSIVE	HNS-I/TEFLON-30, (95/5)	X NO.	525	**Date of Test** 5/65
TMD	1.76	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.278	0.0029	72.6	5.824	0.0398	0.0267	23	
8	1.391	0.0043	79.0	**6.105**	**0.0482**	**0.0290**	23	
16	1.526	0.0028	86.7	6.410	0.0174	0.0247	23	
32	1.644	0.0064	93.4	6.996	**0.0056**	**0.0045**	23	
64	1.724	0.0043	98.0	7.825	0.0638	0.0344	23	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I/TEFLON-30, (95/5)

E4c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I*/TEFLON-30 (95/5)

X NO.: 525 ID: Z NO.: 648 SSGT LOAD ORDER NO.: 1045-1048

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 5/17/65 LOT NO.: CH5962

INITIAL QUANTITY: 250 grams BATCH NO.:

MANUFACTURED BY:
NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 72 cm

s =0.14 log units

n = 25

Remarks
* Made from HNS-I; XNo. 498

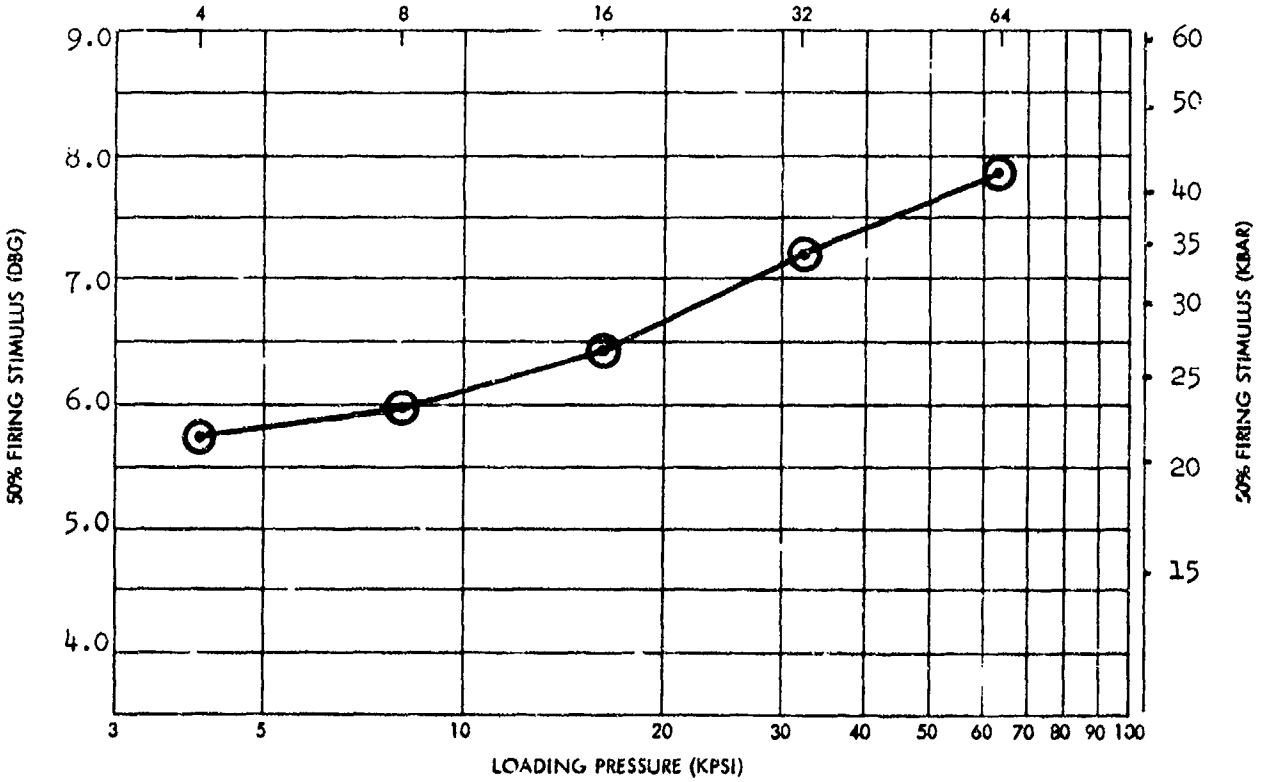
E 4 c 2

4 Sep 1973

EXPLOSIVE	HNS-I/TEFLON-30, (95/5)	X NO.	526	Date of Test 5/65
TMD	1.76	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	DENSITY (GM/CM³) s	% TMD	SENSITIVITY (DBG) AVG.	SENSITIVITY (DBG) g	SENSITIVITY (DBG) s_m	SENSITIVITY (DBG) N	REMARKS
4	1.282	0.0052	72.8	5.754	0.0060	0.0079	18	
8	1.388	0.0027	78.9	5.970	0.0673	0.0437	18	
16	1.526	0.0024	86.7	6.439	-	-	18	(1)
32	1.654	0.0065	94.0	7.192	0.0333	0.0246	18	
64	1.723	0.0032	97.9	7.889	0.0263	0.0240	18	

(1) No mix response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I/TEFLON-30, (95/5)

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I/TEFLON-30 (95/5)

X NO.: 526 **ID:** **Z NO.:** 644 **SSGT LOAD ORDER NO.:** 960-963

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 4/30/65 **LOT NO.:**

INITIAL QUANTITY: 450 grams **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 518

IMPACT SENSITIVITY (50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 83 cm

s = 0.10 log units

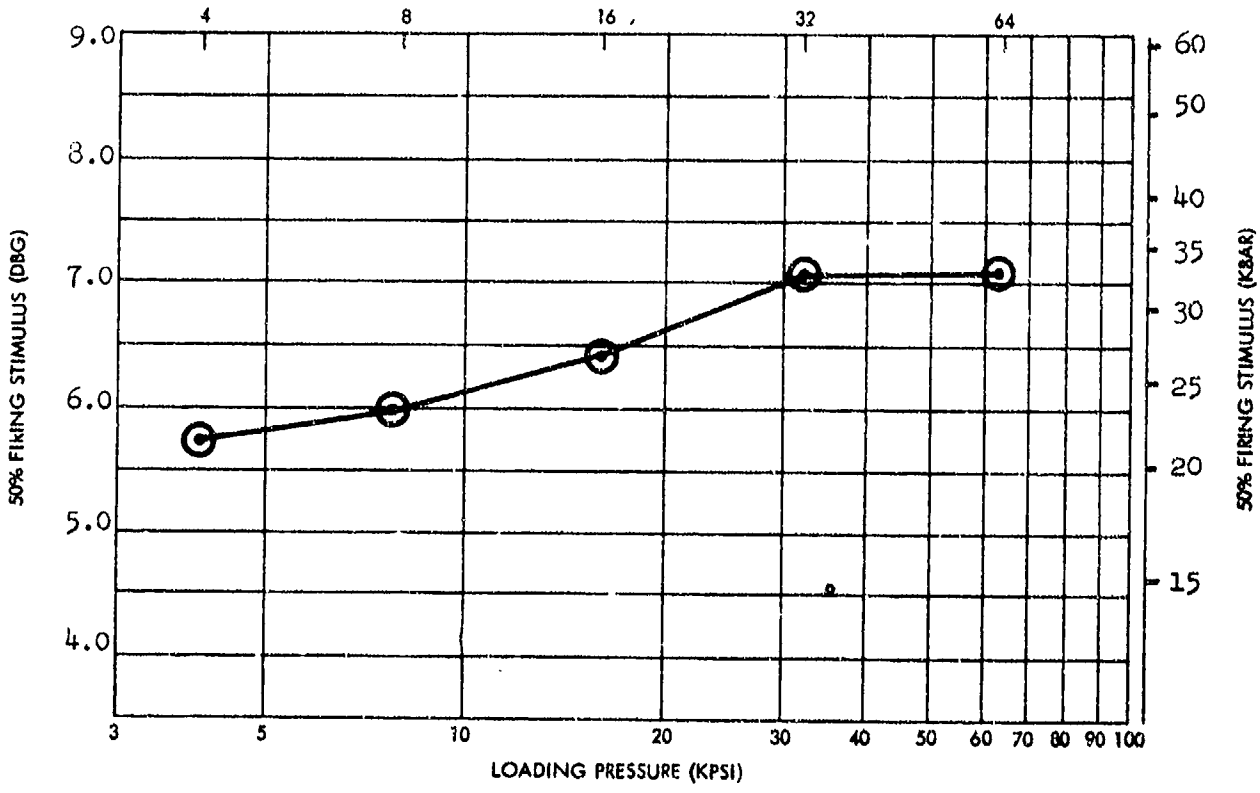
n = 25

Remarks

HNS-I/TEFLON-30, (95/5)

EXPLOSIVE	(95/5)	X NO.	540	Date of Test 8/65
TMD	1.76	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.248	0.0049	70.9	5.758	0.0251	0.0195	20	
8	1.359	0.0051	77.2	5.991	0.0206	0.0142	20	
16	1.500	0.0027	85.2	6.436	**0.0354**	**0.0279**	20	
32	1.631	0.0034	92.7	7.088	0.0504	0.0308	20	
64	1.704	0.0064	96.8	7.092	**0.3585**	0.1893	20	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-I/TEFLON-30 (95/5)

CHEMICAL DATA

EXPLOSIVE NAME: HNS-I*/TEFLON-30 (95/5)

X NO.: 540 ID: % NO.: SSGT LOAD ORDER NO.: 1082

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/11/65 LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:
NOL: WE Division
Bldg 318
(Greer)

IMPACT SENSITIVITY (ℵ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 10/22/65

$\bar{x}$ = 65 cm

s = 0.23 log units

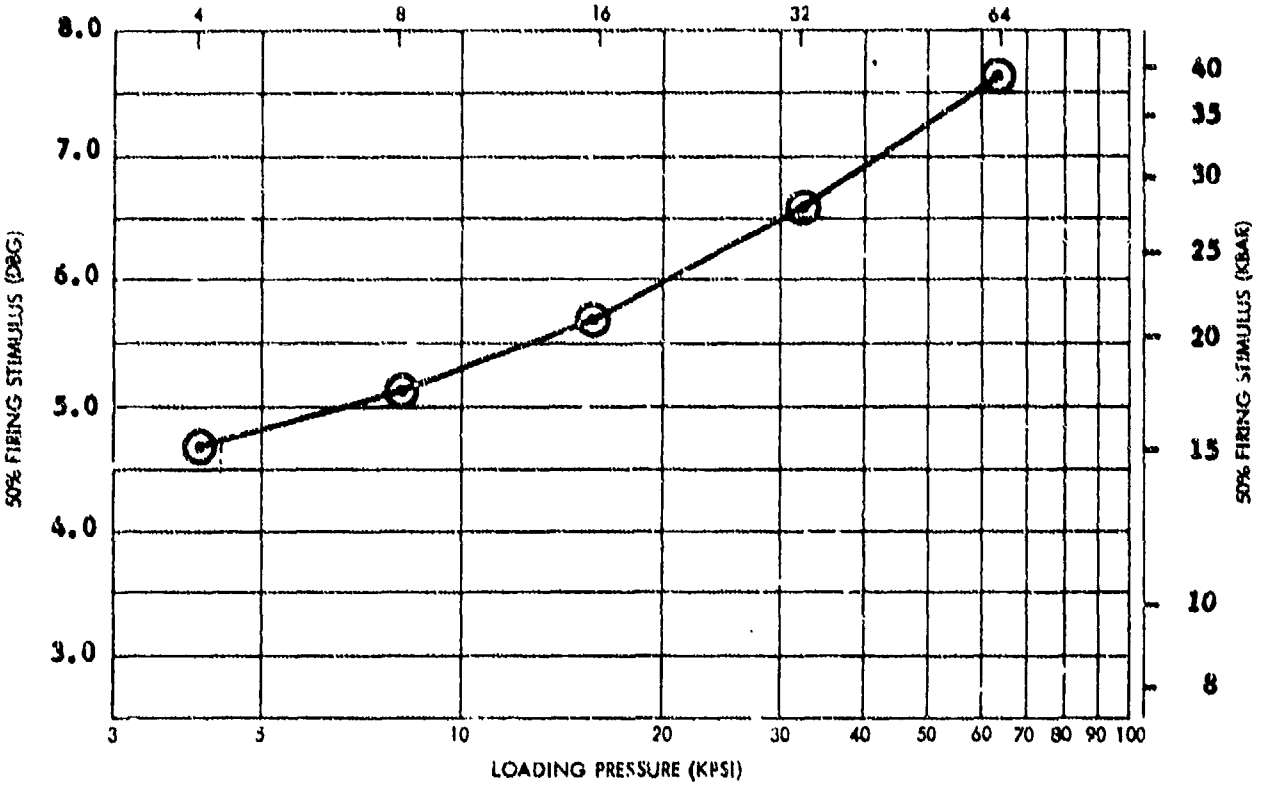
n =

Remarks
*Made from HNS-I XNo. 498

HNS-II/TEFLON-30

EXPLOSIVE	(90/10)	X NO.	571	Date of Test
TMD	1.78	I. D. NO.	-	6/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	σ	% TMD	SENSITIVITY (DBG) AVG.	σ	σ_m	N	REMARKS
4	1.540	0.0036	86.5	4.685	0.0307	0.0234	18	
8	1.609	0.0055	90.4	5.114	0.0180	0.0178	18	
16	1.692	0.0043	95.1	5.673	0.0162	0.0151	18	
32	1.742	0.0052	97.6	6.588	0.0199	0.0241	18	
64	1.769	0.0024	99.4	7.642	0.0299	0.0362	18	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30, (90/10)

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/TEFLON-30 (90/10)

X NO.: 571 ID: Z NO.: SSGT LOAD ORDER NO.: 1133

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/17/66 LOT NO.:

INITIAL QUANTITY: 6 pounds BATCH NO.: 3

MANUFACTURED BY:

NOL: WE Division
(H. Hellar)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

	I	II
$\bar{x}$ =	70 cm	94 cm
s =	.18 log units	0.05 log units
n =		

Remarks

*HNS-II B (X567; see D8b)
purchased from Chemtronics
(formerly Northrup Carolina):
Lot 11138-8.
NOL Contract N60921-9060

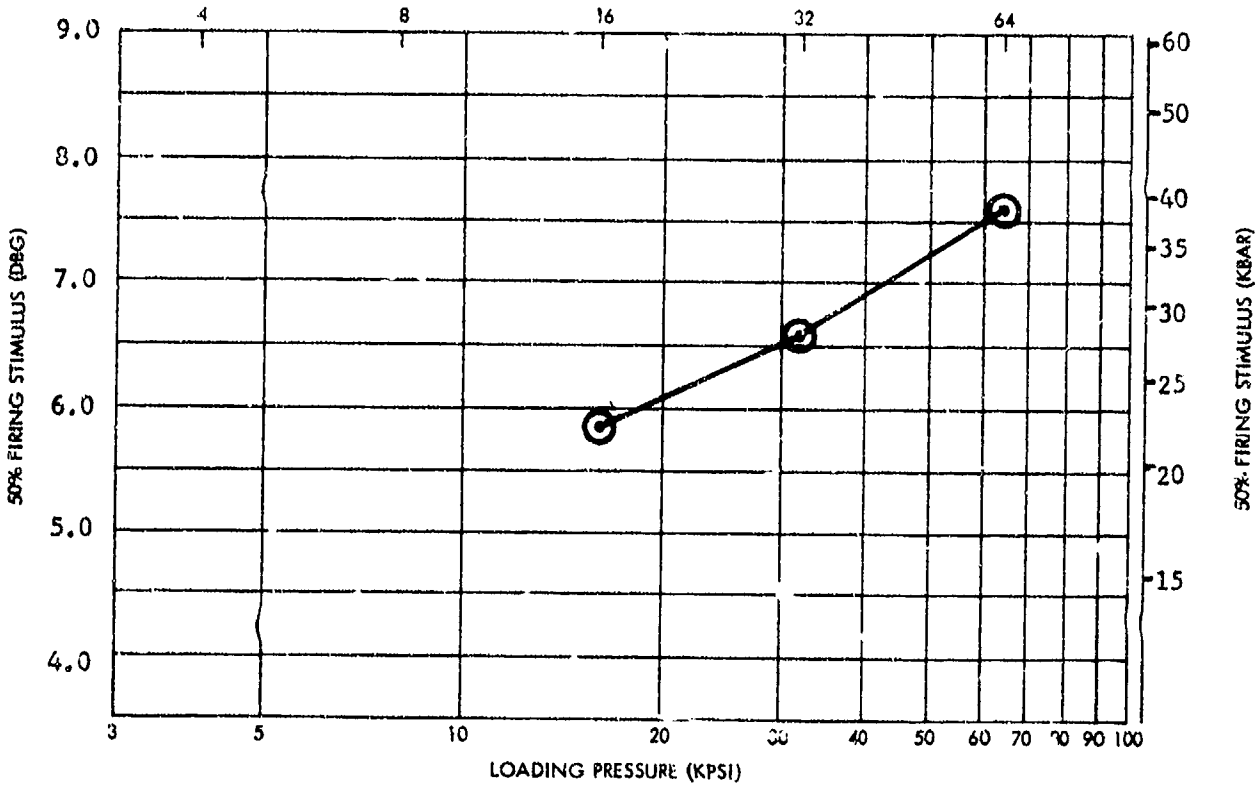
HNS-II/TEFLON - 30

EXPLOSIVE	(90/10)	X NO.	571
TMD	1.78	I. D. NO.	-

Date of Test 6/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	σ	s_m	N	
16	1.696	0.0081	95.3	5.850	0.0878	0.0548	18	
32	1.744	0.0041	98.0	6.576	-	-	13	(1)
64	1.769	0.0055	99.4	7.591	0.0807	0.0614	13	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30(90/10)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/TEFLON-30 (90/10)

X NO.: 571 ID: Z NO.: SSGT LOAD ORDER NO.: 1134

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/17/66 LOT NO.:

INITIAL QUANTITY: 6 pounds BATCH NO.: 3

MANUFACTURED BY:

NOL: WE Division
(H. Hellar)

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

	I	II
$ =	70 cm	94 cm
s =	0.18 log units	0.05 log units
n =		

Remarks

*HNS-II B (X567; see D8b)
purchased from *Chemtron'cs*
(formerly Northrup Caroiina):
Lot 11138-8.
NOL Contract N60921-9060

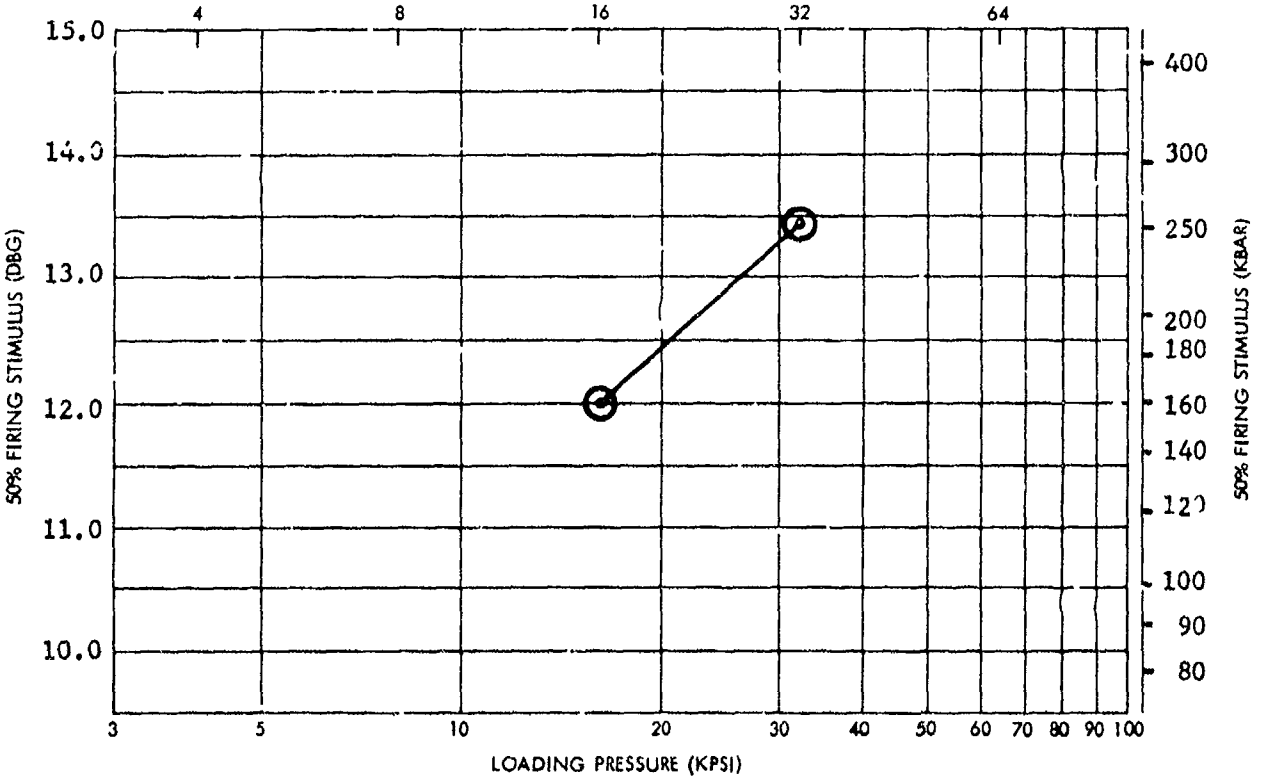
HNS-II/TEFLON-30

EXPLOSIVE	(90/10)	X NO.	571
TMD	1.78	I. D. NO.	-

Date of Test
7/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
16	1.690	0.0043	94.9	12.00	0.4059	0.2789	18	(1)
32	1.739	0.0035	97.7	13.43	1.185	0.6233	17	(1)

(1) Tested at -315°F



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30(90/10)

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/TEFLON-30 (90/10)

X NO.: 571 ID: Z NO.: SSGT LOAD ORDER NO.: 1139

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/17/66 LOT NO.:

INITIAL QUANTITY: 6 pounds BATCH NO.: 3

MANUFACTURED BY:

NOL: WE Division
(H. Hellar)

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

	I	II
ℓ =	70 cm	99 cm
s =	0.18 log units	0.05 log units
n =		

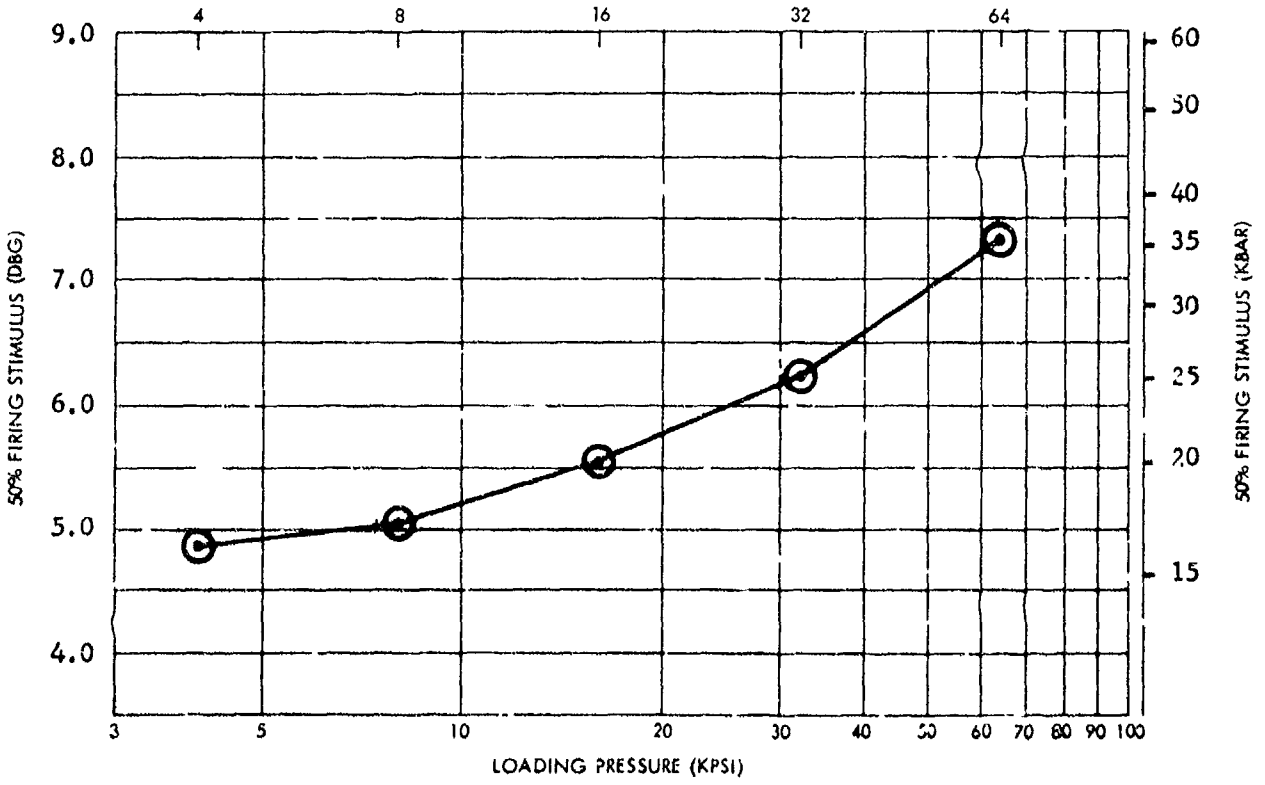
Remarks

*HNS-II B (X567; see D8b)
purchased from Chemtronics
(formerly Northrup Carolina):
Lot 11138-8.
NOL Contract N60921-9060

EXPLOSIVE	HNS-II/TEFLON-30, (90/10)	X NO.	581	Date of Test 1/67
TMD	1.78	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.427	0.0025	80.2	4.853	0.0229	0.0245	18	
8	1.506	0.0047	84.6	5.065	0.0292	0.0234	18	
16	1.618	0.0035	90.9	5.551	0.0470	0.0323	18	
32	1.700	0.0018	95.5	6.249	-	-	18	(1)
64	1.756	0.0030	98.7	7.338	0.0226	0.0260	18	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30 (90/10)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/Teflon-30 (90/10)

X NO.: 581 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 9/2/66 LOT NO.:

INITIAL QUANTITY: 109 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
(R. Hellar)

IMPACT SENSITIVITY (50 or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)

DATE OF TEST	I	II
50 =	68 cm	76 cm
s =	0.15 log units	0.12 log units
n =		

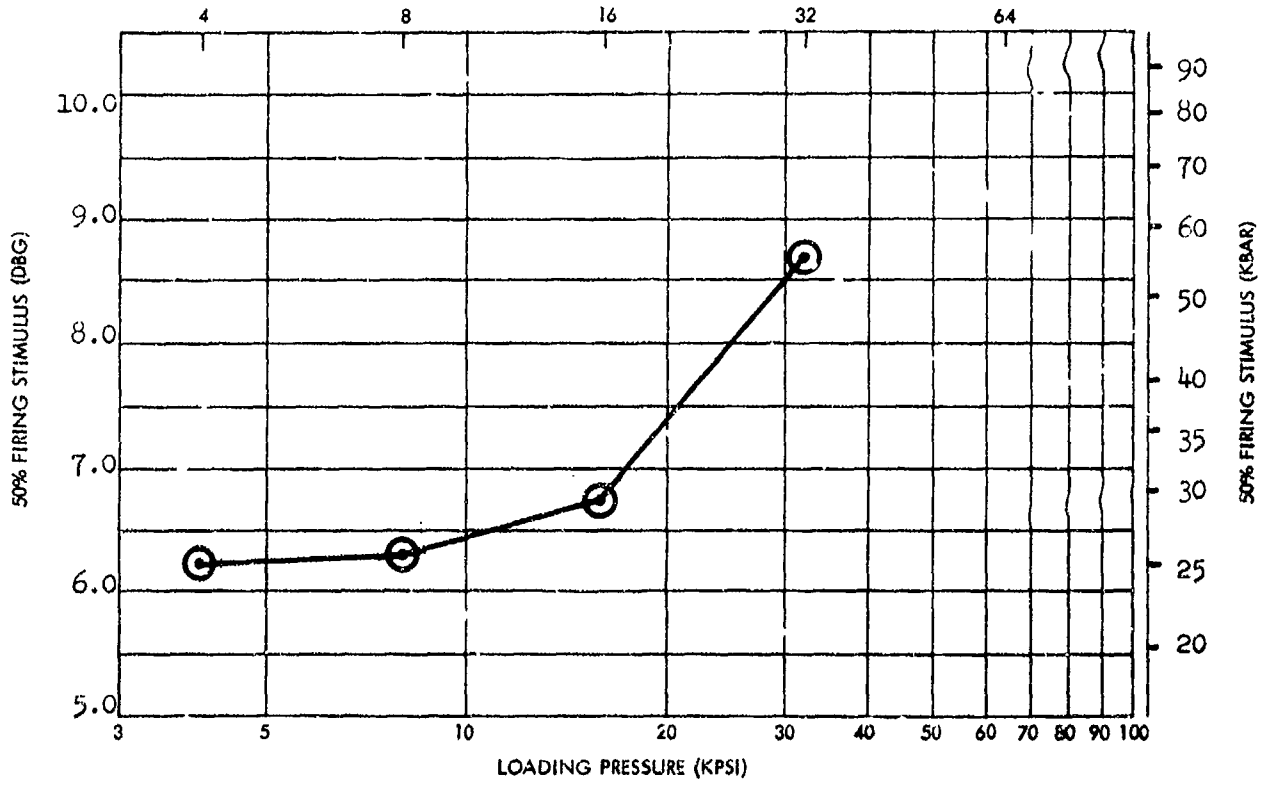
Remarks

*Made from HNS-IIB Lot 11138 (24 & 25). Material purchased from Chemtronics (formerly Northrup Carolina, Inc.) in August 1966.

EXPLOSIVE	HNS-II/TEFLON-30, (90/10)	X No.	581	Date of Test 1/67
TMD	1.78	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.422	0.0043	79.9	6.217	0.0962	0.0577	21	(1)
8	1.511	0.0024	84.9	6.291	0.0517	0.0340	20	(1)
16	1.612	0.0039	90.6	6.747	0.4008	0.1782	24	(1)
32	1.697	0.0023	95.3	8.684	0.1714	0.0848	23	(1)

(1) Tested at -315°F



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30 (90/10)

E5e1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/Teflon-30 (90/10)

X NO.: 581 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 9/2/66 LOT NO.:

INITIAL QUANTITY: 109 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
(H. Hellar)

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

	I	II
ẋ =	68 cm	76 cm
s =	0.12 log units	0.12 log units
n =		

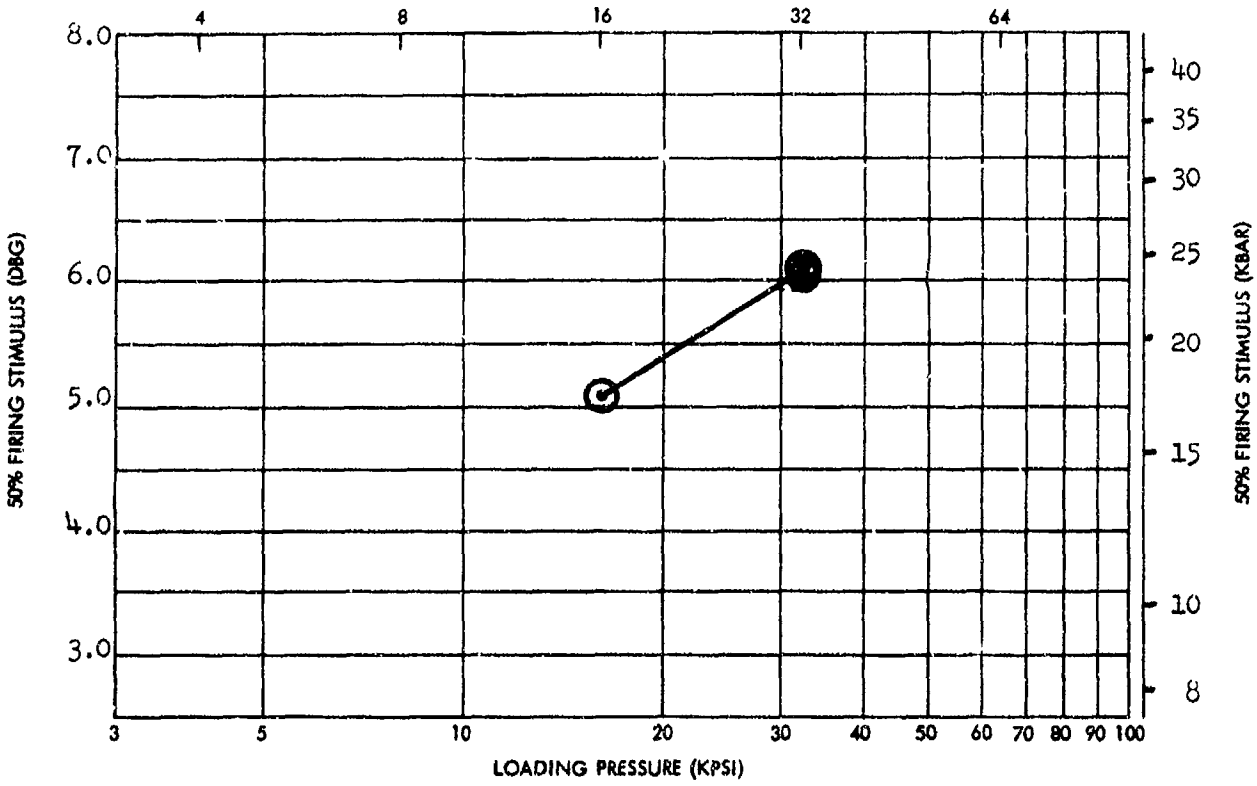
Remarks

*Made from HNS-IIB Lot 11138 (24 & 25). Material purchased from Chemtronics (formerly Northrup Carolina, Inc.) in August 1966.

EXPLOSIVE	HNS-II/TEFLON-7C, (90/10)	X NO.	-	Date of Test 2/71
TMD	1.78	I. D. NO.	1462	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
16	1.640	0.0019	92.1	5.129	0.0002	0.0003	20	
32	1.714	0.0023	96.3	6.051	0.0056	0.0034	20	
32	1.715	0.0036	96.3	6.098	0.0018	0.0033	20	(1)

(1) Units conditioned at 250°F for 24 hours prior to testing



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-7C (90/10)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II/TEFLON-7C (90/10)

X NO.: ID: 1462 Z NO.: SSGT LOAD ORDER NO.: 1323

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 2/9/71 LOT NO.:

INITIAL QUANTITY: 5 kilograms BATCH NO.:

MANUFACTURED BY:
NOL: 233 Division
Bldg 344
(W. Elban)*

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

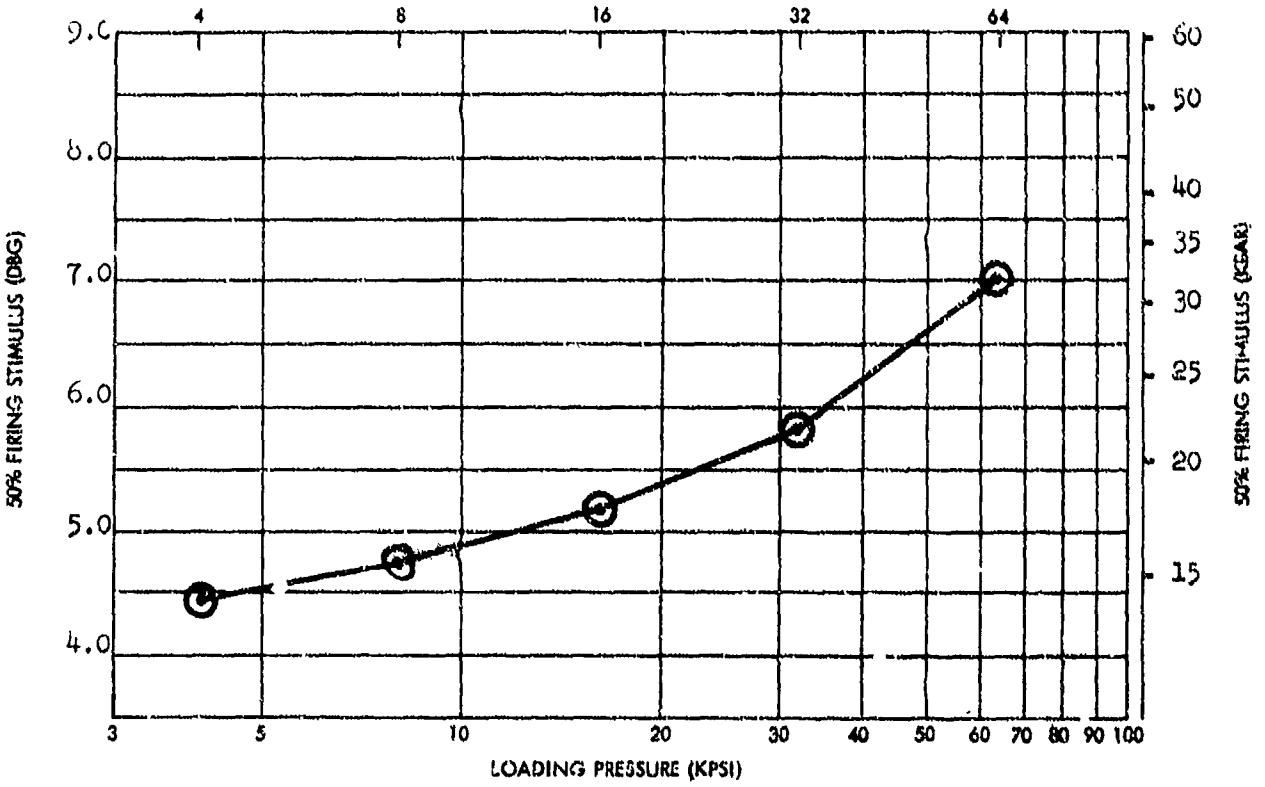
n =

Remarks
*Dry Blend 2/8/71

EXPLOSIVE	HNS-II/TEFLON-7C, (90/10)	X NO.	757	Date of Test 2/71
TMD	1.78	I. D. NO.	1493	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	σ	s_{in}	N	
4	1.396	0.0062	78.4	4.495	-	-	21	(1)
8	1.502	0.0047	84.4	4.746	0.0026	0.0018	22	
16	1.625	0.0027	91.3	5.184	0.0030	0.0023	20	
32	1.703	0.0026	95.7	5.831	0.0050	0.0033	20	
32	1.704	0.0045	95.7	5.891	0.0004	0.0003	20	
64	1.752	0.0024	98.4	7.011	0.0040	0.0024	23	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-7C, (90/10)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II*/TEFLON-7C (90/10)**

X NO.: 757 ID: 1493***S NO.: SSCT LOAD ORDER NO.: 1329 & 1336

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 4/16/71 LOT NO.: CH 1384

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

NOL: 233 Division
Bldg 615
(C. Misener)****

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{H}$ = cm

s = log units

n =

Remarks

* HNS-II - I.D. No. 1476
Del Mar Lot No. 250-7
N60921-71-C-0152

** Teflon duPont 7C
Lot No. 10001

*** Sample taken from 200-pound mix X No. 757, I.D. No. 1494

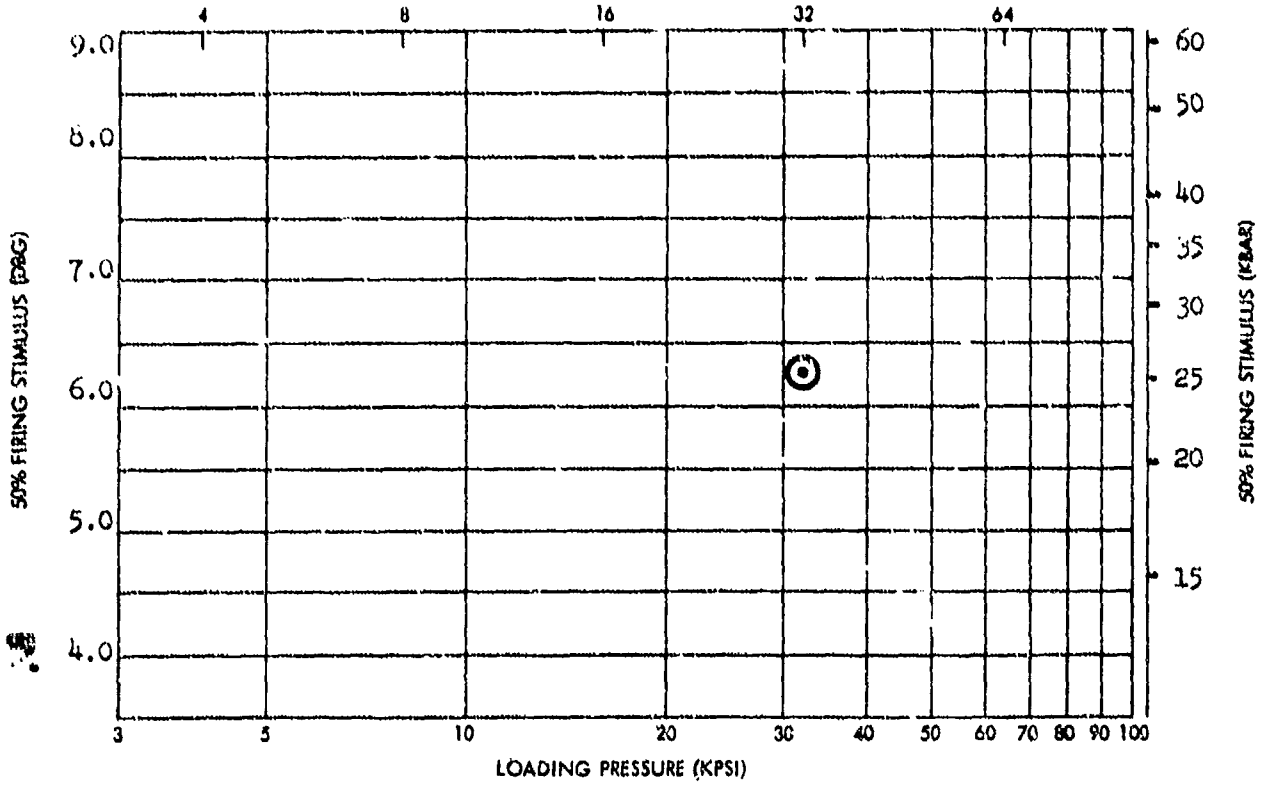
****50-pound batches mixed in 55-gallon drum - 4 hours @ 11 R.P.M. The four 50-pound batches blended together in 109-gallon drum with baffles 8 hours @ 9 R.P.M.

HNS-II/TEFLON-7C

EXPLOSIVE	(90/10)	X NO.		Date of Test
TMD	1.78	I. D. NO.	1541	8/71

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	s	% TMD	SENSITIVITY (DBG) AVG.	Q	s_m	N	REMARKS
30	1.699	0.0024	95.4	6.27	0.0093	0.0052	20	(1)

(1) Reblended from machinings obtained from pressed charges made from HNS-II/Teflon-7C (90/10) x No. 757



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-7C, (90/10)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II/TEFLON-7C (90/10)

X NO.: ID: 1541 S NO.: SSGT LOAD ORDER NO.: 1134

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

NOL: 233 Division

IMPACT SENSITIVITY (H or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

H = cm

n = log units

n =

Remarks
Reblend of machinings from charges that had been pressed from XNo. 757. (The charges had been isostatically pressed @ 30 KPSI to an approximate density of 1.68 gm/cc)

EXPLOSIVE	PBXW-3	X NO.	474	Date of Test 6/71
TMD	1.784	I. D. NO.	1507	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
64	1.603	0.0027	96.0	7.184	0.0046	0.0023	20	

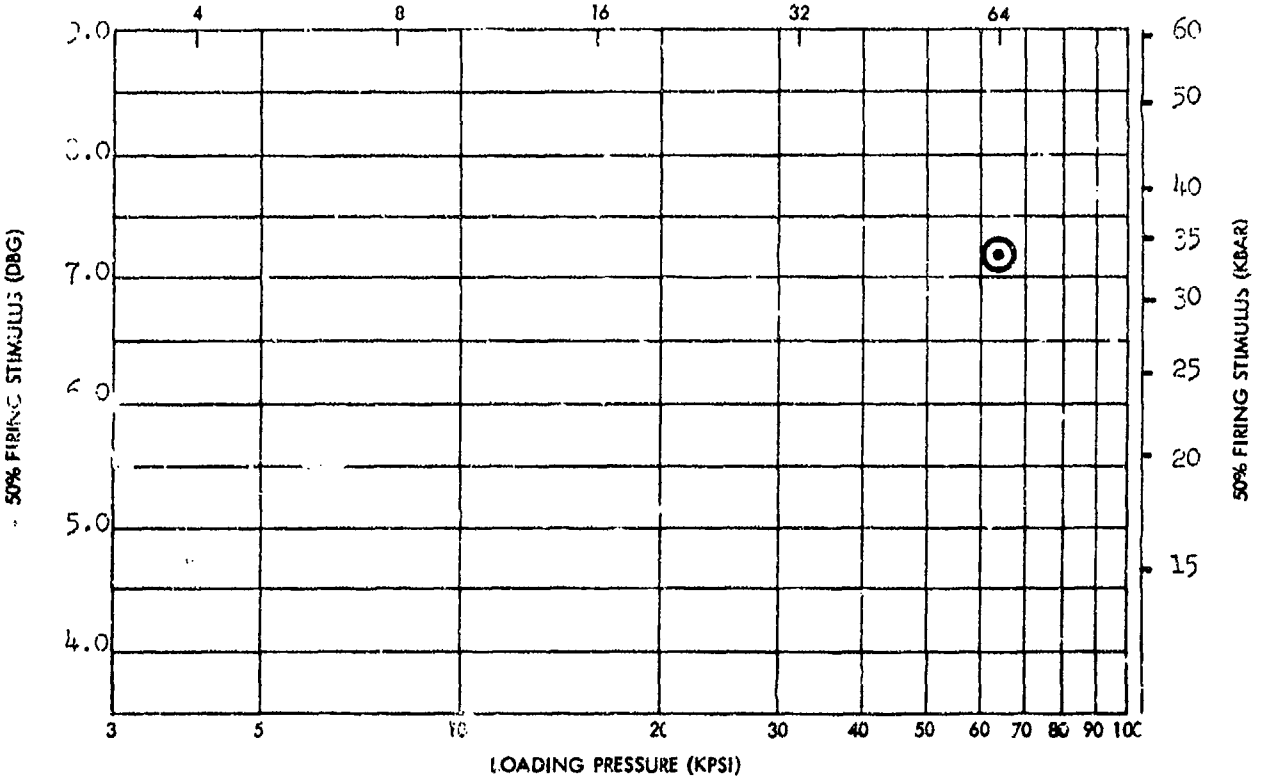


TABLE SMALL SCALE GAP TEST (SSGT) DATA FOR PBXW-3

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PBXN-3*

X NO.: 474 ID: 1507 Z NO.: SSGT LOAD ORDER NO.:

SOURCE: NOS Indian Head, Md.

CHEMICAL NAME:

DATE RECEIVED: 5/20/71 LOT NO.: HOL-SR-95A-63

INITIAL QUANTITY: 400 pounds BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

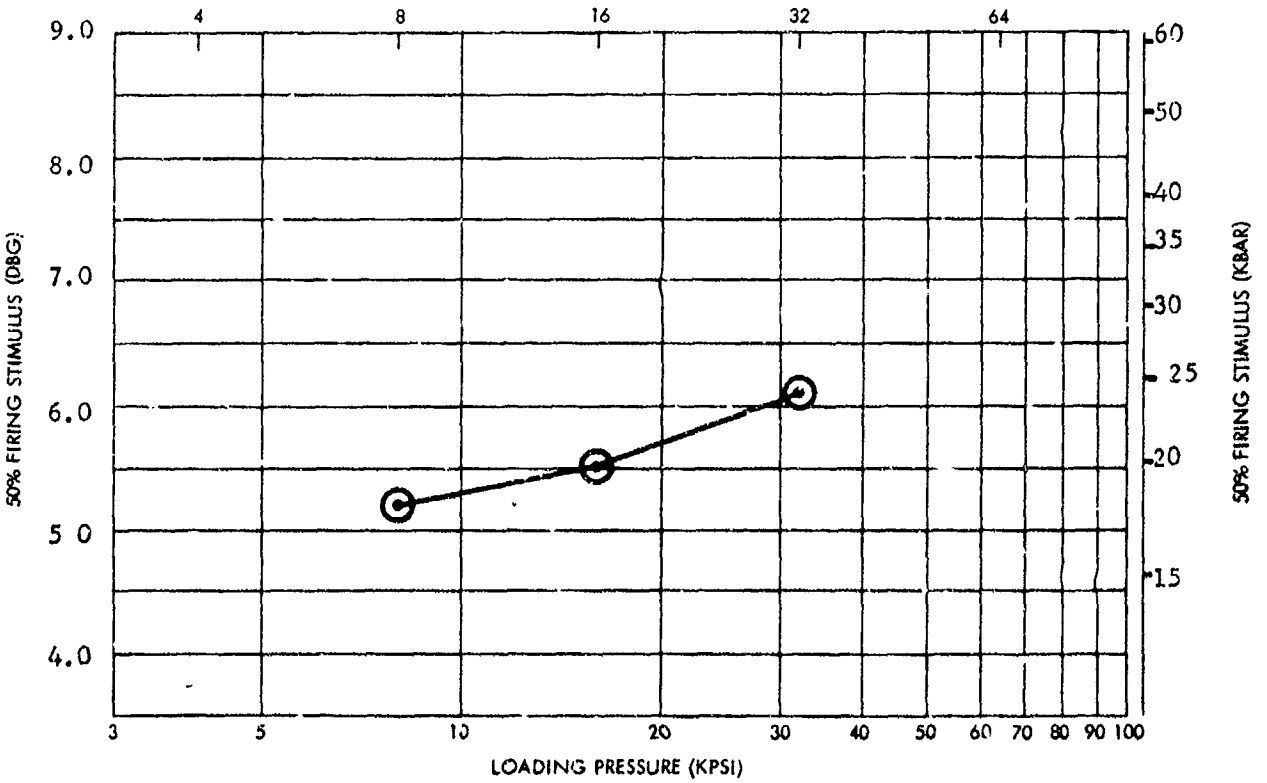
n =

Remarks
*Composition: HMX/NYLON (86/14)

EXPLOSIVE	PBXC-6 (1)	X NO.	419	Date of Test
TMD	-	I. D. NO.	437, 438, 441	9/67

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.644	0.0046	-	5.192	0.0263	0.0210	20	
16	1.719	0.0035	-	5.518	0.0132	0.0122	20	
32	1.793	0.0094	-	6.109	0.0103	0.0098	20	

(1) Predecessor to PBXN-5.



SMALL SCALE GAP TEST (SSGT) DATA
PBXC-6 (1)

E8a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PBXC-6*

X NO.: 419 ID: 437, 438, 441 Z NO.: 461 SEGT LOAD ORDER NO.: 1192

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 2/23/63 LOT NO.:

INITIAL QUANTITY: 600 grams BATCH NO.:

MANUFACTURED BY:

NOTS
China Lake, Calif.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 38 cm (For 3/16" dia. pellets)

s = 0.07 log units

n =

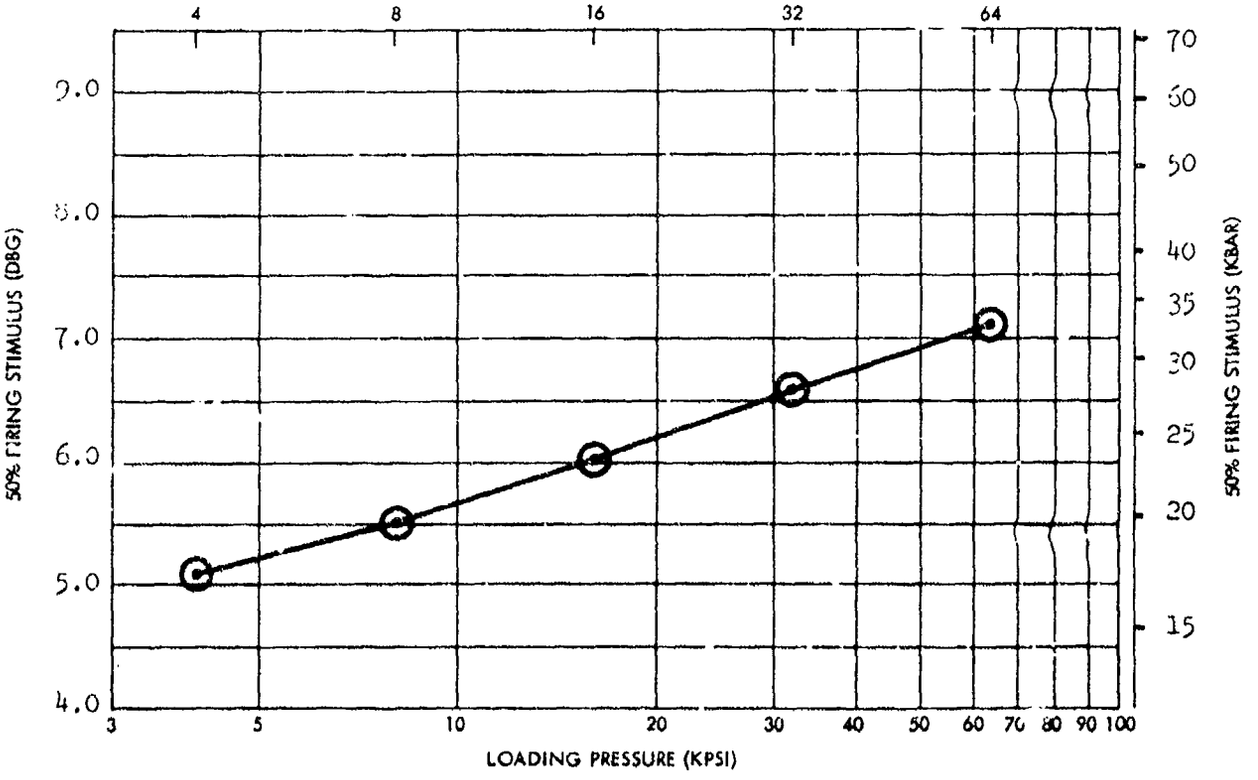
Remarks

*"PBXC-6 Mixed Blend"

Composition: HMX/VITON A (95/5)

EXPLOSIVE	PBXN-5	X NO.	618	Date of Test
TMD	1.905	I. D. NO.	579	10/57

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.511	0.0079	79.3	5.124	0.0070	0.0054	20	
8	1.588	0.0037	83.4	5.509	0.0296	0.0203	20	
16	1.668	0.0055	87.6	6.003	0.0034	0.0030	20	
32	1.758	0.0030	92.3	6.611	0.0307	0.0249	20	
64	1.846	0.0031	96.9	7.111	0.0175	0.0144	20	



SMALL SCALE GAP TEST (SSGT) DATA
PBXN-5

E8b1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PBXN-5 *

X NO.: 618 YD: 579 Z NO.: SSGT LOAD ORDER NO.: 1205

SOURCE: NOTS, China Lake B/L-D-1167670
Voucher No. 7283-9250

CHEMICAL NAME:

DATE RECEIVED: 10/17/67 LOT NO.: WS 7236-1

INITIAL QUANTITY: 8230 grams BATCH NO.:

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

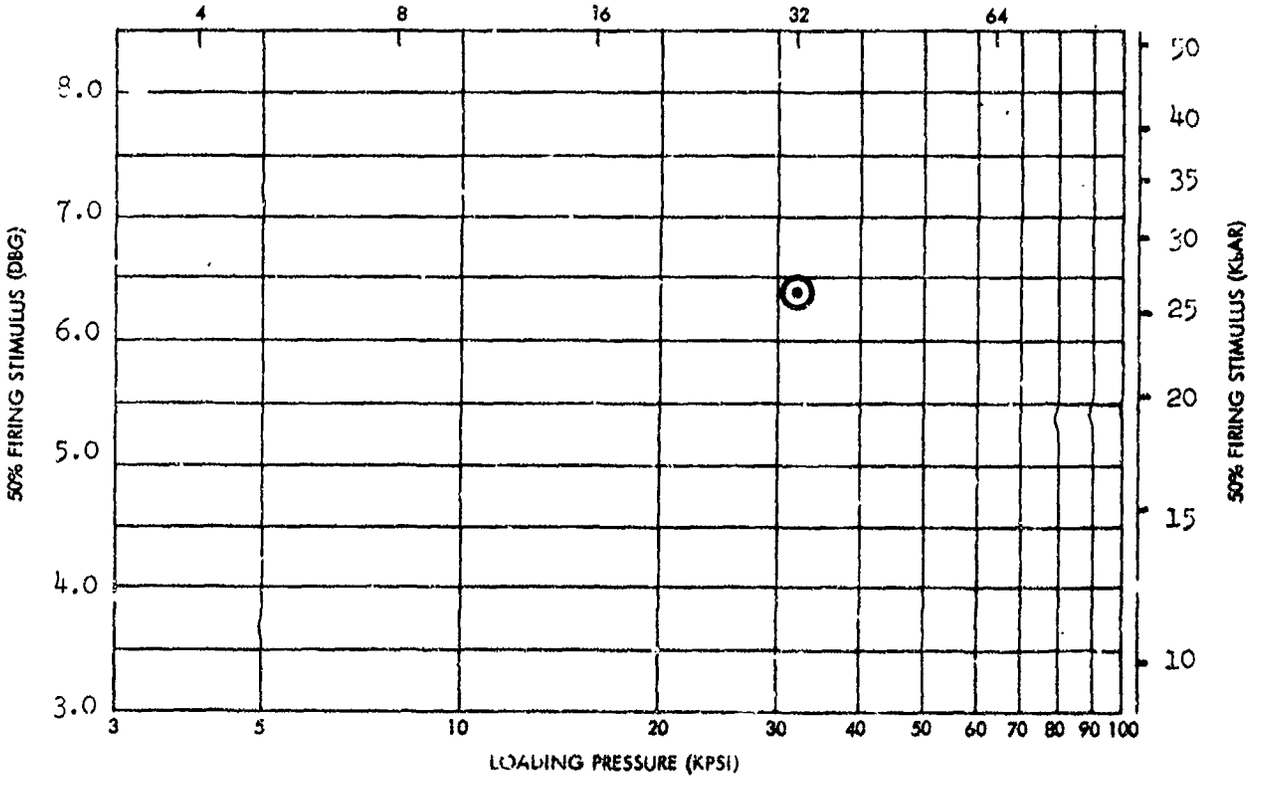
s = log units

n =

Remarks
*Composition: HMX/VITON A (95/5)

EXPLOSIVE	PBXN-5	X NO.	619	Date of Test 10/67
TMD	1.905	I. D. NO.	580	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
32	1.753	0.0051	92.0	6.393	0.0241	0.0247	20	



SMALL SCALE GAP TEST (SSGT) DATA
PBXN-5

CHEMICAL DATA

EXPLOSIVE NAME: PBXN-5*

X NO.: 619 **ID:** 580 **Z NO.:** **SSGT LOAD ORDER NO.:** 1206

SOURCE: NOTS, China Lake B/L-D-116-7670
Voucher No. 7283-9250

CHEMICAL NAME:

DATE RECEIVED: 10/17/67 **LOT NO.:** WS 7272-1

INITIAL QUANTITY: 1 pound **BATCH NO.:**

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ẍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẍ = cm

s = log units

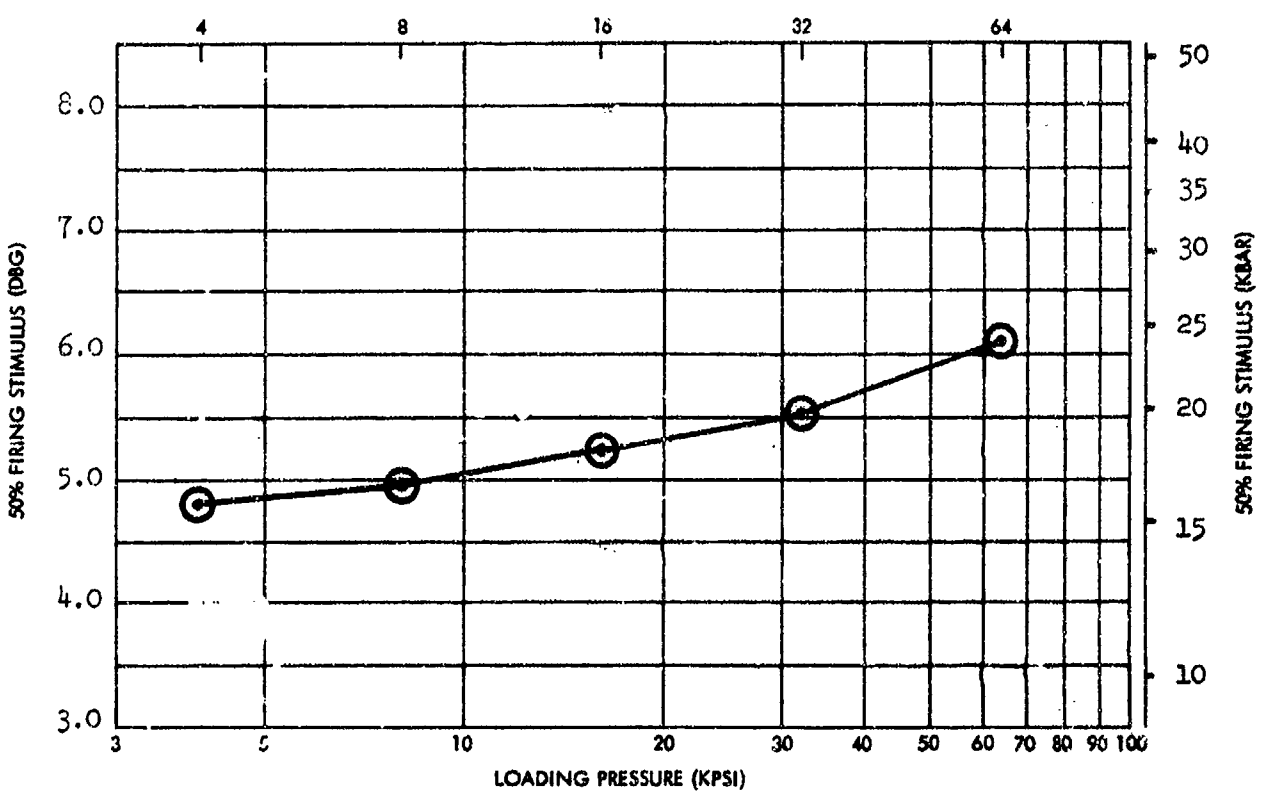
n =

Remarks
*Composition: HMX/VITON A (95/5)

EXPLOSIVE	PBXN-5	X NO.	715	Date of Test
TMD	1.905	I. D. NO.	1120	12/69

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.471	0.0058	77.2	4.818	-	-	20	(1)
8	1.557	0.0054	81.7	4.986	0.0077	0.0114	20	
16	1.658	0.0120	87.0	5.241	0.0188	0.0205	20	
32	1.749	0.0039	91.8	5.528	0.0177	0.0270	20	
64	1.842	0.0041	96.7	6.127	0.0086	0.0127	20	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
PBXN-5

CHEMICAL DATA

EXPLOSIVE NAME: PBXN-5*

X NO.: 715 ID: 1120 Z NO.: SSGT LOAD ORDER NO.: 1282

SOURCE: Part of 2000-pound shipment to
Picatinny Arsenal MIPR N60921-0-8261-0019

CHEMICAL NAME:

DATE RECEIVED: 11/26/69 LOT NO.: HOL-951-8

INITIAL QUANTITY: 100 pounds BATCH NO.: 5085-6

MANUFACTURED BY:
Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẋ = cm

s = log units

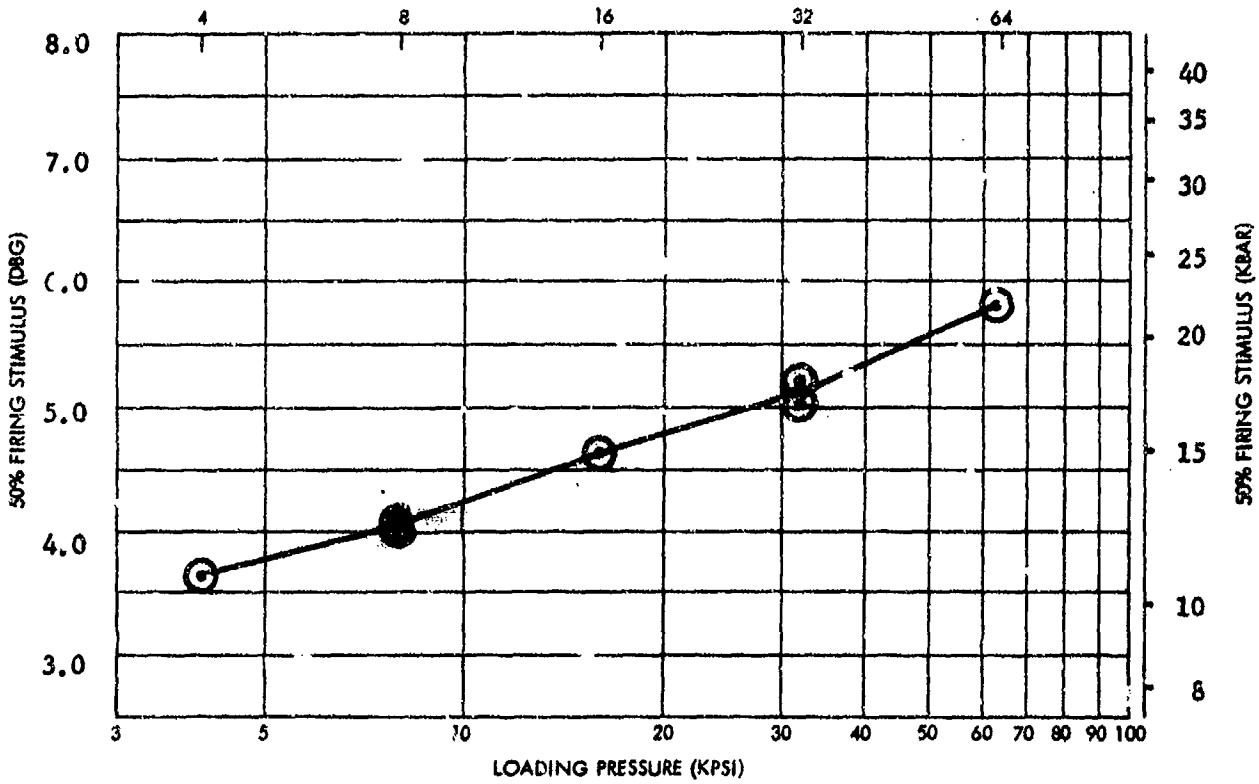
n =

Remarks
*Composition: HMX/VITON A (95/5)

EXPLOSIVE	PBX 9407	X NO.	-	Date of Test
TMD	1.61	I. D. NO.	1467	6/71

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	s	s_m	N	
4	1.269	0.0048	70.1	3.627	0.0185	0.0199	20	
8	1.400	0.0071	77.3	4.097	0.0099	0.0135	20	
8	1.393	0.0056	76.9	4.007	0.0247	0.0164	20	
16	1.508	0.0036	83.3	4.630	-	-	20	(1)
32	1.653	0.0043	91.3	5.008	-	-	20	(1)
32	1.666	0.0081	92.0	5.212	0.0218	0.0203	20	
64	1.735	0.0084	97.0	5.684	-	-	20	(1)
64	1.742	0.0049	96.2	5.880	0.0642	0.0367	20	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
PBX 9407

CHEMICAL DATA

EXPLOSIVE NAME: PBX 9407*

X NO.: **ID:** 1467 **Z NO.:** **SSGT LOAD ORDER NO.:** 1334 & 1348

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 2/24/71 **LOT NO.:** A-142

INITIAL QUANTITY: **BATCH NO.:**

MANUFACTURED BY:

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

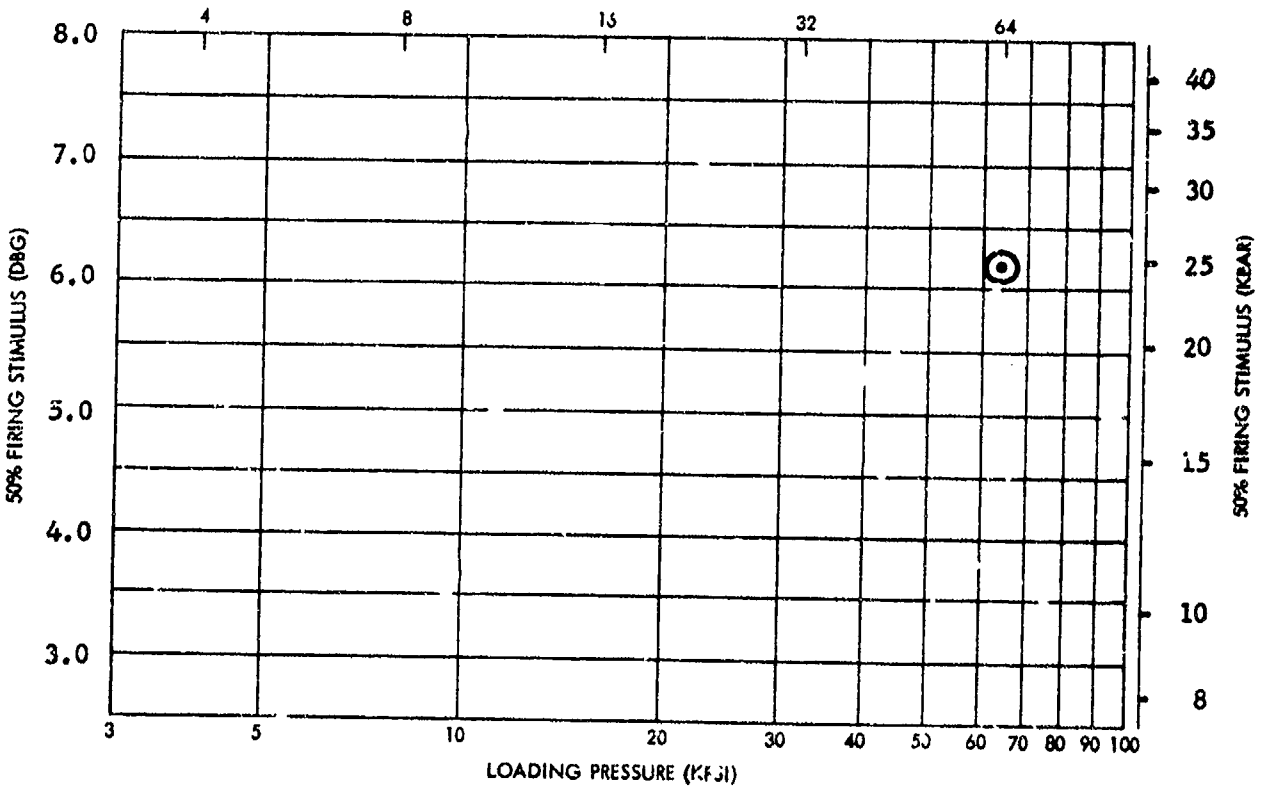
s = log units

n =

Remarks
*RDX Class E/Exon (94/6)
Mfd. 26 Jan 71
Dried overnight; 5 Mar 71;
Vacuum @ 50°C

EXPLOSIVE	LX-04-0	X NO.	-	Date of Test
TMD	1.89	I. D. NO.	1505	6/71

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	s	s_m	N	
64	1.828	0.0033	96.7	6.199	0.0037	0.0025	21	



SMALL SCALE GAP TEST (SSGT) DATA
LX-04-0

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: LX-04-0*

X NO.: ID: 1505 Y NO.: SSGT LOAD ORDER NO.:

SOURCE: Livermore

CHEMICAL NAME:

DATE RECEIVED: LOT NO.: 01-SR-583-62

INITIAL QUANTITY: 1/2 pound BATCH NO.: BLEND #1

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

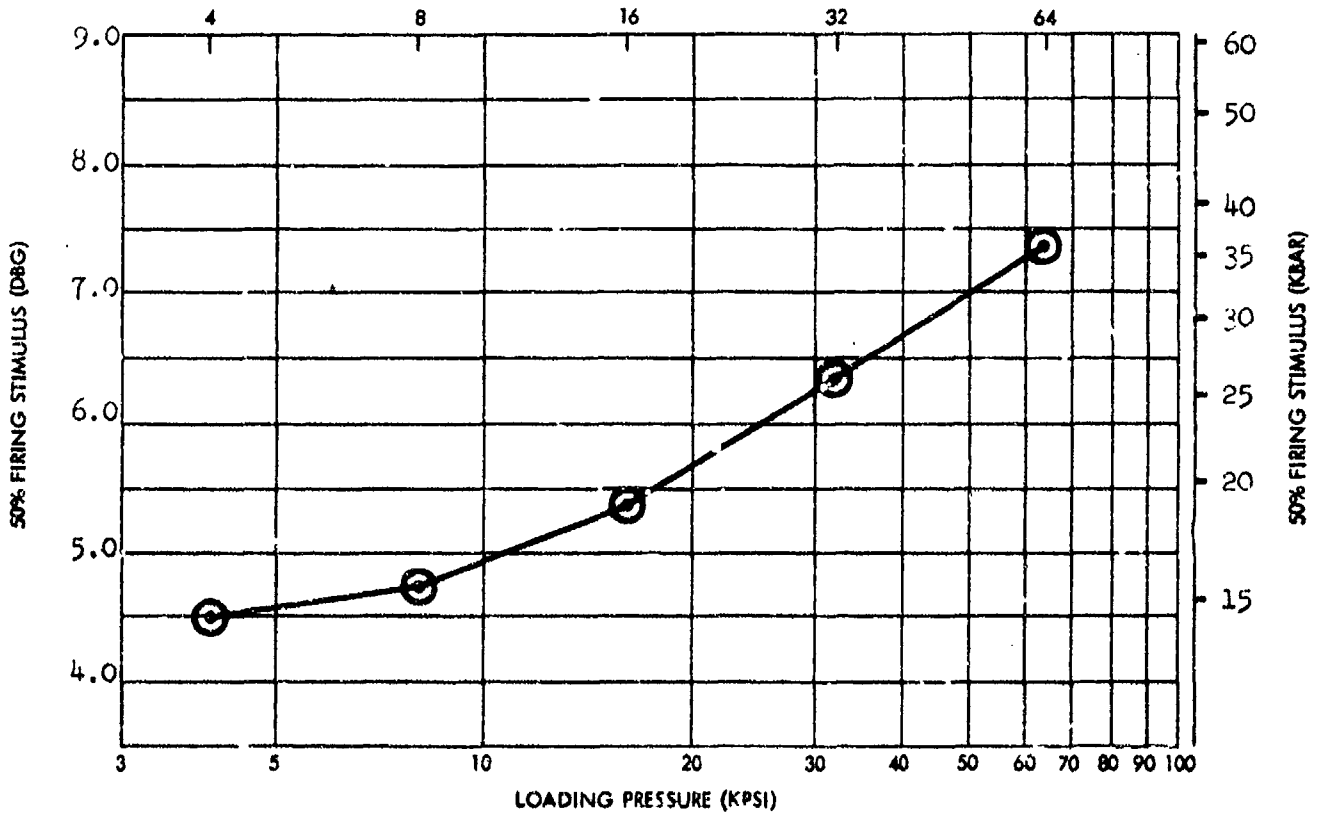
n =

Remarks
*Composition: HMX/VITON (85/15)

HNS-II/TEFLON-30 (95/5)

EXPLOSIVE		X NO.	533	Date of Test
TMD	1.76	I. D. NO.	-	7/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.422	0.0052	80.8	4.495	0.0213	0.0170	18	
8	1.524	0.0034	86.6	4.741	0.0162	0.0290	18	
16	1.622	0.0049	92.1	5.357	0.0060	0.0268	18	
32	1.699	0.0027	96.5	6.354	0.0948	0.0551	18	
64	1.745	0.0032	99.1	7.372	0.0024	0.0027	18	



SMALL SCALE GAP TEST (SSGT) DATA
HNS-II/TEFLON-30 (95/5)

Ellal

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: HNS-II/TEFLON-30 (95/5)

X NO.: 533 ID: Z NO.: SSGT LOAD ORDER NO.: 1077

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/25/65 LOT NO.:

INITIAL QUANTITY: 1/2 pound BATCH NO.:

MANUFACTURED BY:
NOL: WE Division

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST 7/6/65

$\bar{x}$ = 77 cm

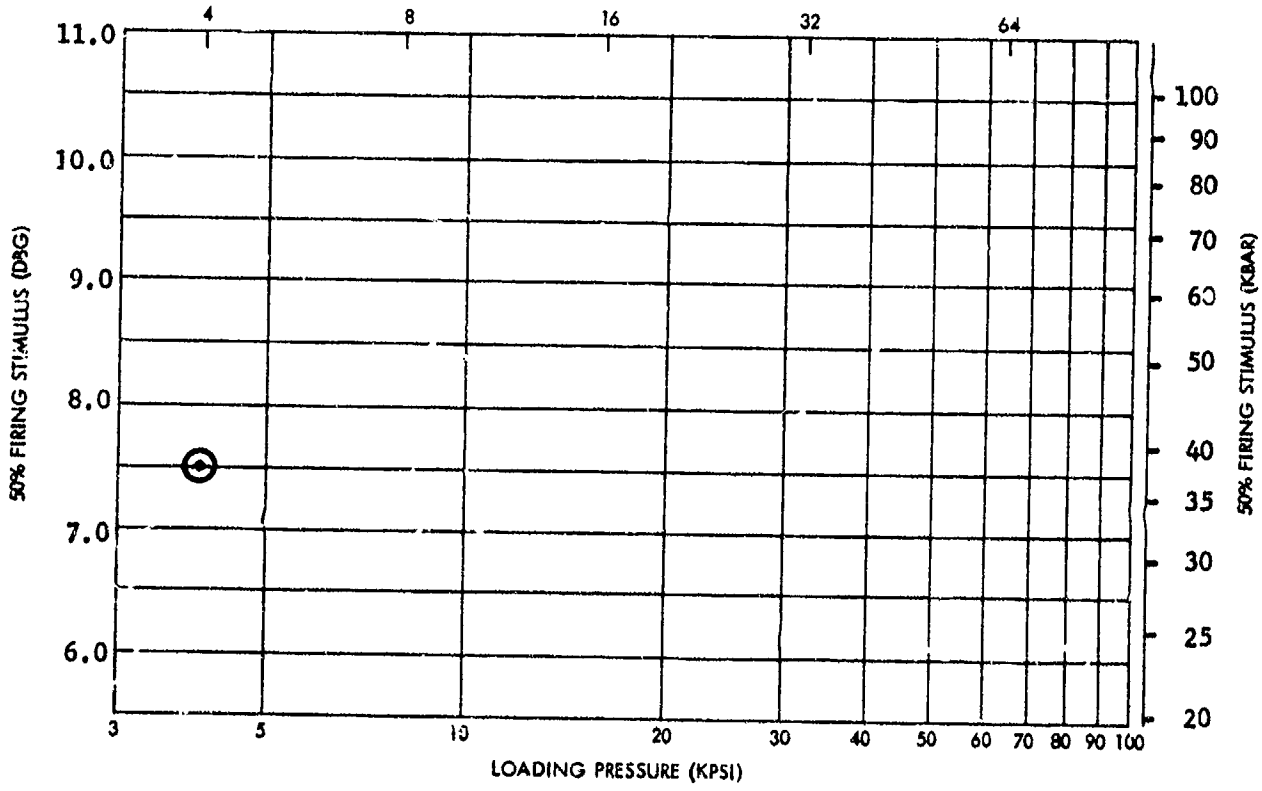
s = 0.23 log units

n =

Remarks
Used HNS-II X528

EXPLOSIVE	COMP C-3	X NO.	-	Date of Test
TMD	-	I. D. NO.	-	4/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.612	0.0296	-	7.510	0.1874	0.0925	23	



SMALL SCALE GAP TEST (SSGT) DATA
COMP C-3

CHEMICAL DATA

EXPLOSIVE NAME: COMP C-3*

X NO.: **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 1027

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: **LOT NO.:**

INITIAL QUANTITY: **BATCH NO.:**

MANUFACTURED BY:

IMPACT SENSITIVITY (ℵ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℵ = cm

s = log units

n =

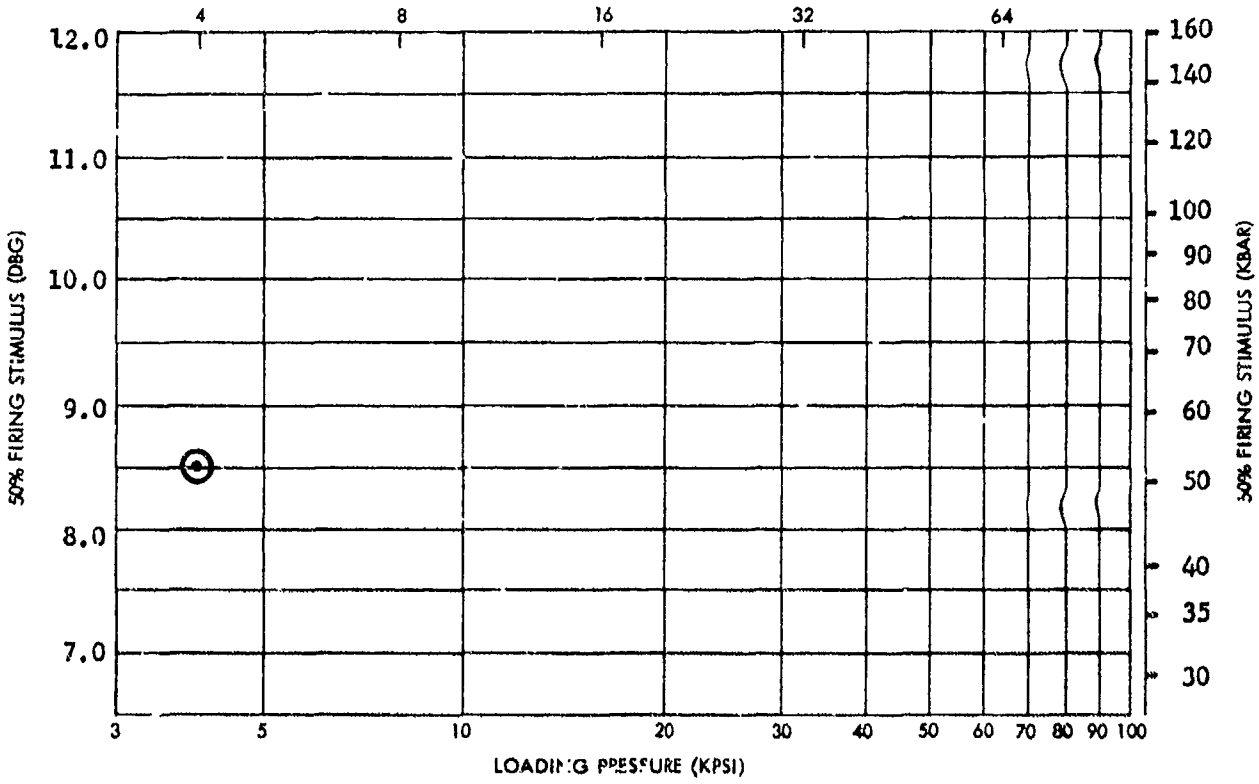
Remarks

*Composition:

RDX	77%
Tetryl	3%
TNT	4%
DNT	10%
MNT	5%
NC	1%

EXPLOSIVE	COMP C-4	X NO.	524	Date of Test 4/65
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.643	0.0044	-	8.508	0.0278	0.0196	23	



SMALL SCALE GAP TEST (SSGT) DATA
COMP C-4

CHEMICAL DATA

EXPLOSIVE NAME: COMP C-4 *

X NO.: 524 ID: Z NO.: SSGT LOAD ORDER NO.: 1028

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

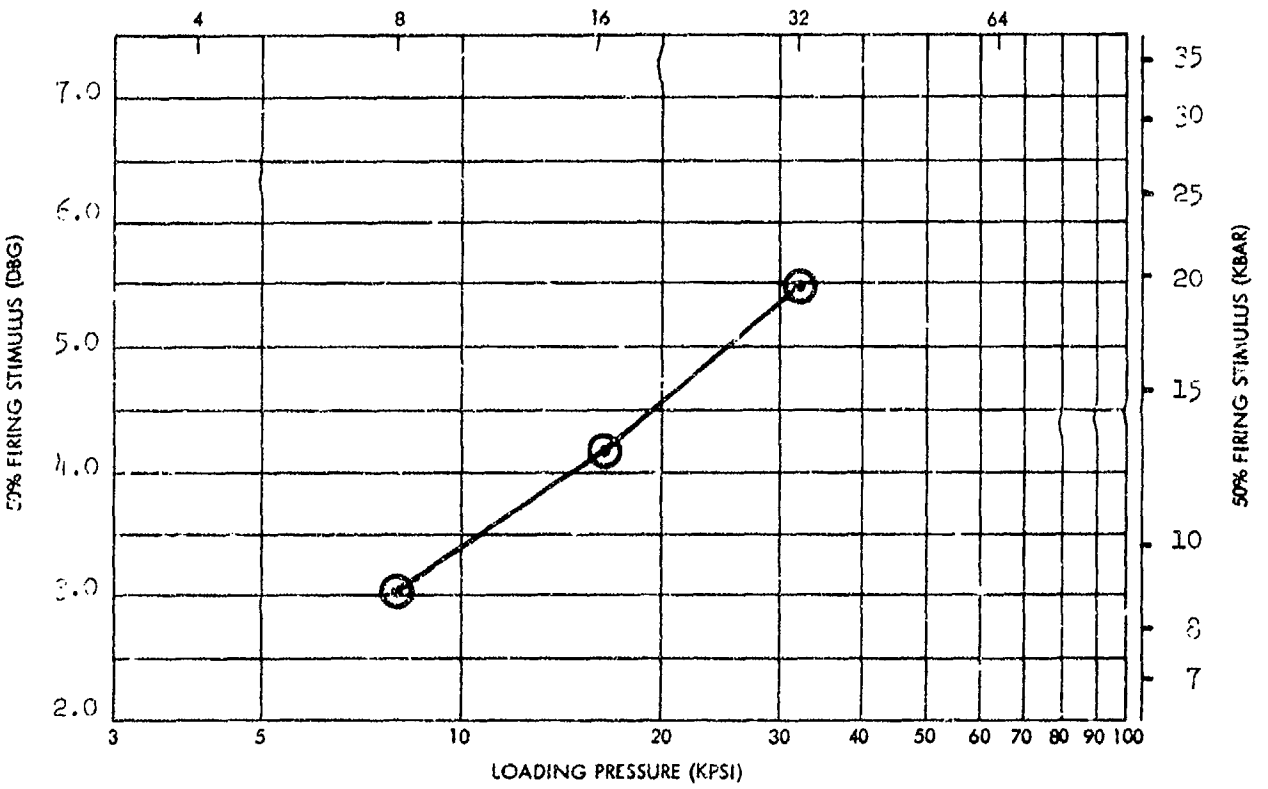
n =

Remarks
*Composition: RDX/Inert Plasticizer (91/9)

EXPLOSIVE	TNETB	Y NO.	563	Date of Test
TMD	1.72	I. D. NO.	-	7/66

LOADING PRESSURE (KFSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
0	1.563	0.0083	87.3	3.042	-	-	23	(1)
16	1.698	0.0046	94.9	4.193	0.0530	0.0306	23	
32	1.776	0.0023	99.2	5.497	0.0016	0.0022	23	

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
TNETB

F3a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: TNETB

X NO.: 563 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE: Yorktown
BOSO 166218
CHEMICAL NAME: Trinitroethyl-Trinitrobutyrate

DATE RECEIVED: 2/20/56 LOT NO.: 86-107-86

INITIAL QUANTITY: BATCH NO.: Al No. 801 889

MANUFACTURED BY:

Naugutuck Chemical
Naugutuck, Conn.
NC 84
PB 94, 99, 93, 93

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 18 cm

s = log units

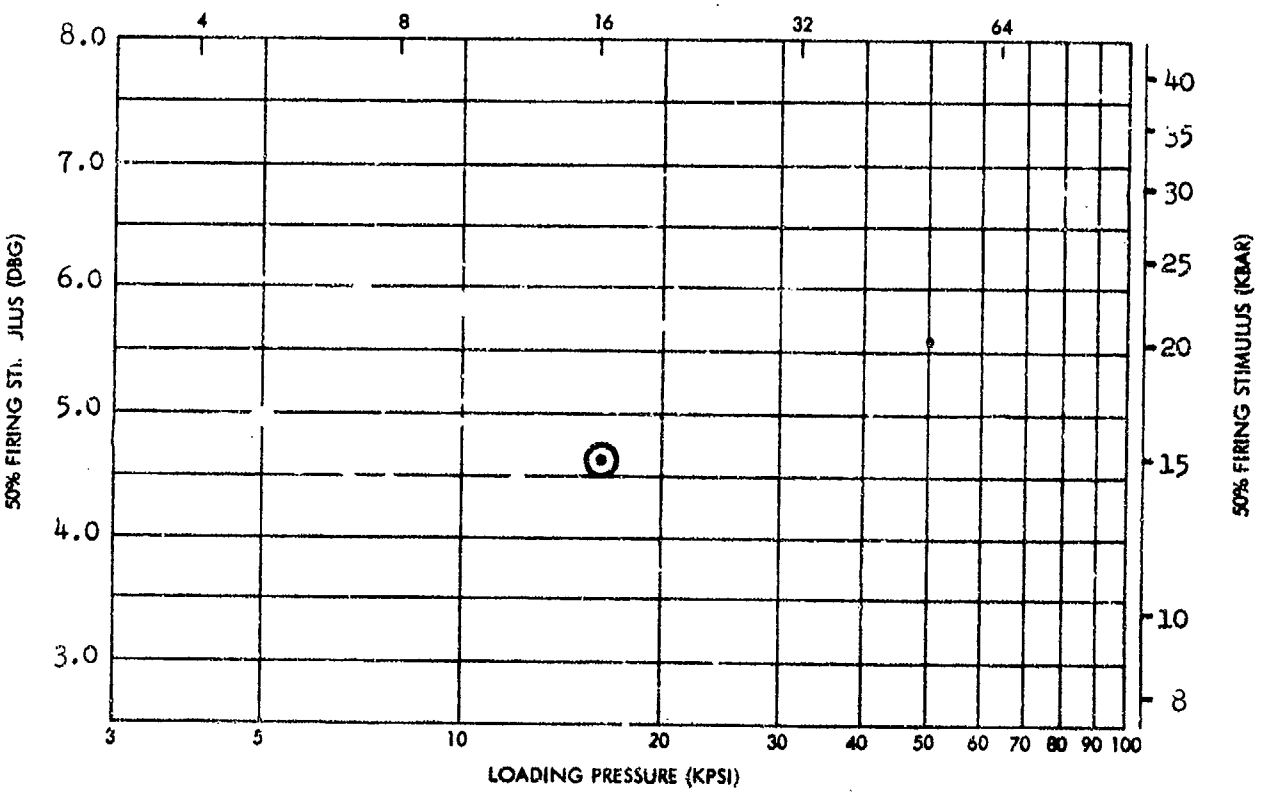
n =

Remarks

EXPLOSIVE	TNEDV	X NO.	579	Date of Test
TMD	-	I. D. NO.	-	9/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.436	0.0032	-	4.622	-	-	23	(1)

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
TNEDV

CHEMICAL DATA

EXPLOSIVE NAME: TNEDV

X NO.: 579 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME: 2,2,2-Trinitroethyl-4,4-dinitrovalerate

DATE RECEIVED: 8/18/66 NOL Notebook LOT NO.: 96-7696-pg 8

INITIAL QUANTITY: 500 grams BATCH NO.:

MANUFACTURED BY:

NOL: WO Division
Bldg 310
(Dr. K. Shipp)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

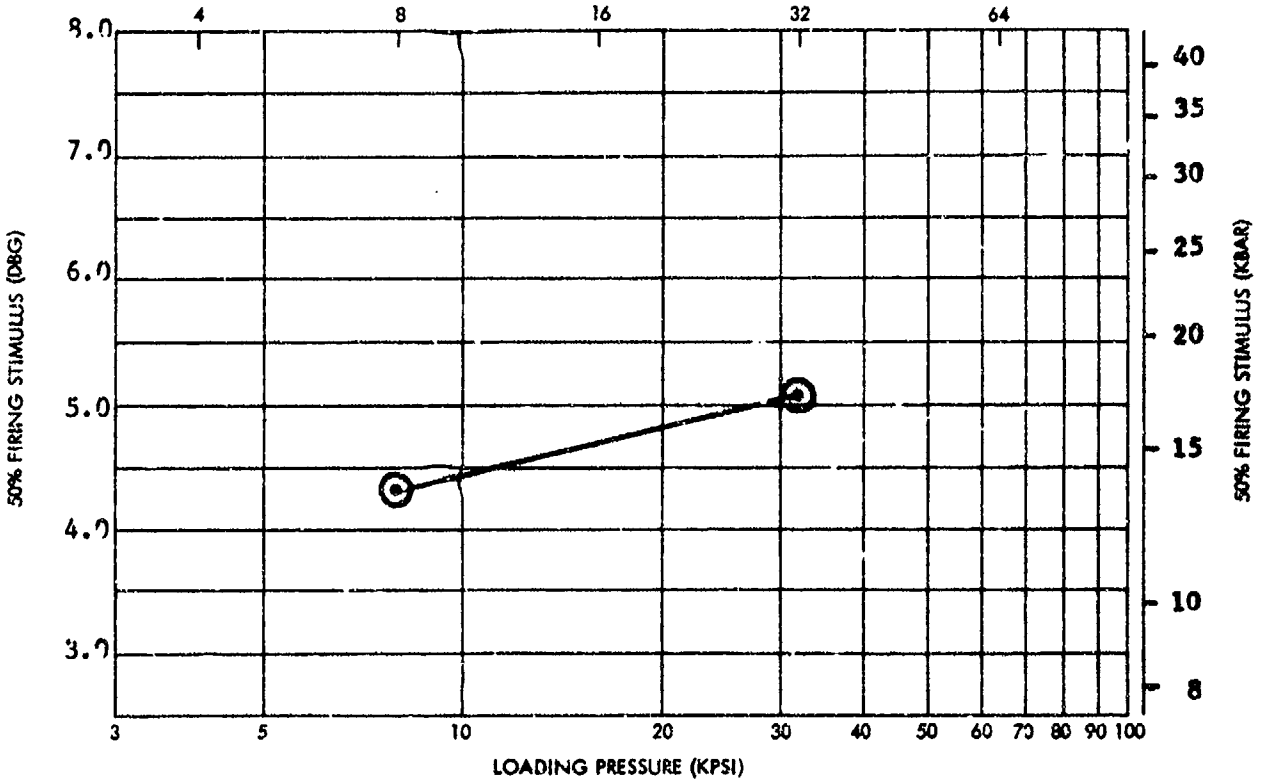
n =

Remarks

EXPLOSIVE	HNB (1)	X NO.	501	Date of Test 9/67
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.248	0.[illegible]	-	4.332	0.0470	0.0279	20	
8	-	-	-	4.376	0.0013	0.0012	20	(2)
32	1.570	0.0148	-	5.080	0.0422	0.0276	20	

(1) Hexanitrobiphenyl
(2) Date of test - 2/65



SMALL SCALE GAP TEST (SSGT) DATA
HNB

CHEMICAL DATA

EXPLOSIVE NAME: HNB*

X NO.: 501 ID: Z NO.: 575 SSGT LOAD ORDER NO.: 1010 & 1188

SOURCE:

CHEMICAL NAME: Hexanitrobiphenyl

DATE RECEIVED: 9/1/64 LOT NO.: NOL Notebook 96-7310-pg 24-1

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

NOL: WO Division
Bldg 310
(Dr. J. Dacons)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 67 cm

s =0.27 log units

n =

$\bar{x}$ = 85 cm

s =0.12 log units

$\bar{x}$ = 56 cm

s =0.12 log units

$\bar{x}$ = 85 cm

s =0.28 log units

Remarks

*Recrystallized

4 Sep 1973

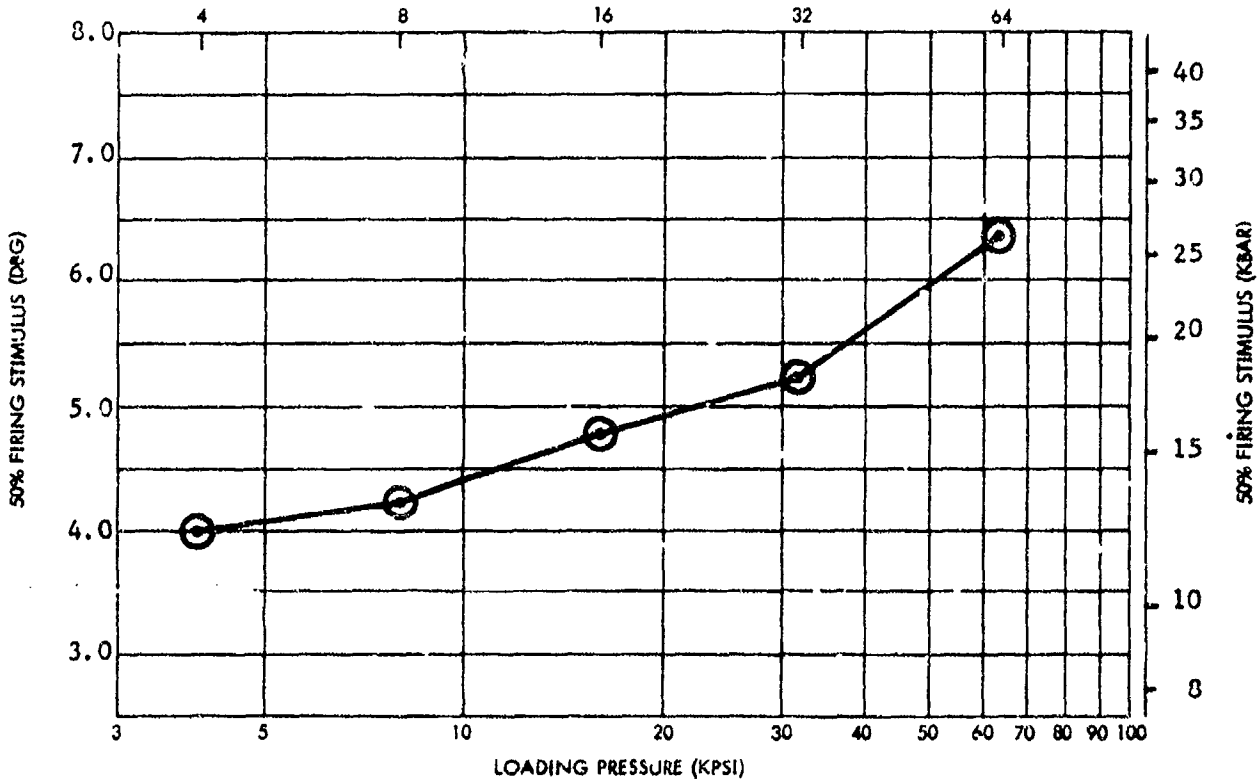
EXPLOSIVE	EPM-2 (1)	X NO.	-
TMD	1.87	I. D. NO.	-

Date of Test: 6/61

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	$s_{\bar{x}}$	N	
4	1.550	0.0059	82.9	4.000	0.0155	0.0167	20	
8	1.634	0.0061	87.4	4.257	0.0787	0.0496	18	
16	1.724	0.0038	92.2	4.732	-	-	18	(2)
32	1.798	0.0016	96.2	5.243	0.0040	0.0054	17	
64	1.846	0.0030	98.7	6.364	-	-	18	(2)

(1) EPM-2 is an HMX analogue of CH-6

(2) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
EPM-2 (1)

NOL 73-132

CHEMICAL DATA

EXPLOSIVE NAME: EPM-2 (1)

X NO.: ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

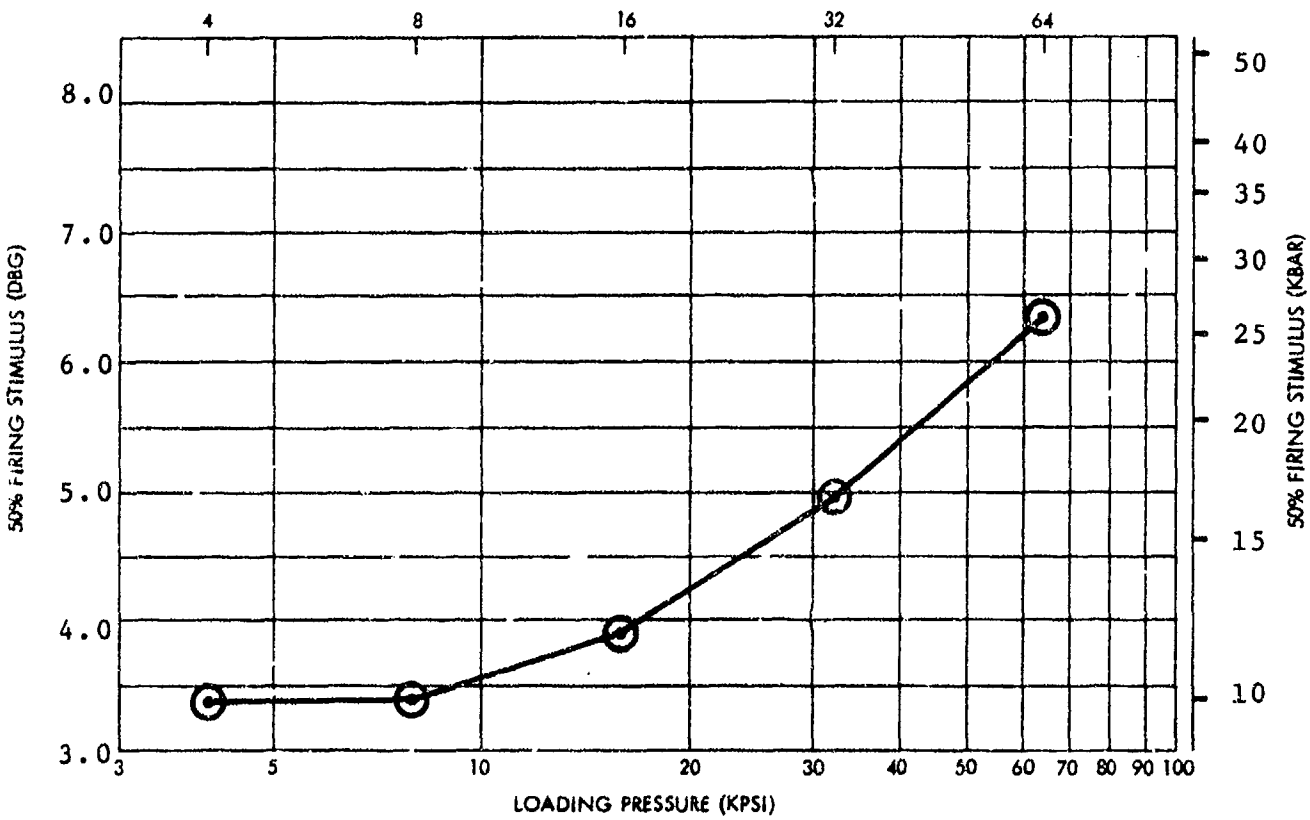
s = log units

n =

Remarks
(1) EPM-2 is an HMX analogue of CH-6

EXPLOSIVE	RDX/CA-ST (99.4/0.6)	X NO.	348	Date of Test
TMD	1.802	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.439	0.0070	79.9	3.374	0.0774	0.0450	20	
8	1.513	0.0062	84.0	3.399	0.0315	0.0222	20	
16	1.611	0.0059	89.4	3.901	0.0472	0.0293	20	
32	1.699	0.0050	94.3	4.941	0.0913	0.0615	20	
64	1.763	0.0084	97.8	6.340	0.0943	0.0520	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (99.4/0.6)

Glal

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (99.4/0.6)

X NO.: 348 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 790

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/30/61 **LOT NO.:** HOL-SR-114-60

INITIAL QUANTITY: 1 pound* **BATCH NO.:** 86-369-1

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ẍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẍ = cm

s = log units

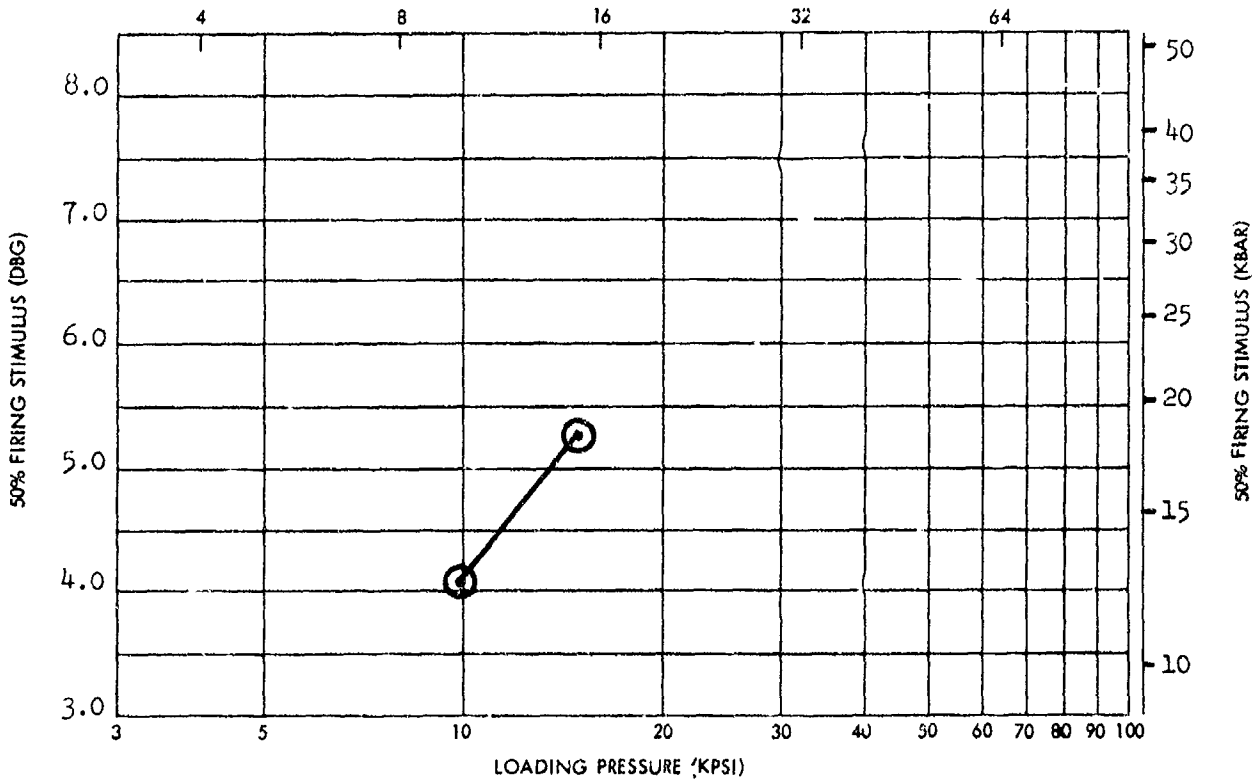
n =

Remarks

*Approximately 100 pounds, manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 0.7% analysis for % Calcium Stearate was 0.59 ± 0.05.

EXPLOSIVE	RDX/CA-ST, (99.3/0.7)	X NO.	302	Date of Test
TMD	-	I. D. NO.	-	4/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.588	0.0055	-	4.066	0.0211	0.0123	46	
15	1.708	0.0051	-	5.316	0.0387	0.0163	46	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (99.3/0.7)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (99.3/0.7)

X NO.: 302 ID: Z NO.: 280 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318
(Reynolds)

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

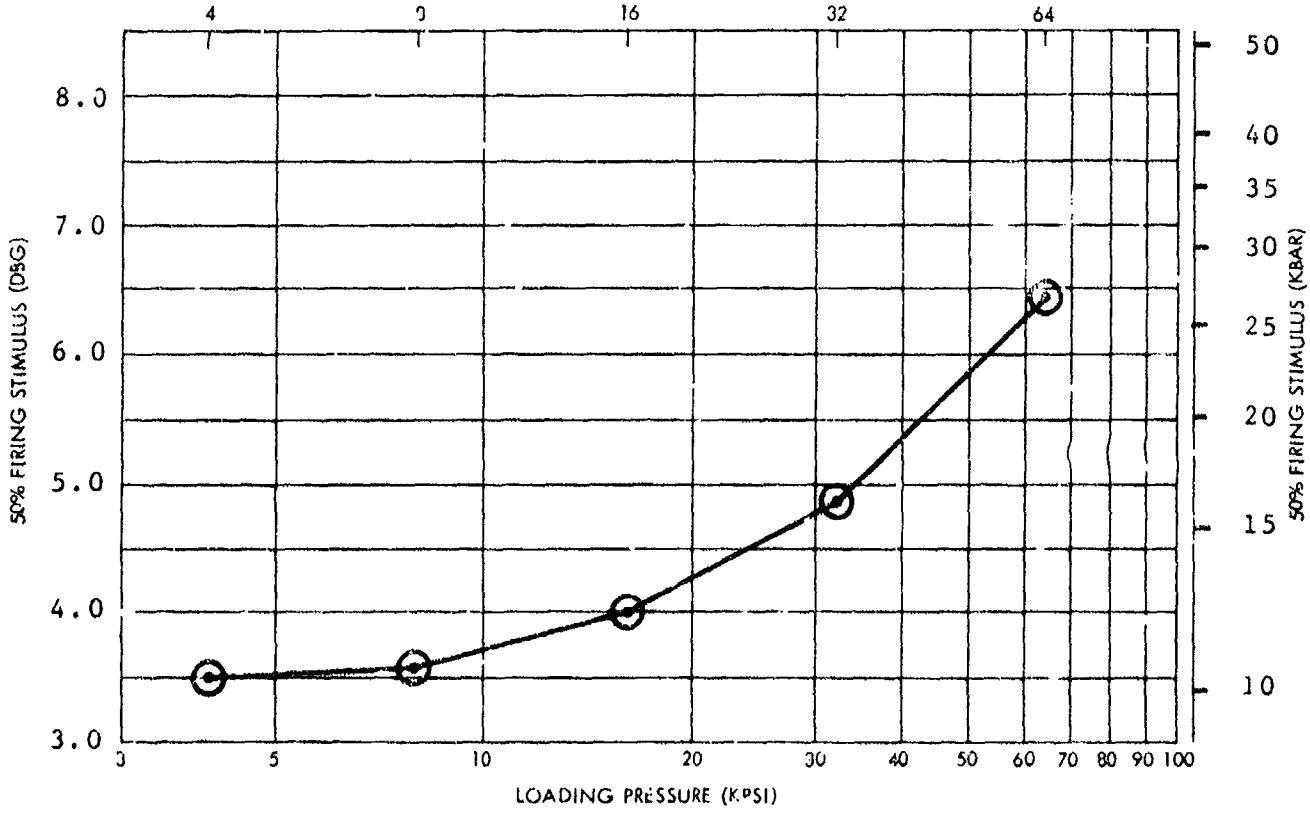
s = log units

n =

Remarks

EXPLOSIVE	RDX/CA-ST (99.2/0.8)	X NC.	349	Date of Test
TMD	1.799	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.442	0.0022	80.3	3.501	0.0299	0.0232	20	
8	1.513	0.0041	84.1	3.576	0.0328	0.0245	20	
16	1.598	0.0026	88.8	3.995	0.0325	0.0234	20	
32	1.701	0.0050	94.5	4.844	0.0305	0.0222	20	
64	1.767	0.0054	98.2	6.424	0.0637	0.0384	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (99.2/0.8)

NOLTR 73-132

CHEMICAL DATA

3

EXPLOSIVE No.: RDX/Calcium Stearate (99.2/0.8)

LOT NO.: 369 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/30/61 LOT NO.: HCL-SR-115-60

INITIAL QUANTITY: * BATCH NO.: 86-369-2

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

Remarks

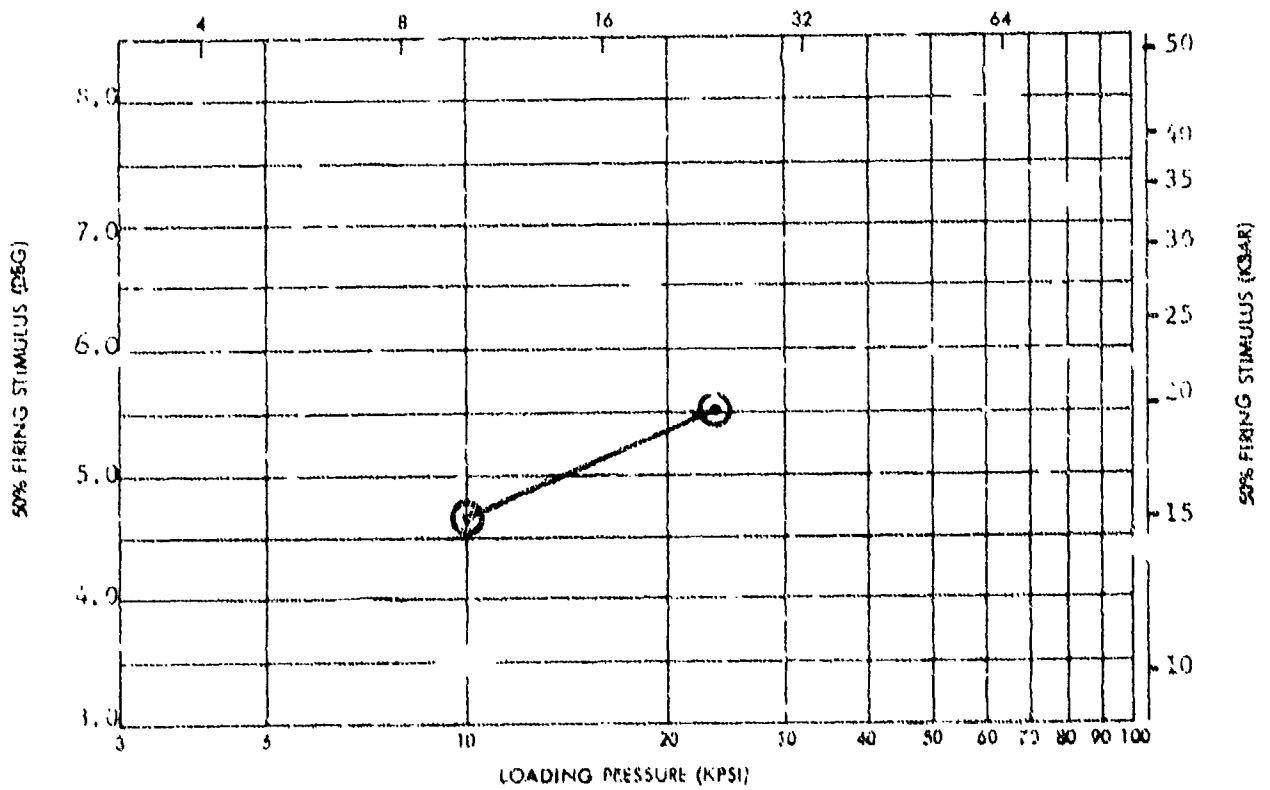
*Approximately 100 pounds, manufactured for NOL Corona. NOL-WC received 1 pound for calibration. Analysis for % calcium stearate was 0.85 ± 0.15

4 Sep 1973

EXPLOSIVE	RDX/CA-ST (98.6/1.4)	X NO.	208	Date of Test
TMD	-	I. D. NO.	-	12/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DRG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.590	0.0039	-	4.641	0.0095	0.0084	46	
24	1.703	0.0098	-	5.520	0.0109	0.0137	46	

(1) Date of Test - 4/60



SMALL SCALE GAP TEST (SSGT) DATA

RDX/CA-ST (98.6/1.4)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (98.6/1.4)

X NO.: 208 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 9/7/55 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318
(Canter, Reynolds)

IMPACT SENSITIVITY (50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = **cm**

s = **log units**

n =

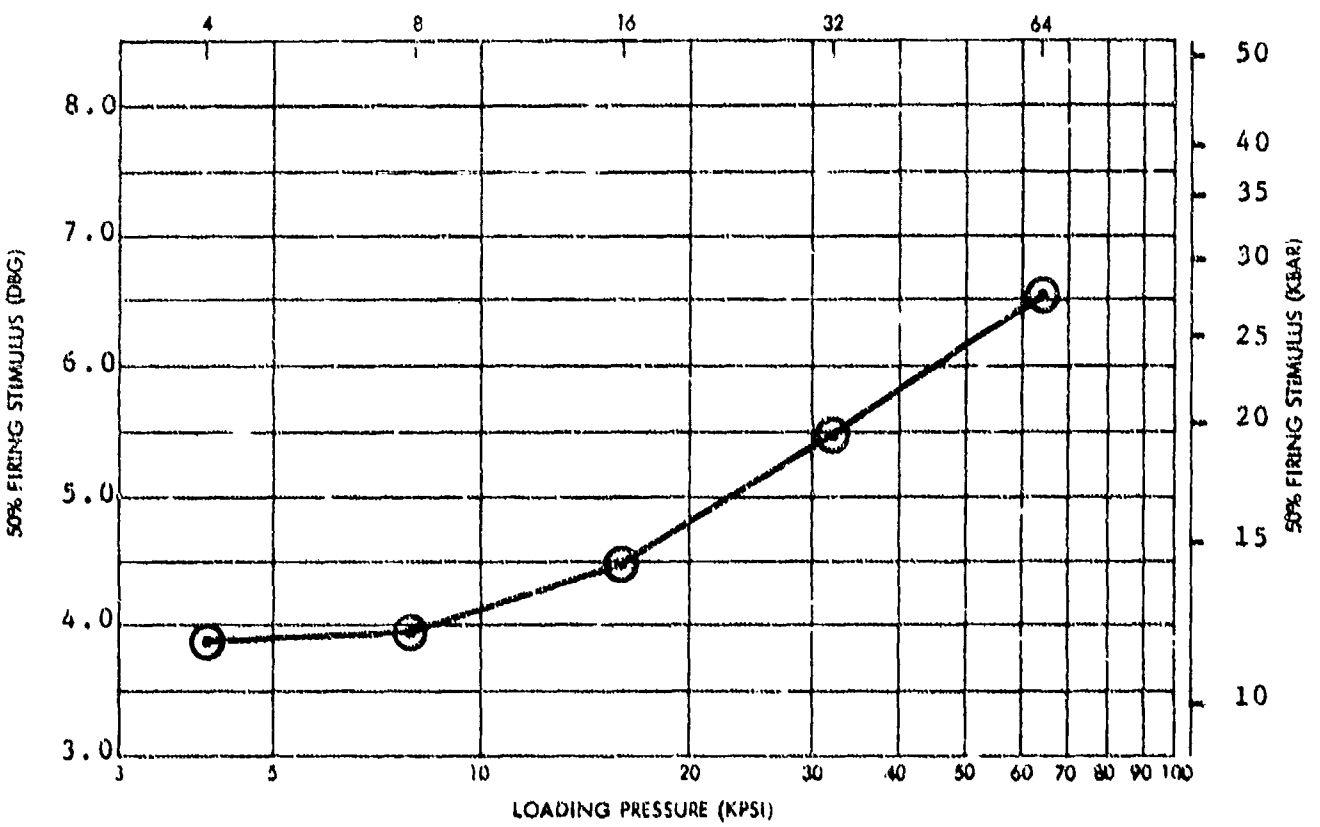
Remarks

(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST (98.3/1.7)	X NO.	350	Date of Test
TMD	1.788	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.450	0.0089	81.1	3.882	0.0232	0.0174	20	
8	1.531	0.0099	85.7	3.950	0.1010	0.0562	20	
16	1.621	0.0093	90.7	4.475	0.1038	0.0583	20	
32	1.708	0.0053	95.5	5.473	0.0279	0.0219	20	
64	1.760	0.0039	98.4	6.526	0.0576	0.0384	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (98.3/1.7)

Glel

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (98.3/1.7)

X NO.: 350 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/30/61 LOT NO.:

INITIAL QUANTITY: * BATCH NO.: 86-369-3

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

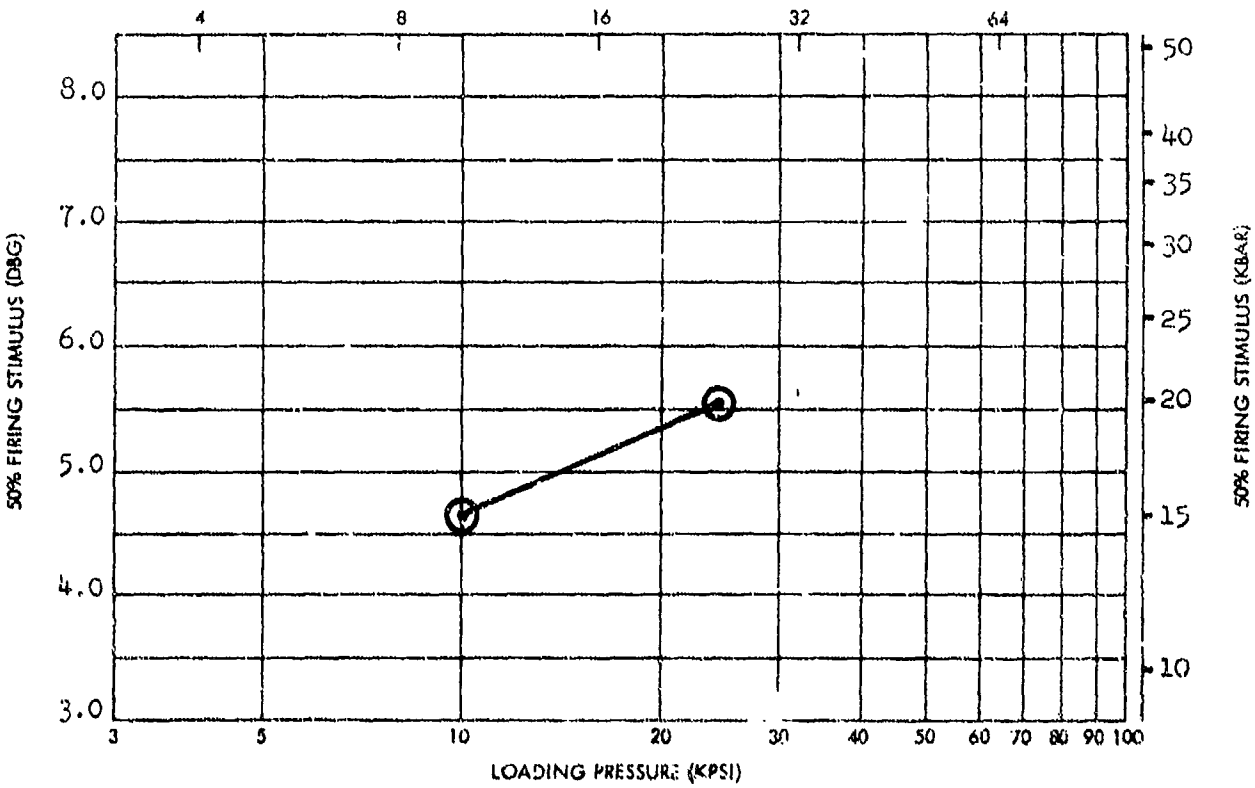
Remarks

*Approximately 100 pounds, manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 2.0%. Analysis for % Calcium Stearate was 1.65 $\pm$ 0.06.

EXPLOSIVE	RDX/CA-ST. (98/2)	X NO.	215	Date of Test 12/59
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10.	1.596	0.0028	-	4.659	0.0424	0.0175	46	
24.25	1.702	0.0047	-	5.560	0.2229	0.0717	45	(1)

(1) Date of Test - 5/60



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (98/2)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (98.0/2.0)

X NO.: 215 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

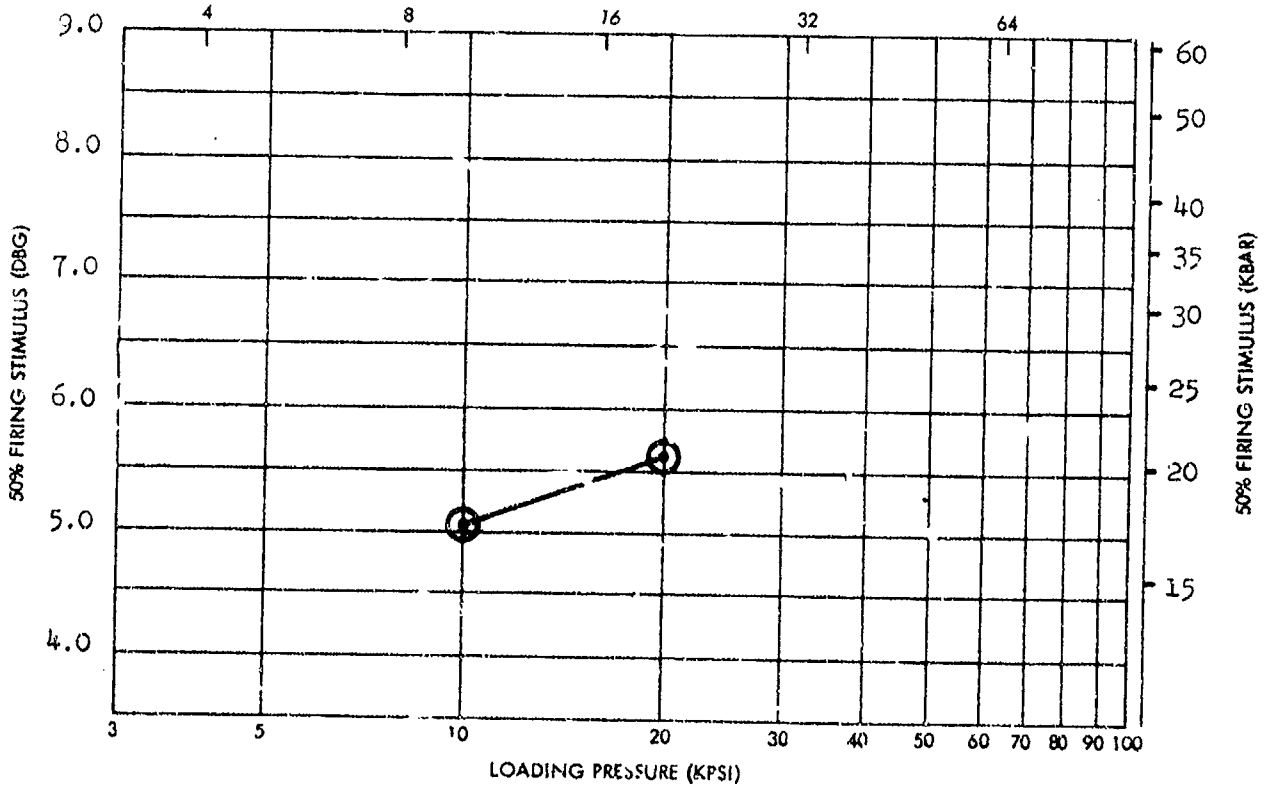
4 Sep 1973

EXPLOSIVE	RDX/CA-ST, (98/2)	X NO.	281
TMD	-	I. D. NO.	-

Date of Test 12/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.603	0.0031	-	5.030	0.0661	0.0237	46	
20	1.688	0.0045	-	5.629	0.1827	0.0588	46	(1)

(1) **Date of Test - 5/60**



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (98/2)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (98.0/2.0)

X NO.: 281 **ID:** **Z NO.:** 283 **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 8/26/58 **LOT NO.:**

INITIAL QUANTITY: 4 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = **cm**

s = **log units**

n =

Remarks

(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

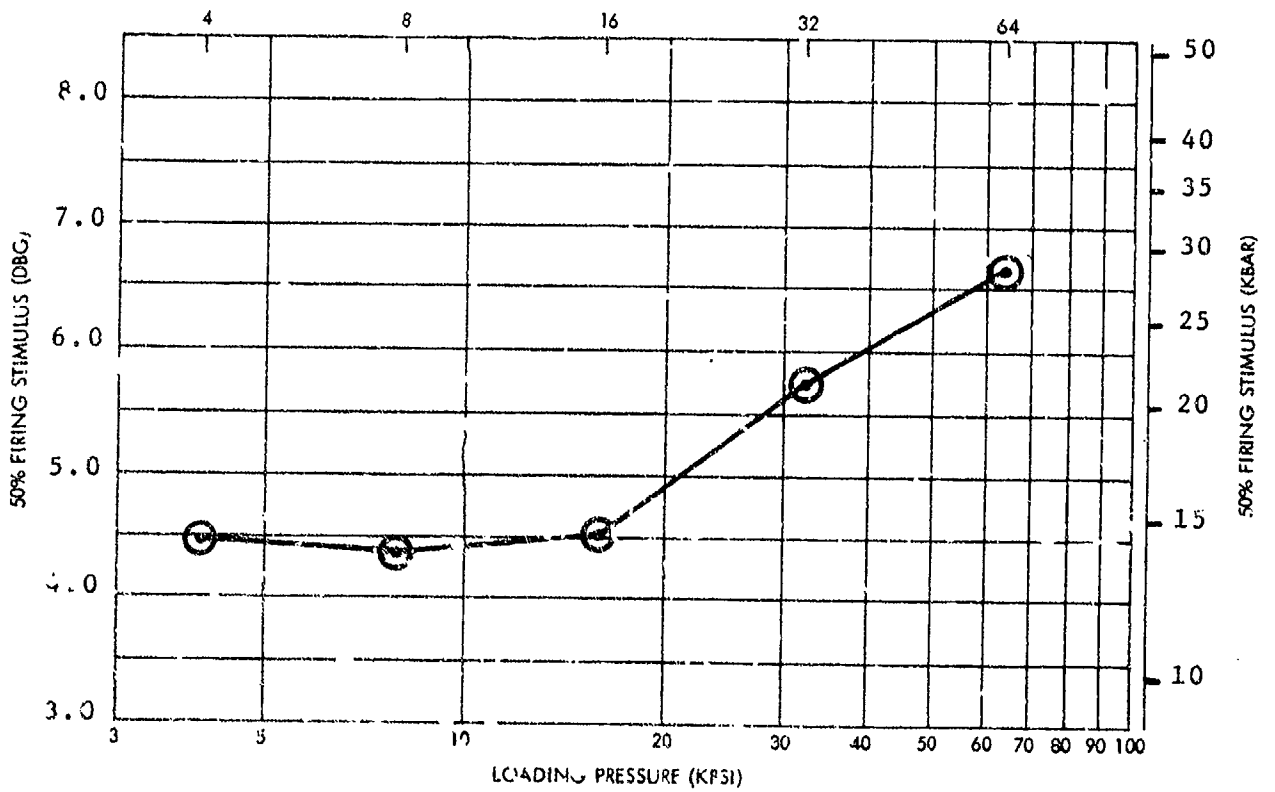
*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE | RDX/CA-ST (97.5/2.5) X NO. | 353 Date of Test

TMD | 1.777 I. D. NO. | - 4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.468	0.0079	82.6	4.471	0.0538	0.0338	20	
8	1.540	0.0087	86.7	4.359	-	-	20	(1)
16	1.639	0.0105	92.2	4.510	0.0489	0.0329	20	
32	1.710	0.0054	96.2	5.748	0.0330	0.0229	20	
64	1.752	0.0046	98.6	6.642	0.0531	0.0341	20	

(1) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (97.5/2.5)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (97.5/2.5)

X NO.: 353 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 793

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/30/61 **LOT NO.:**

INITIAL QUANTITY: * **BATCH NO.:** 86-369-45

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

n =

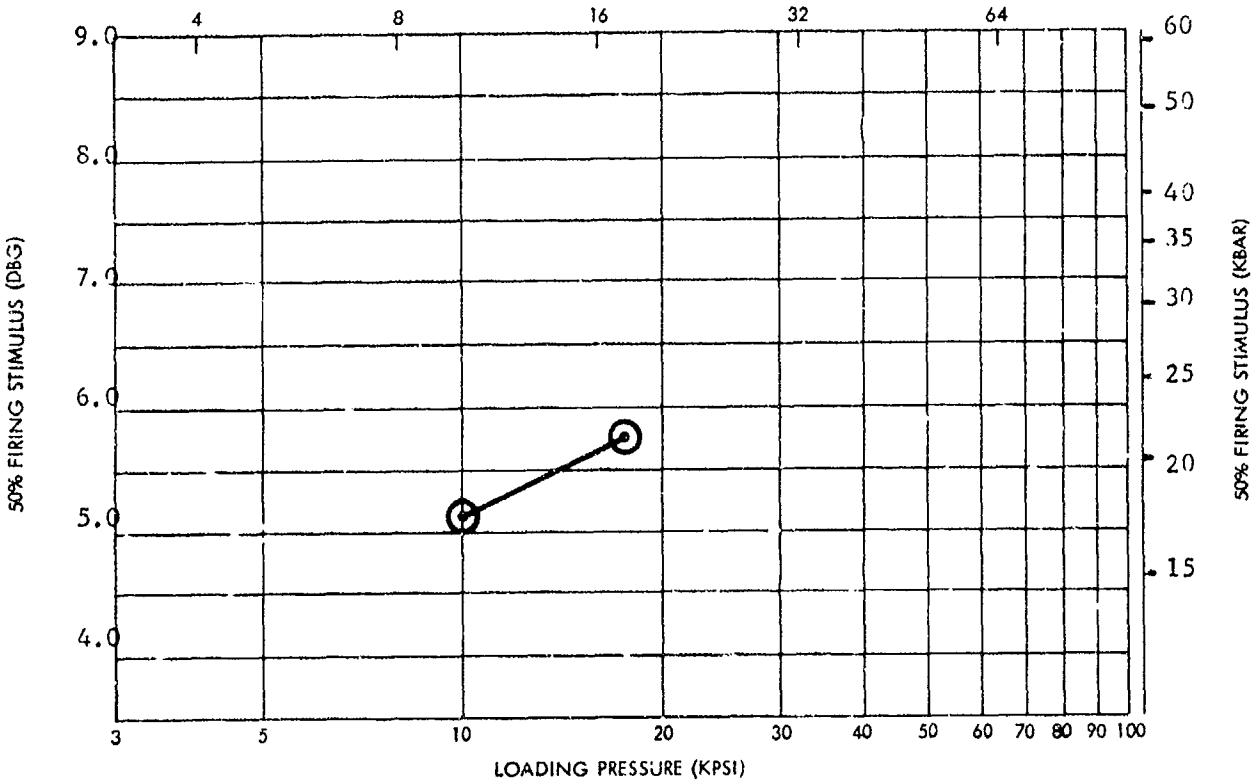
Remarks

*Approximately 200 pounds, made in two 100-pound batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 2.8%. Analysis for % Calcium Stearate was 1.65 $\pm$ 0.06.

EXPLOSIVE	RDX/CA-ST, (97.2/2.8)	X NO.	209	Date of Test
TMD	-	I. D. NO.	-	10/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10.0	1.614	0.0050	-	5.136	0.0257	0.0114	95	
17.5	1.689	0.0037	-	5.785	0.1492	0.0491	46	(1)

(1) Date of Test - 5/60



SMALL SCALE GAP TEST (SSGT) DATA

RDX/CA-ST, (97.2/2.8)

Glil

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (97.2/2.8)

X NO.: 209 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 9/6/55 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

HOL: WE Division
Bldg 318
(Canter, Reynolds)

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = **cm**

s = **log units**

n =

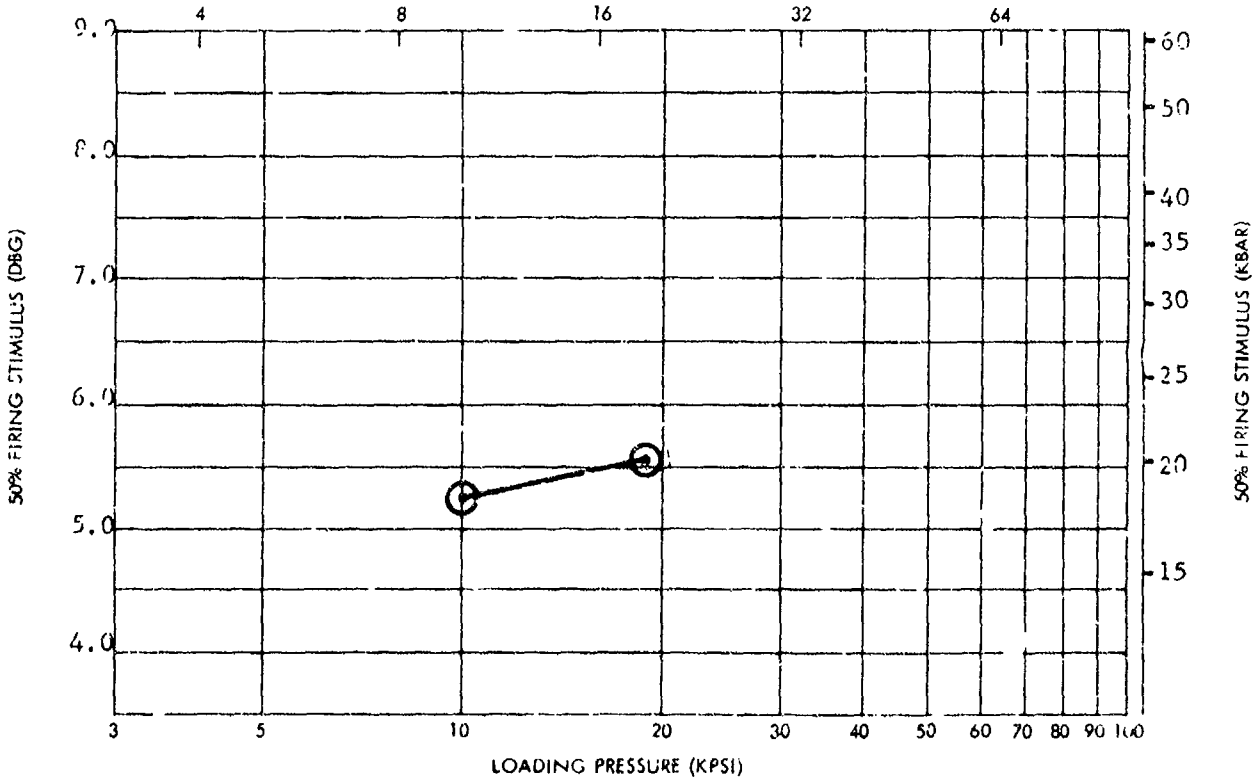
Remarks

(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST, (97.2/2.8)	X NO.	282	Date of Test
TMD	-	I. D. NO.	-	12/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.608	0.0064	-	5.244	0.0240	0.0110	46	
19	1.680	0.0048	-	5.541	0.1008	0.0359	42	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (97.2/2.8)

Glj1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX Calcium Stearate (97.2/2.8)

X NO.: 282 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 8/26/59 LOT NO.:

INITIAL QUANTITY: 4 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

n =

Remarks

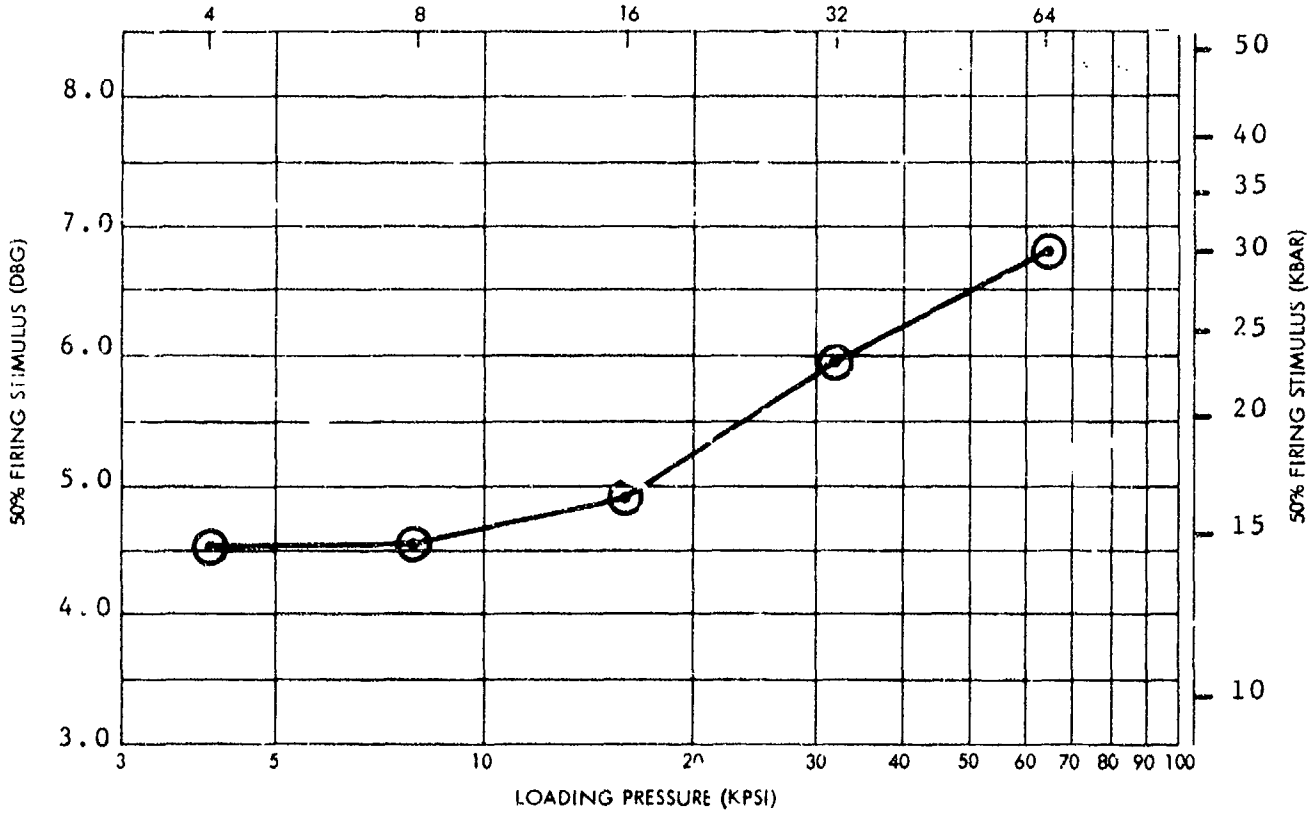
(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST (96.7/3.3)	X NO.	354	Date of Test
TMD	1.767	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.482	0.0045	83.8	4.538	0.0849	0.0497	20	
8	1.562	0.0106	88.4	4.558	0.0423	0.0287	20	
16	1.653	0.0038	93.5	4.901	-	-	20	(1)
32	1.716	0.0020	97.1	5.963	-	-	20	(1)
64	1.742	0.0034	98.6	6.817	0.0338	0.0256	20	

(1) No mixed response zone.



SMALL SCALE CAP TEST (SSCT) DATA
RDX/CA-ST (96.7/3.3)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (96.7/3.3)

X NO.: 354 ID: Z NO.: SSGT LOAD ORDER NO.: 794

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/30/61 LOT NO.:

INITIAL QUANTITY: * BATCH NO.: 96-369-6/7

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

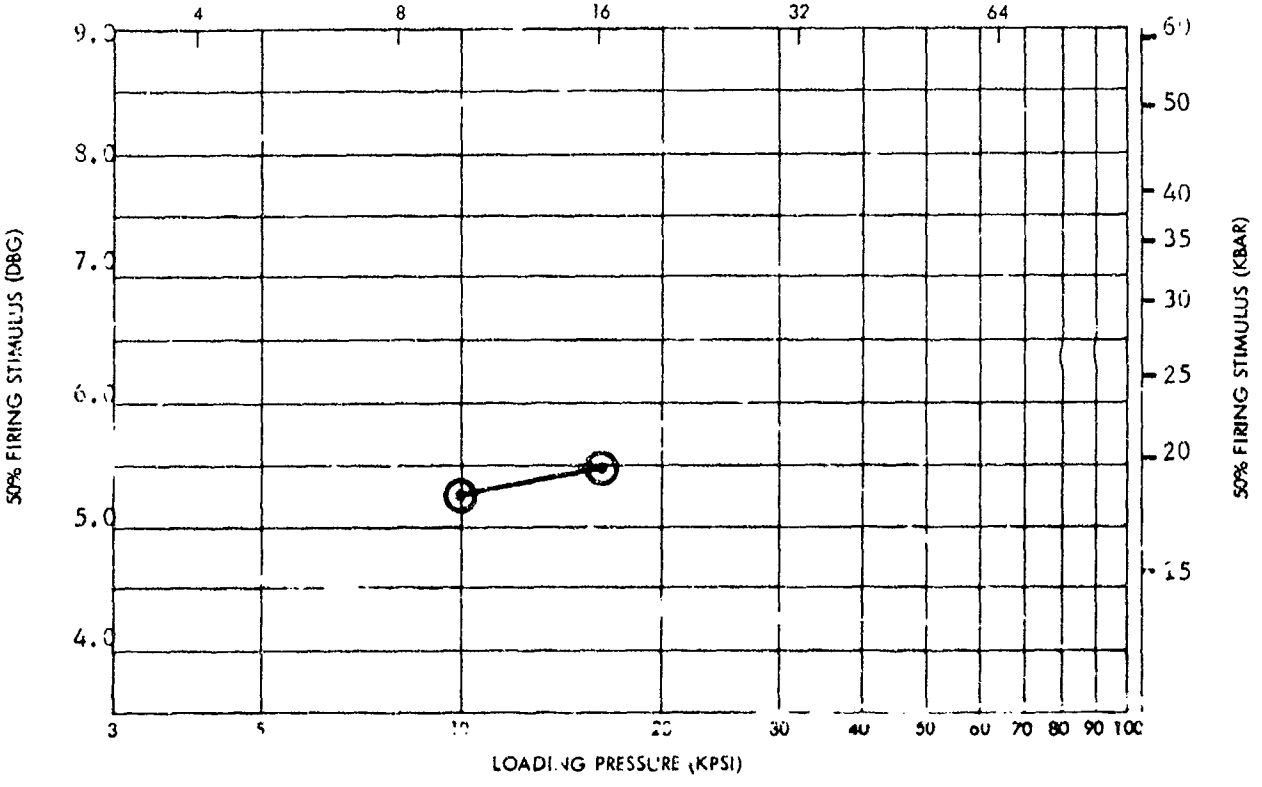
Remarks

*Approximately 200 pounds, made in two 100-pound sub-batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 4.0%. Analysis for % Calcium Stearate was 3.34 $\pm$ 0.14.

EXPLOSIVE	RDX/CA-ST, (96/4)	X NO.	210	Date of Test
TMD	-	I. D. NO.	-	10/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.619	0.0053	-	5.251	0.0558	0.0193	96	
16.3	1.679	0.0023	-	5.494	0.0285	0.0121	46	(1)

(1) Date of Test - 7/60



SMALL SCALE GAP TEST (SSGT) DATA

RDX/CA-ST, (96/4)

G1&1

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (96.0/4.0)

X NO.: 210 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 9/7/55 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318
(Canter, Reynolds)

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = **cm**

s = **log units**

n =

Remarks

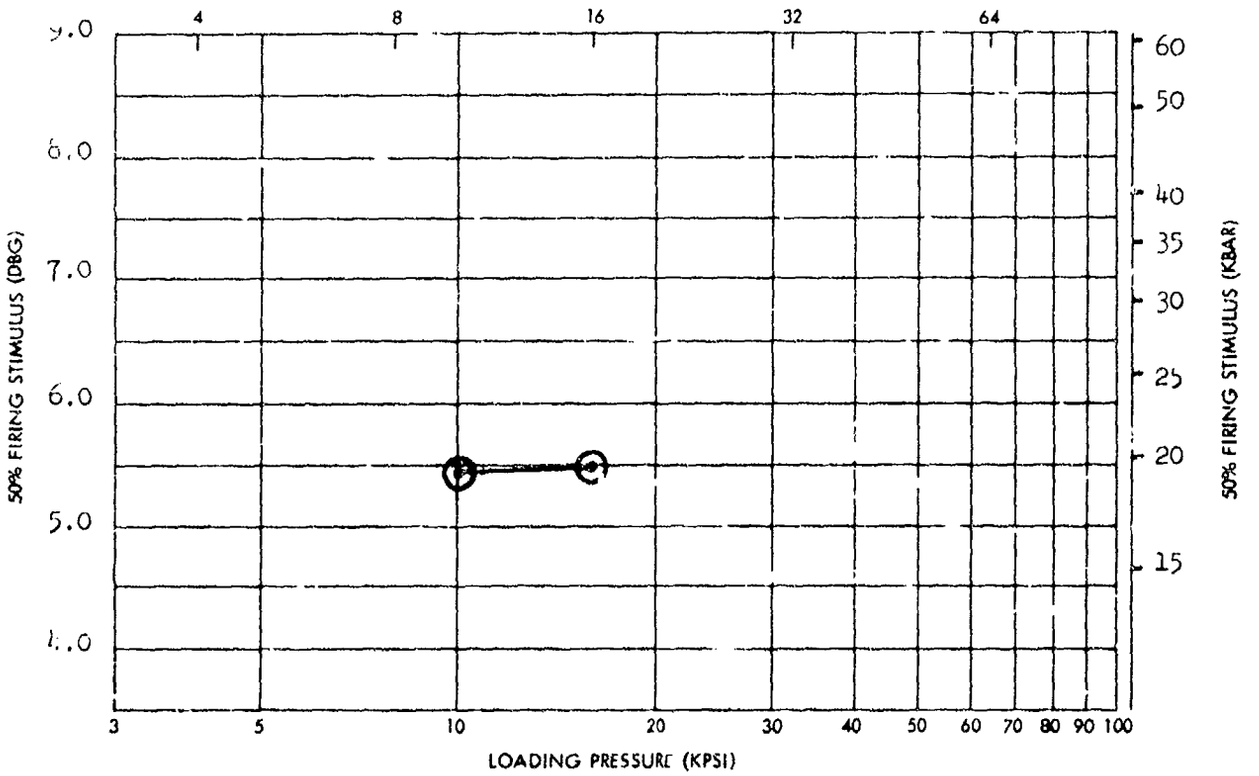
(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-8T, (96/4)	X NO.	283	Date of Test 12/59
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.608	0.0026	-	5.459	0.0632	0.0287	46	
16	1.675	0.0043	-	5.493	0.0529	0.0200	46	(1)

(1) Date of test - 7/60



SMALL SCALE GAP TEST (SSGT) DATA

RDX/CA-8T, (96/4)

G1m1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (96.0/4.0)

X NO.: 283 **ID:** **Z NO.:** 285 **SSGT LOAD ORDER NO.:**

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/26/58 **LOT NO.:**

INITIAL QUANTITY: 5 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

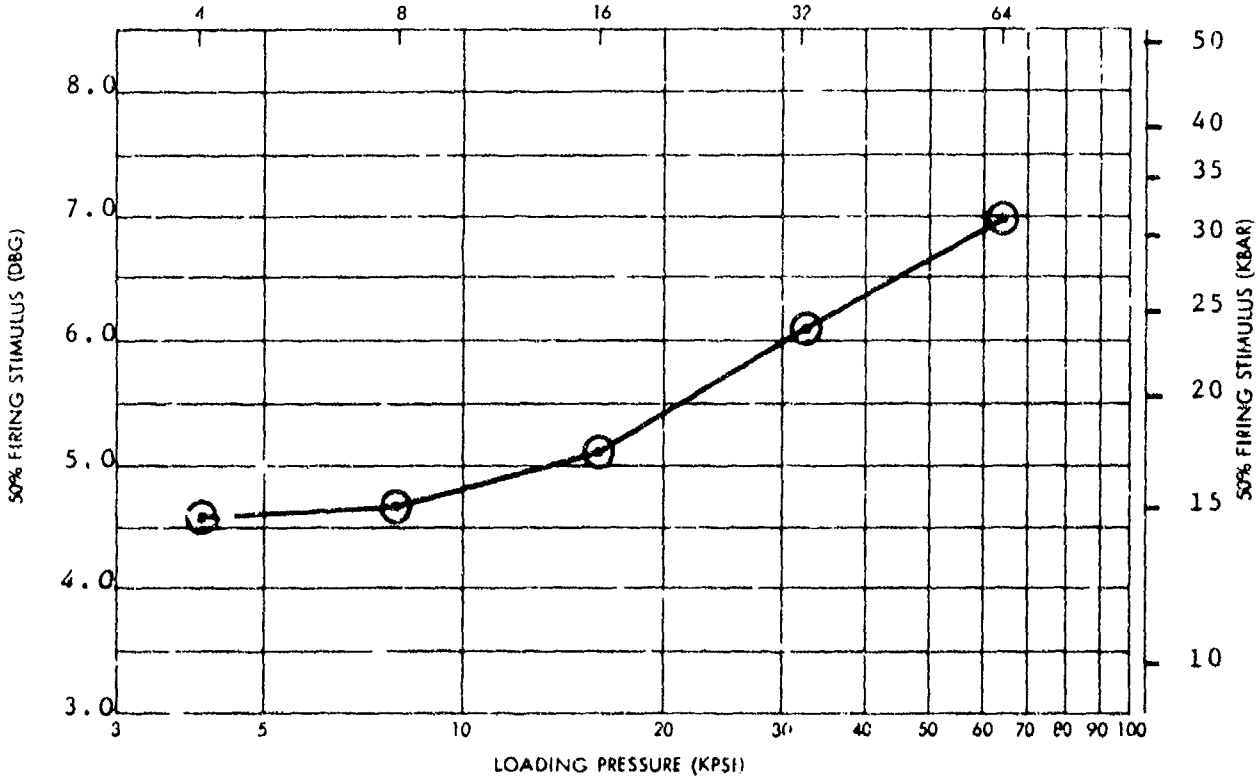
Remarks

G l m ?

4 Sep 1973

EXPLOSIVE	RDX/CA-ST (95.0/5.0)	X NO.	358	Date of Test
TMD	1.745	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.487	0.0076	85.2	4.584	0.0391	0.0280	20	
8	1.566	0.0052	89.7	4.662	0.0693	0.0426	20	
16	1.652	0.0028	94.6	5.103	0.0286	0.0232	20	
32	1.701	0.0017	97.5	6.087	0.0457	0.0327	20	
64	1.727	0.0054	99.0	6.981	0.1467	0.0792	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (95.0/5.0)

Glnl

4 Sep 1973

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (95.0/5.0)

X NO.: 358 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 795

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/31/61 **LOT NO.:**

INITIAL QUANTITY: * **BATCH NO.:** 86-369-8/9/10

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

n =

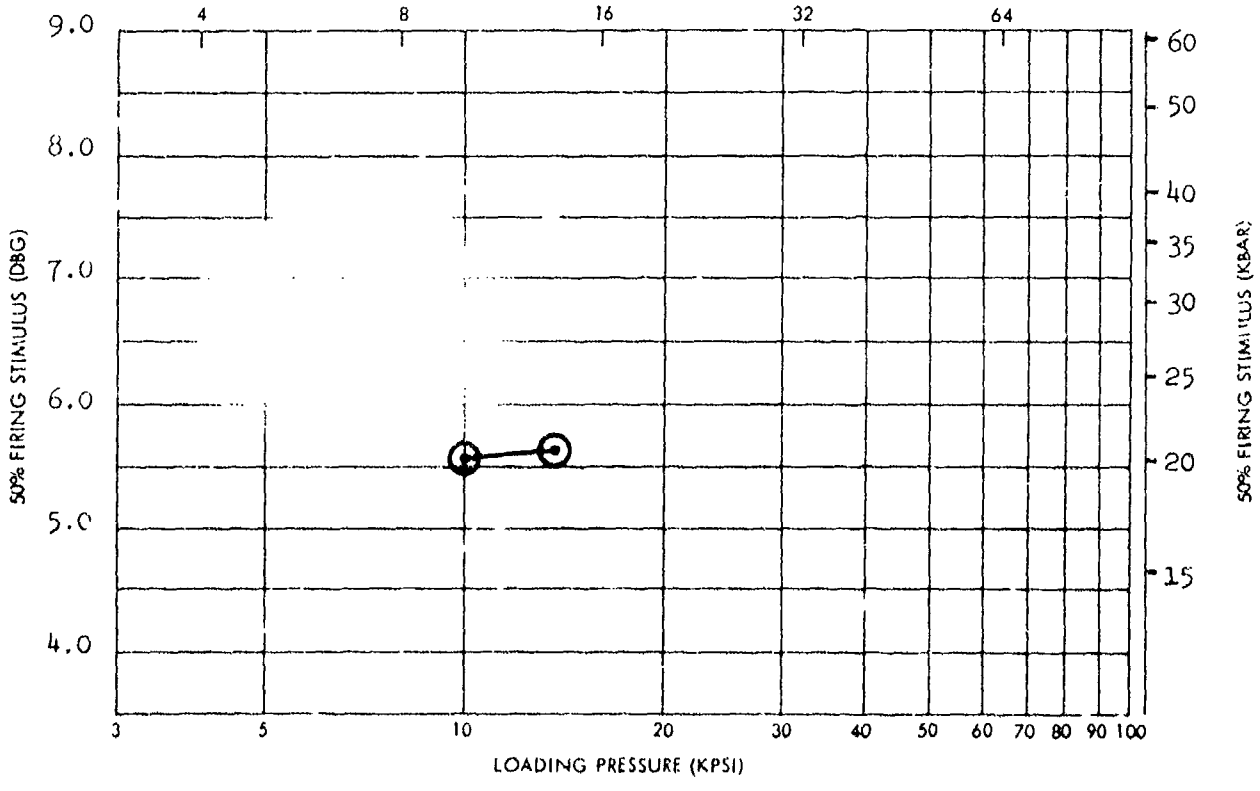
Remarks

*Approximately 300 pounds, made in three 100-pound sub-batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 5.6%. Analysis for % Calcium Stearate was 4.99 ± 0.28.

EXPLOSIVE	RDX/CA-ST, (94.4/5.6)	X NO.	211	Date of Test
TMD	-	I. D. NO.	-	10/54

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10.0	1.622	0.0040	-	5.574	0.0210	0.0112	96	
14.3	1.658	0.0044	-	5.631	0.0347	0.0139	46	(1)

(1) Date of test - 9/60



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (94.4/5.6)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (94.4/5.6)

X NO.: 211 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 9/7/55 LOT NO.:

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318
(Canter, Reynolds)

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

n =

Remarks

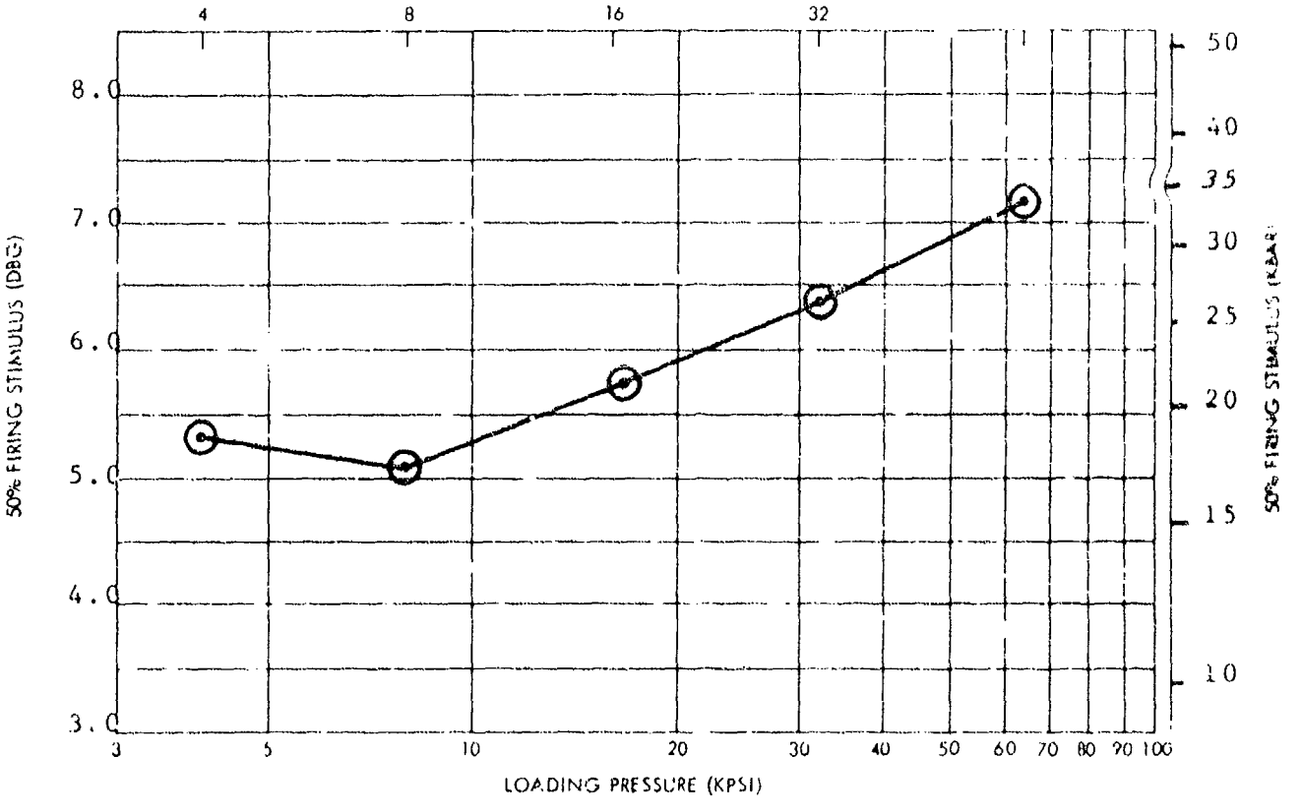
(1) RDX X NO. 189 "Chemical Precipitation Methods. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

4 Sep 1973

EXPLOSIVE	RDX/CA-ST (93.9/6.1)	X NO.	362	Date of Test
TMD	1.729	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.502	0.0076	86.7	5.311	0.1830	0.0985	20	
8	1.568	0.0078	90.5	5.096	0.0631	0.0419	20	
16	1.649	0.0043	95.1	5.704	0.0162	0.0146	20	
32	1.685	0.0023	97.2	6.374	0.3609	0.1730	20	
64	1.701	0.0037	98.2	7.177	0.1167	0.0647	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (93.9/6.1)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (93.9/6.1)

X NO.: 362 ID: Z NO.: SSGT LOAD ORDER NO.: 796

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/31/61 LOT NO.:

INITIAL QUANTITY: * BATCH NO.: 86/369-11/12/13

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

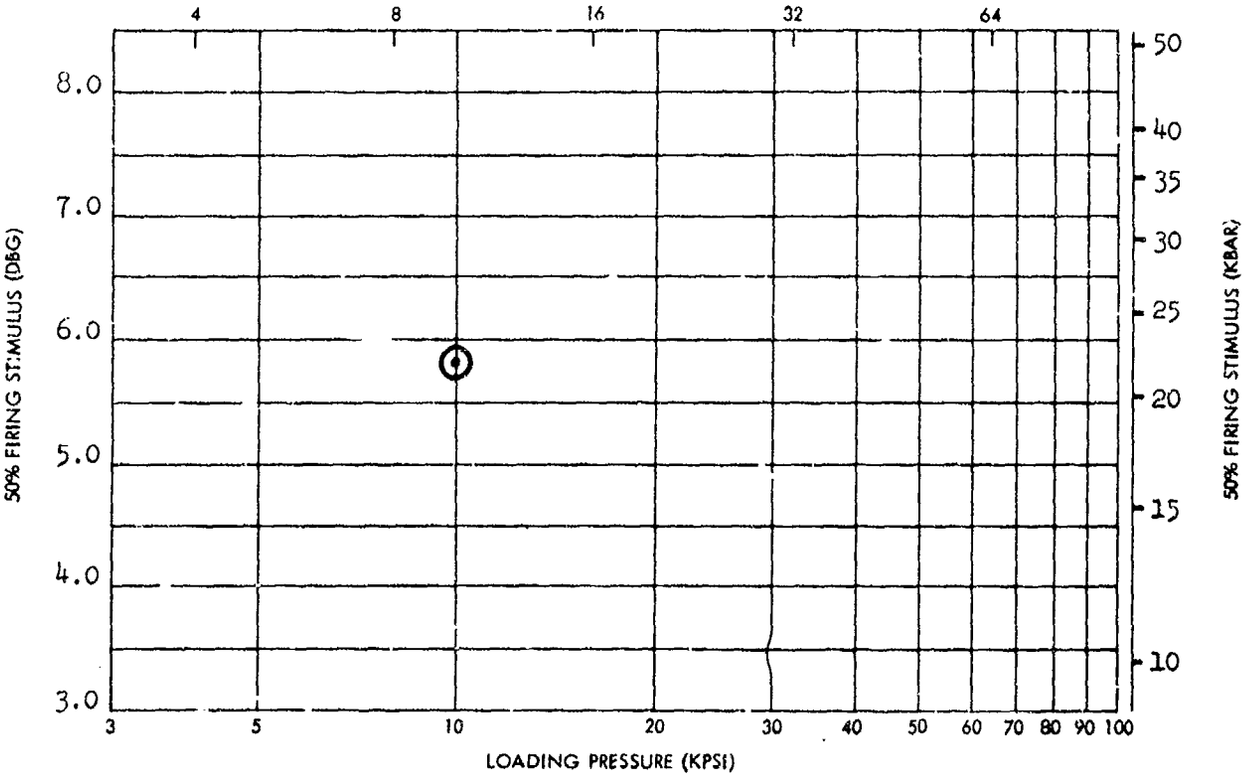
Remarks

*Approximately 300 pounds, made in three 100-pound sub-batches blended together; manufactured for NOL Corona, NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 6.0%. Analysis for % Calcium Stearate was 6.07 ± 0.09.

4 Sep 1973

EXPLOSIVE	RDX/CA-ST, (92/8)	X NO.	212	Date of Test
TMD	-	I. D. NO.	-	10/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10.	1.612	0.0034	-	5.841	0.0219	0.0145	90	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (92/8)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (92.0/8.0)

X NO.: 212 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 9/7/55 LOT NO.:

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318
(Canter, Reynolds)

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

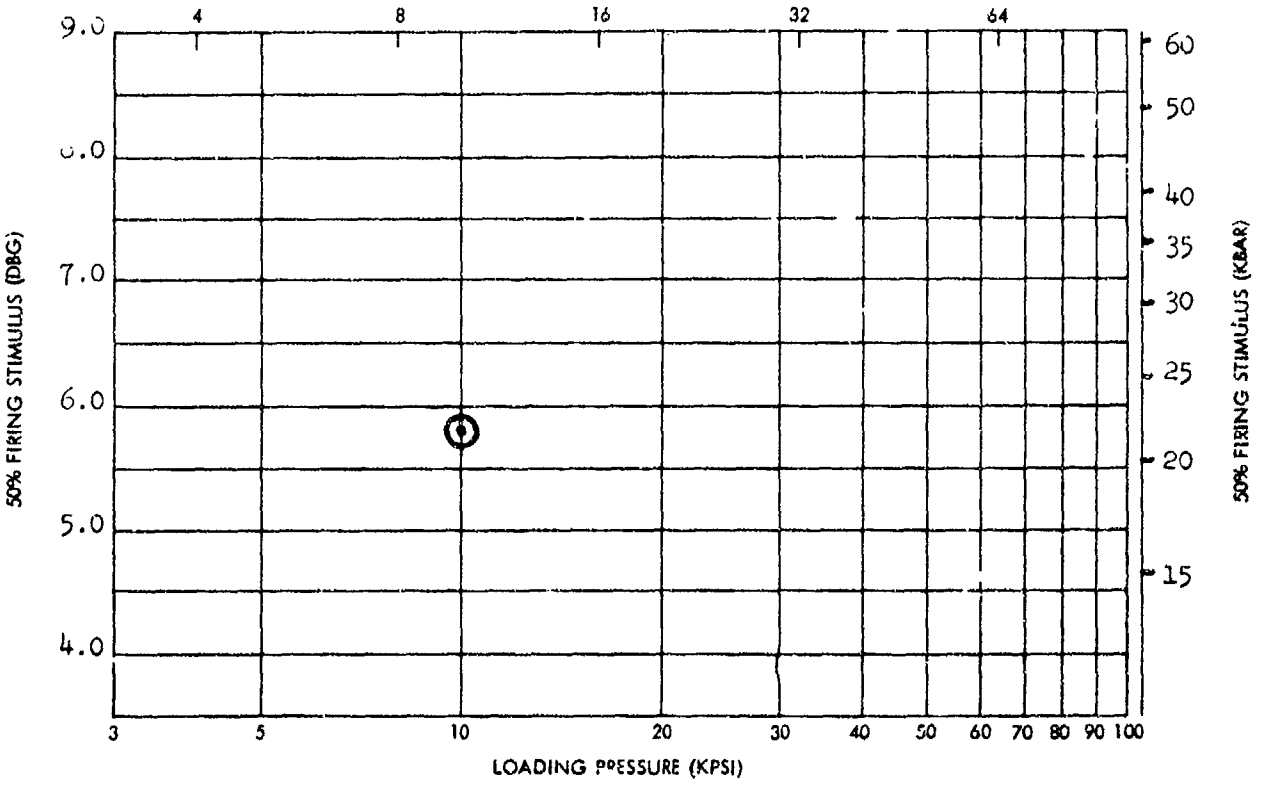
Remarks

(1) RDX X NO. 189 "Chemical Precipitation Methods. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST, (92/8)	X NO.	285	Date of Test 12/59
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.603	0.0027	-	5.818	0.0405	0.0160	46	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (92/8)

Glrl

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (92.0/8.0)

X NO.: 285 **ID:** **Z NO.:** 197 **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 7/28/58 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 51 cm

s =0.07 log units

n =

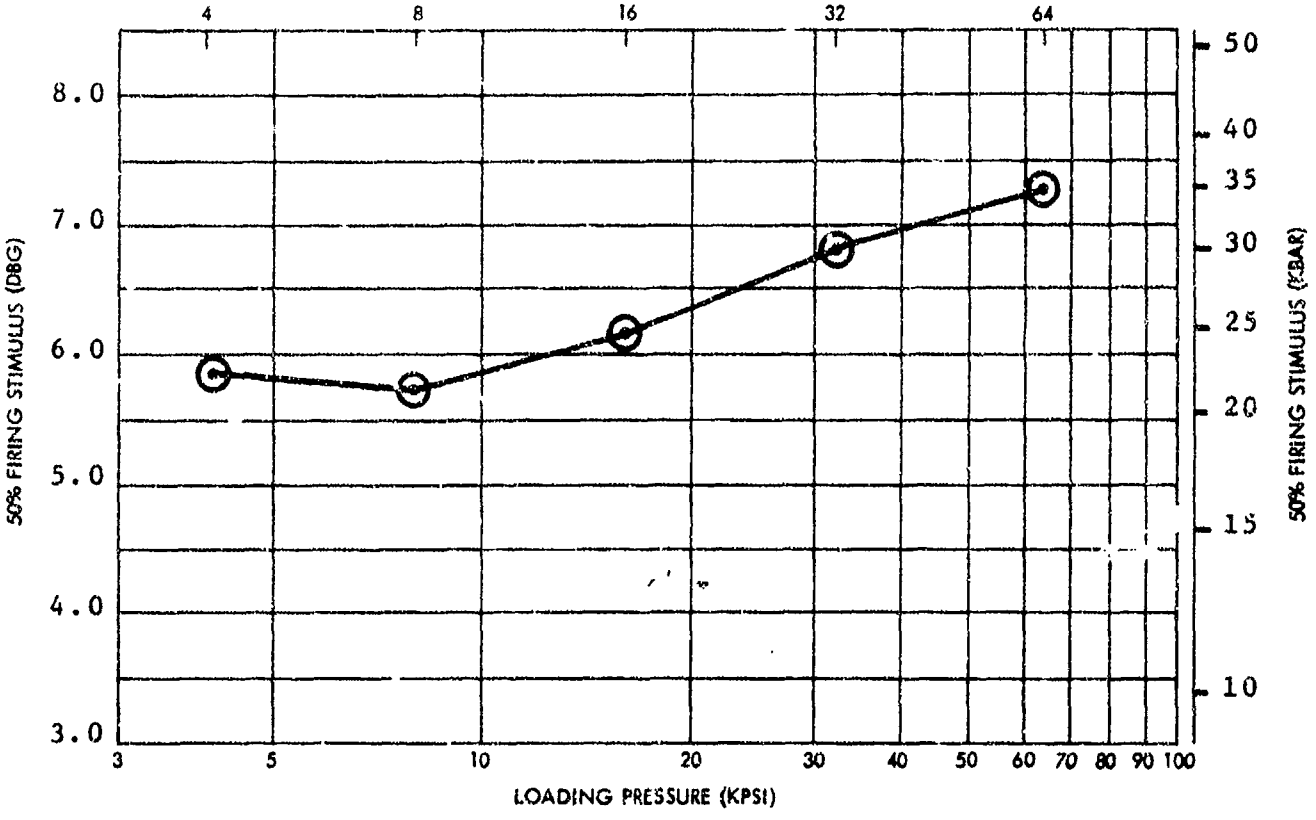
Remarks

(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST (90.8/9.2)	X NO.	366	Date of Test
TMD	1.694	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.503	0.0040	88.7	5.859	0.0653	0.0398	20	
8	1.564	0.0025	92.3	5.737	0.0223	0.0166	20	
16	1.625	0.0061	96.0	6.157	0.0615	0.0409	20	
32	1.639	0.0059	96.8	6.805	0.0629	0.0386	20	
64	1.650	0.0023	97.4	7.257	0.0066	0.0061	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (90.8/9.2)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (90.8/9.2)

X NO.: 366 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 797

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/31/61 **LOT NO.:**

INITIAL QUANTITY: * **BATCH NO.:** 86-369-14/15/16

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (50% or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

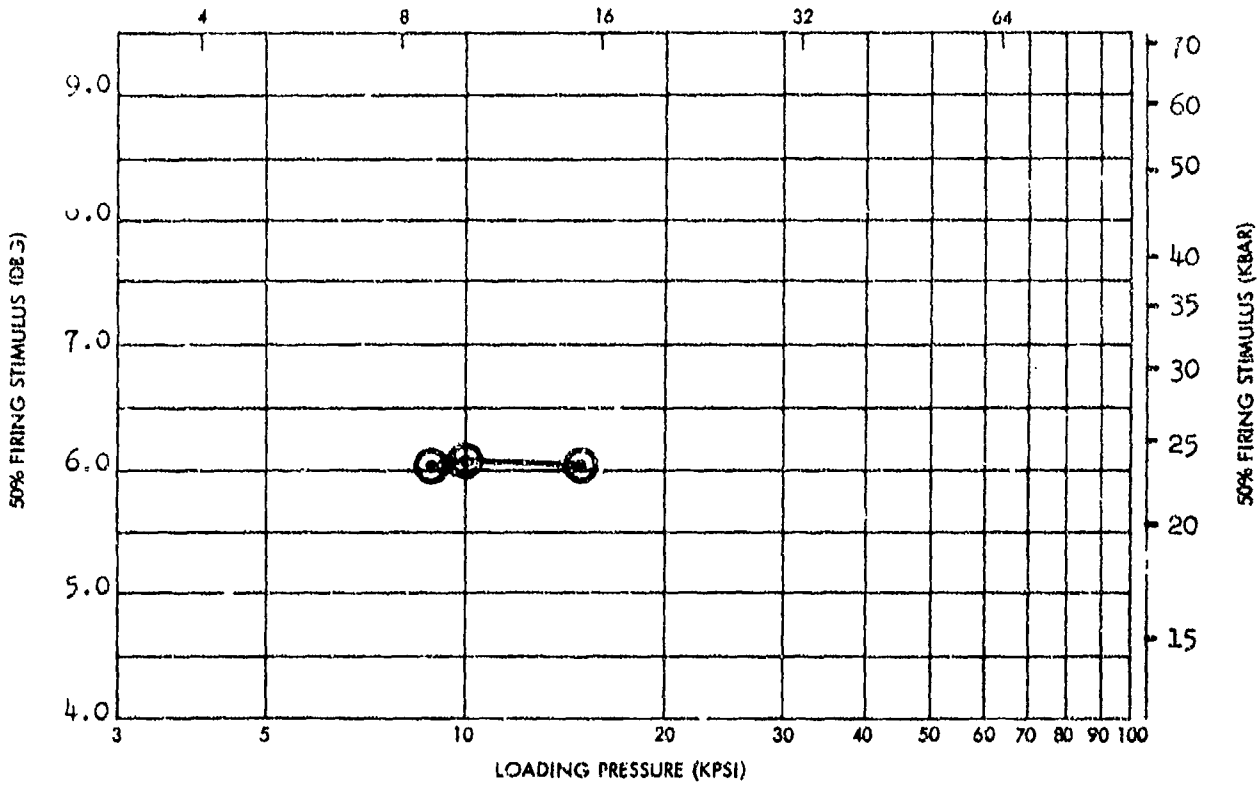
Remarks

*Approximately 300 pounds, made in three 100-pound sub-batches blended together; manufactured for NOL Corona, NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 12.0%. Analysis for % Calcium Stearate was 9.16 $\pm$ 0.24.

EXPLOSIVE	RDX/CA-ST, (89/11)	X NO.	286	Date of Test
TMD	-	I. D. NO.	-	6/60

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
9	1.594	0.0056	-	6.040	0.0873	0.0301	46	
10	1.586	0.0063	-	6.087	0.0494	0.0188	46	(1)
15	1.609	0.0026	-	6.050	0.0151	0.0139	46	

(1) Date of Test - 12/59



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (89/11)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (89.0/11.0)

X NO.: 786 **ID:** **Z NO.:** 194 **SSGT LOAD ORDER NO.:**

SOURCE: See Note (1)

CHEMICAL NAME:

DATE RECEIVED: 7/28/58 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = 73 cm

s = 0.10 log units

n =

Remarks

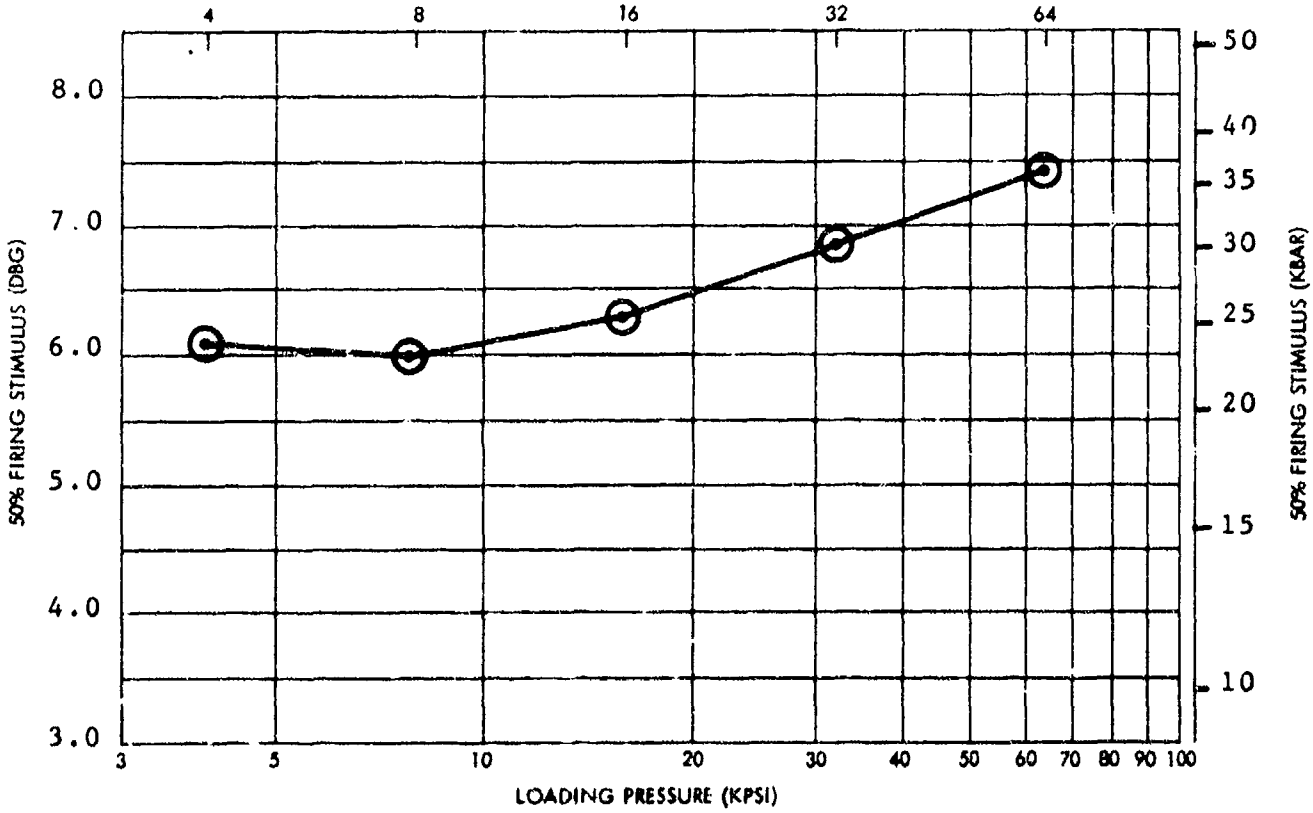
(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST (88.9/11.1)	X NO.	370	Date of Test
TMD	1.673	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.501	0.0057	89.7	6.091	0.0824	0.0474	20	
8	1.561	0.0027	93.3	6.000	0.0236	0.0199	20	
16	1.601	0.0015	95.7	6.292	-	-	20	(1)
32	1.618	0.0018	96.7	6.846	0.0697	0.0424	20	
64	1.625	0.0028	97.1	7.422	0.0149	0.0137	20	

(1) No mixed response zone.



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (88.9/11.1)

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4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (88.9/11.1)

X NO.: 370 **ID:** **Z NO.:** **SSGT LOAD ORDER NO.:** 798

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: **LOT NO.:**

INITIAL QUANTITY: **BATCH NO.:** 8-369-17/18/19

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = **cm**

s = **log units**

n =

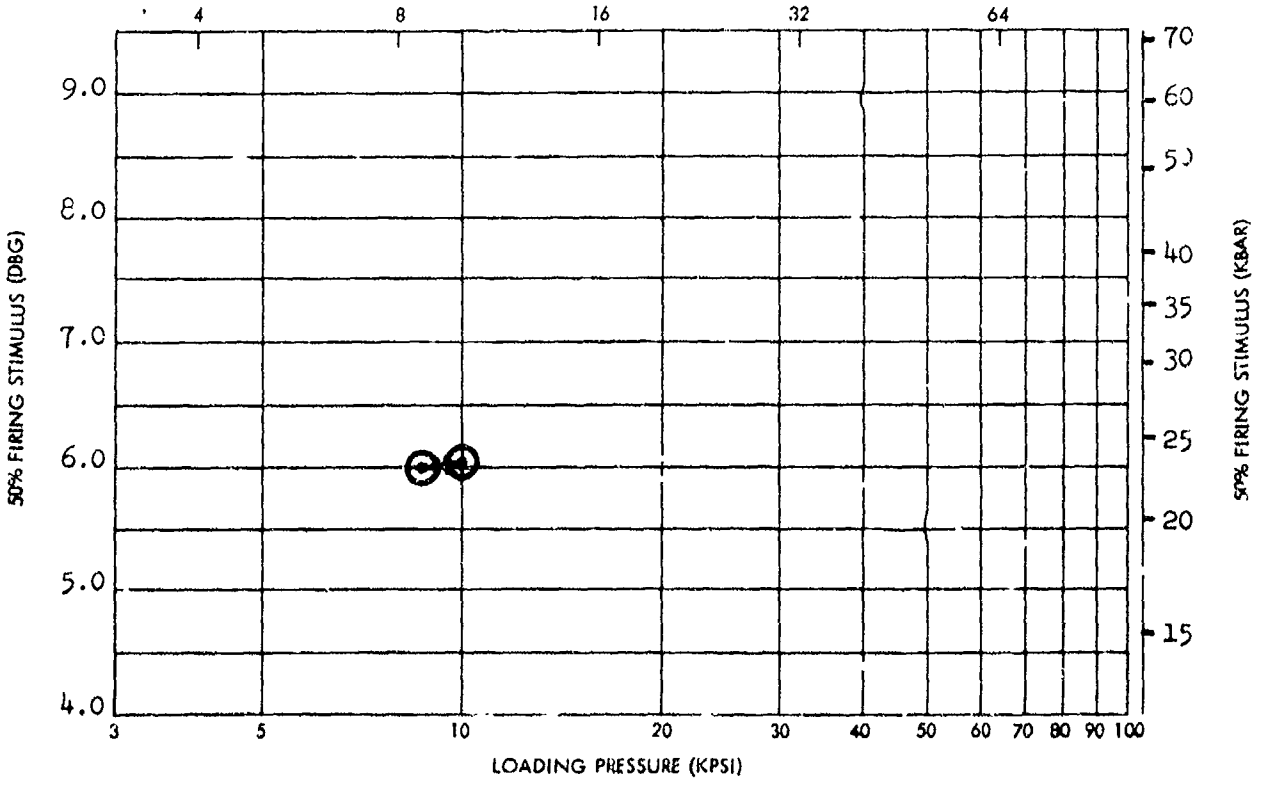
Remarks

*Approximately 300 pounds, made in thee 100-pound sub-batches blended together; manufactured for NOL Corona. NOL-WO received 1/2 pound for calibration. Specified Calcium Stearate content was 14.0%. Analysis for % Calcium Stearate was 11.05 ± 0.45.

EXPLOSIVE	RDX/CA-ST, (88.7/11.3)	X NO.	216	Date of Test 12/59
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8.9	1.589	0.0023	-	6.007	0.0655	0.0238	46	(1)
10.0	1.588	0.0033	-	6.044	0.0590	0.0213	46	

(1) Date of test 9/60



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (88.7/11.3)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (88.7/11.3)

X NO.: 216 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 10/15/55 LOT NO.:

INITIAL QUANTITY: 5 kilograms BATCH NO.:

MANUFACTURED BY:

NOL: EP Division

IMPACT SENSITIVITY (50 or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

50 = cm

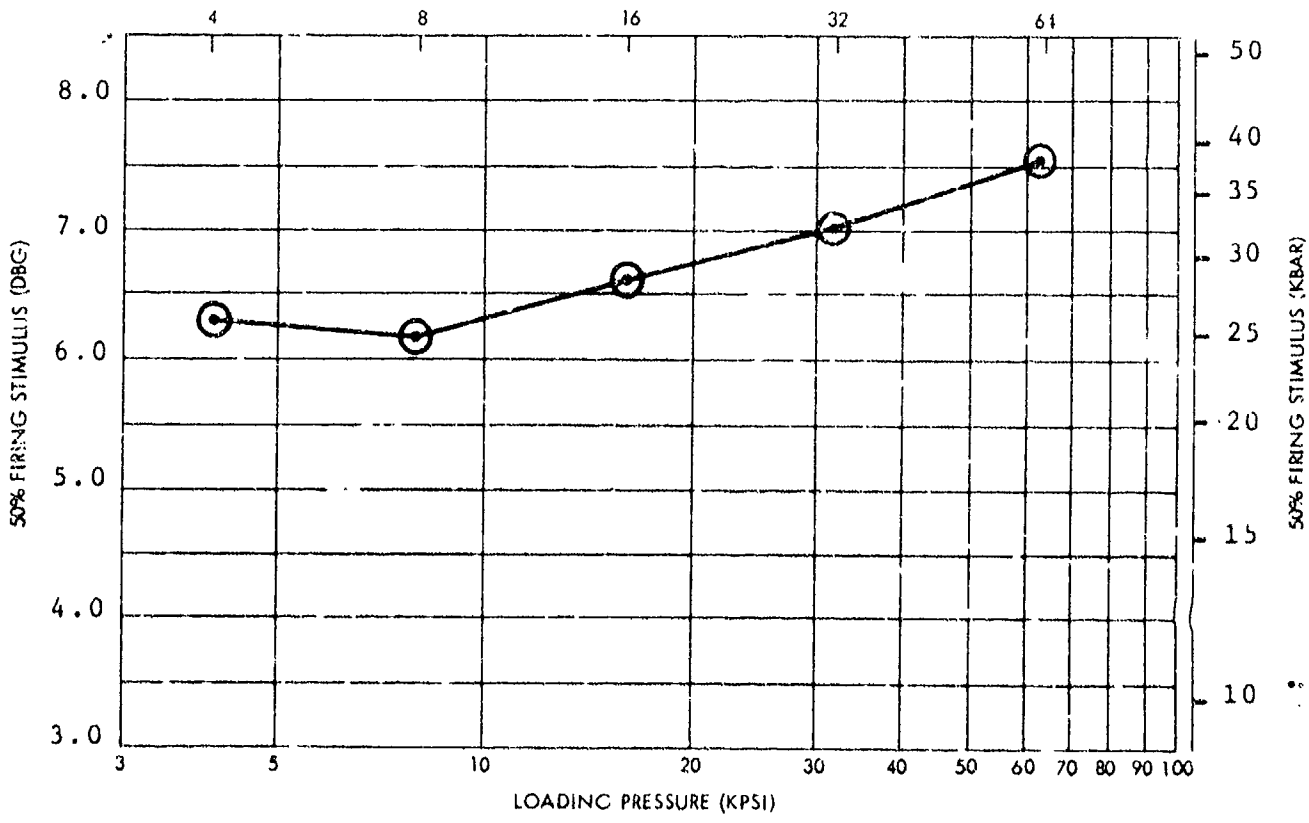
s = log units

n =

Remarks

EXPLOSIVE	RDX/CA-ST (87.2/12.8)	X NO.	374	Date of Test
TMD	1.653	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBC)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.488	0.0069	90.0	6.290	0.0068	0.0089	20	
8	1.546	0.0036	93.5	6.178	0.0569	0.0349	20	
16	1.587	0.0025	96.0	6.602	0.0719	0.0426	20	
32	1.601	0.0013	96.9	7.018	0.0135	0.0102	20	
64	1.609	0.0023	97.3	7.553	0.0431	0.0277	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/C. -ST (87.2/12.8)

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4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (87.2/12.8)

X NO.: 374* ID: % NO.: SSGT LOAD ORDER NO.: 799

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/31/61 LOT NO.:

INITIAL QUANTITY: ** BATCH NO.: 8-369-20/21/30

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

Remarks

*X-416 is from same 8-369-20/21/30 batch.
**Approximately 300 pounds, made in three 100-pound sub-batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 16.0%. Analysis for % Calcium Stearate was 12.79 ± 0.44.

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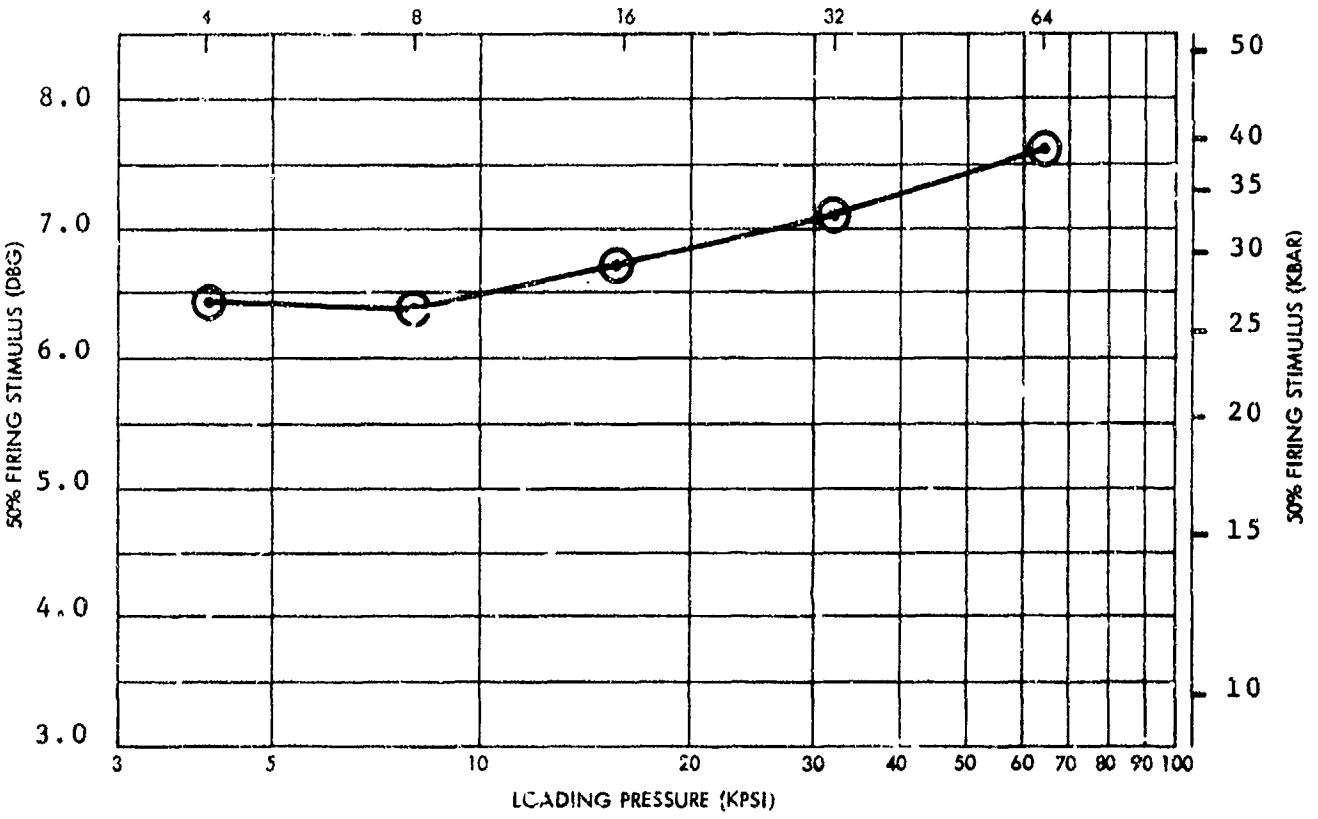
4 Sep 1973

EXPLOSIVE	RDX/CA-ST (85.8/14.2)	X NO.	378	Date of Test
TMD	1.639	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	b_m	N	
4	1.487	0.0041	90.7	6.430	0.0141	0.0125	20	
8	1.541	0.0023	94.0	6.359	0.0323	0.0217	20	
16	1.578	0.0021	96.3	6.712	0.0067	0.0073	20	
32	1.583	0.0034	96.6	7.129	0.0239	0.0370	20	
64	1.589	0.0029	96.9	7.615	0.0591	0.0378	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (85.8/14.2)

G1x1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (85.8/14.2)

X NO.: 378 ID: Z NO.: SSGT LOAD ORDER NO.: 800

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/31/61 LOT NO.:

INITIAL QUANTITY: * BATCH NO.: 8-369-22/23/31

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (ℰ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℰ = cm

s = log units

n =

Remarks

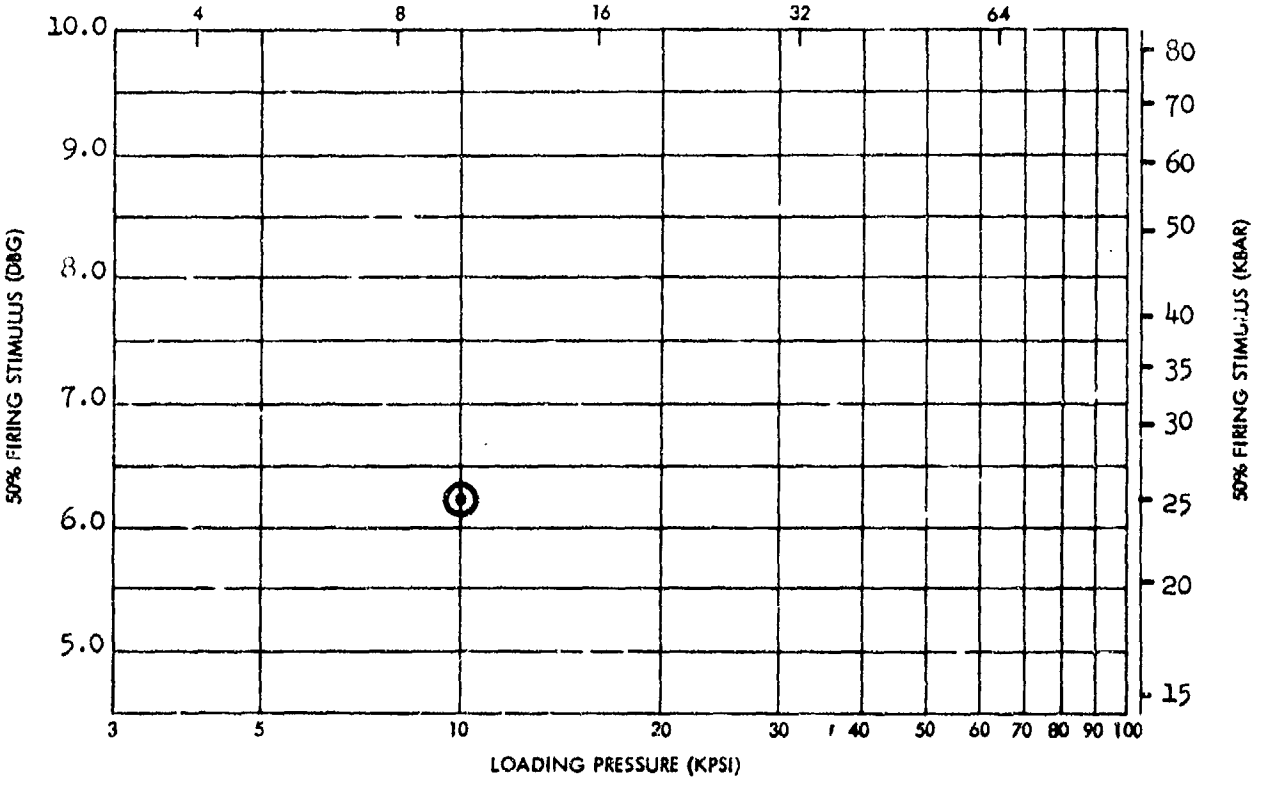
*Approximately 300 pounds, made in three 100-pound sub-batches blended together; manufactured for NOL Carona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 18.4%. Analysis for % Calcium Stearate was 14.16 ± 0.44.

G 1 x 2

4 Sep 1973

EXPLOSIVE	RDX/CA-ST, (85/15)	X NO.	287	Date of Test
TMD	-	I. D. NO.	-	12/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
10	1.559	0.0052	-	6.222	0.0175	0.0122	46	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (85/15)

Glyl

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (85.0/15.0)

X NO.: 287 **ID:** **Z NO.:** 195 **SSGT LOAD ORDER NO.:**

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 7/28/58 **LOT NO.:**

INITIAL QUANTITY: 10 pounds **BATCH NO.:**

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

G l y 2

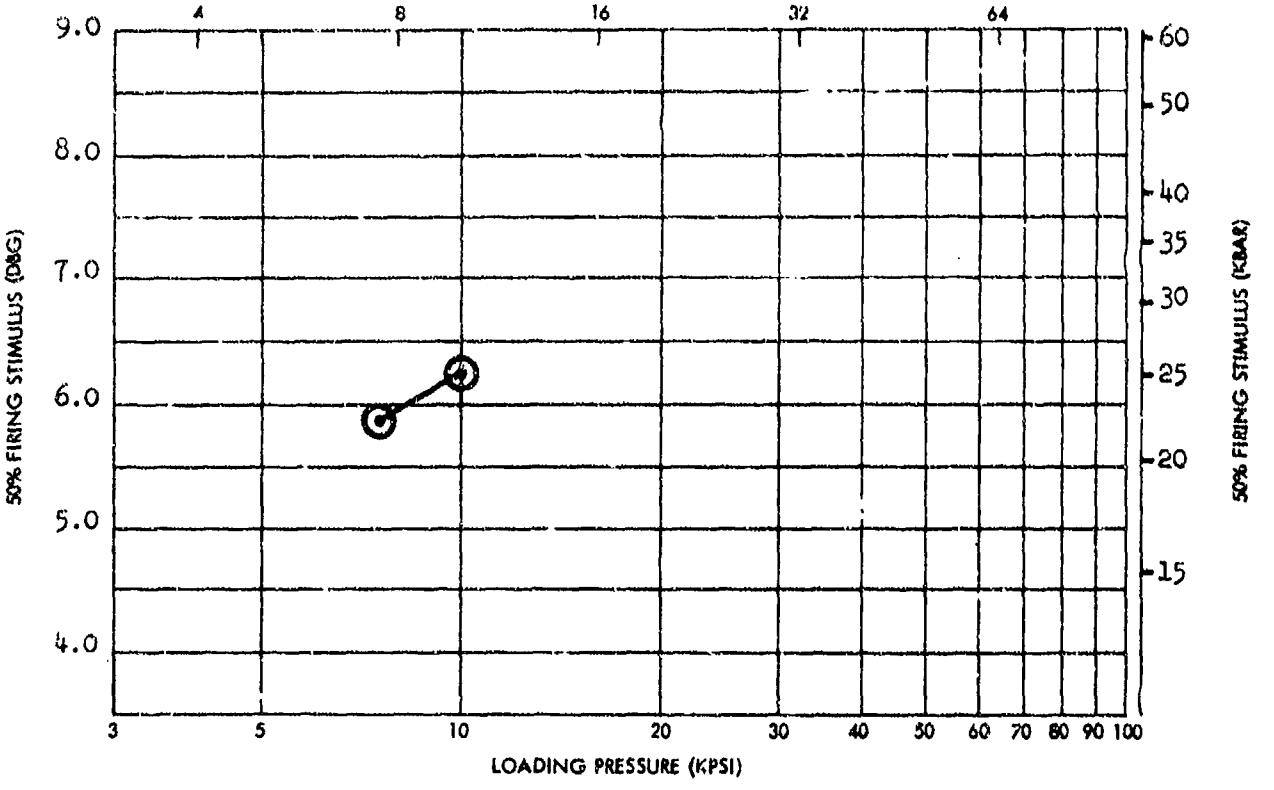
4 Sep 1973

EXPLOSIVE	RDX/CA-8T, (84.2/15.8)	X NO.	217
TMD	"	I. D. NO.	"

Date of Test 12/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	s	% TMD	SENSITIVITY (DBG) AVG.	σ	$\bar{y}_m$	N	REMARKS
7.6	1.563	0.0038	"	5.875	0.0535	0.0215	46	(1)
10.0	1.559	0.0025	-	6.247	0.0531	0.0212	46	

(1) Date of test - 9/60



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-8T, (84.2/15.8)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (84.2/15.8)

X NO.: 217 ID: S NO.: 277 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 10/15/55 LOT NO.:

INITIAL QUANTITY: 5 kilograms BATCH NO.:

MANUFACTURED BY:

NOL: EP Division

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

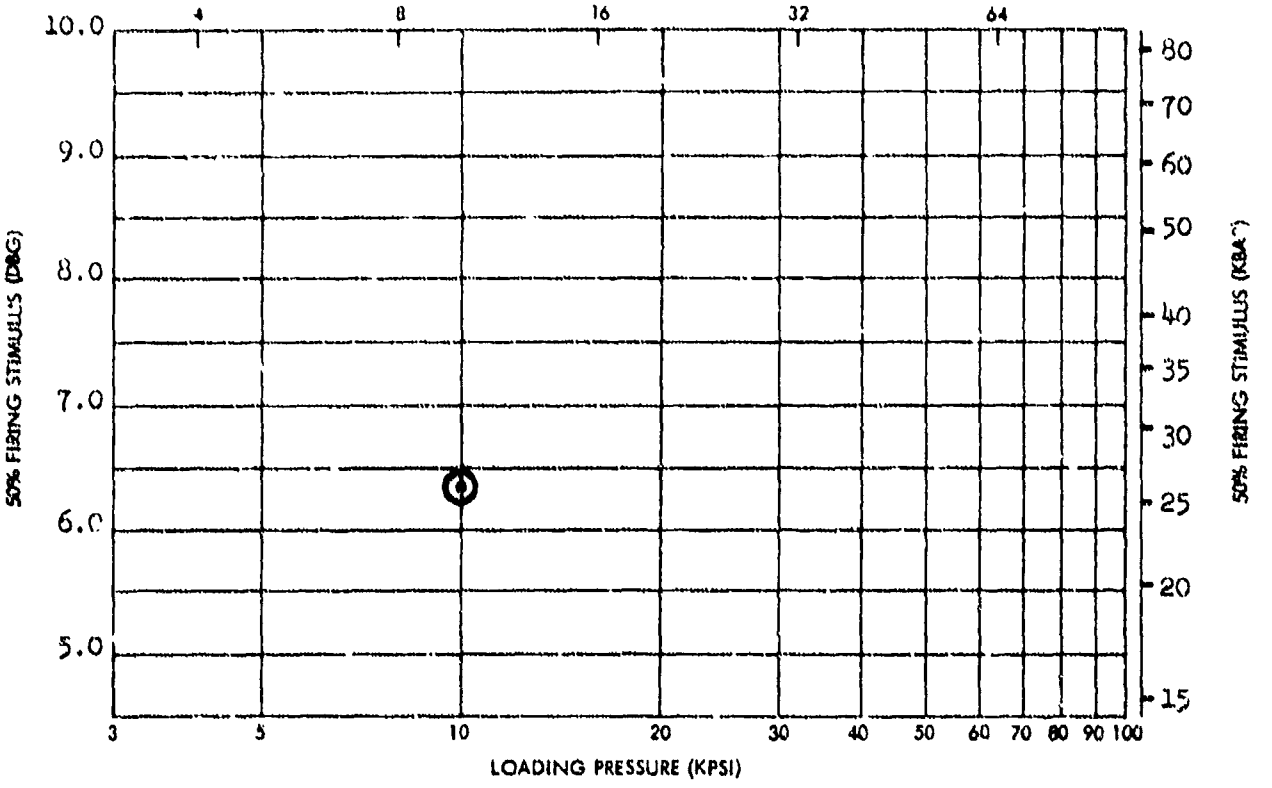
Remarks

4 Sep 1973

EXPLOSIVE RDX/CA-8T, (84.2/15.8) X NO. 388 Date of Test 12/59

TMD - I. D. NO. -

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	σ	% TMD	SENSITIVITY (DBG) AVG.	σ	σ_m	N	REMARKS
10	1.551	0.0176	-	6.304	0.1385	0.0439	46	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-8T, (84.2/15.8)

Glaal

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (84.2/15.8)

X NO.: 288 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 5/29/58 LOT NO.:

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

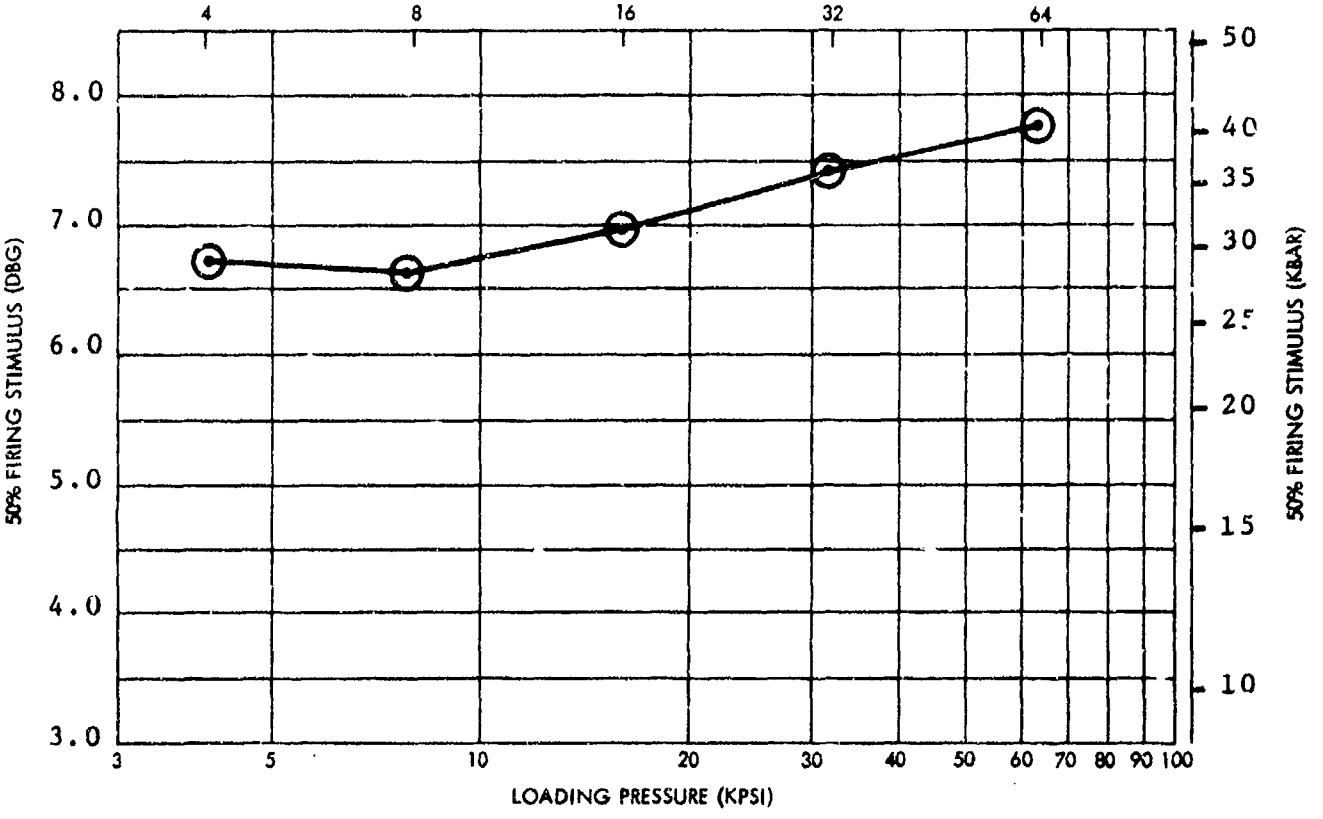
s = log units

n =

Remarks

EXPLOSIVE	RDX/CA-ST (83.4/16.6)X	NO.	381	Date of Test
TMD	1.612	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.474	0.0031	91.4	6.709	0.0295	0.0214	20	
8	1.525	0.0025	94.6	6.625	0.0453	0.0285	20	
16	1.554	0.0013	96.4	6.959	0.0088	0.0063	20	
32	1.560	0.0014	96.8	7.413	0.0112	0.0126	20	
64	1.566	0.0026	97.2	7.763	0.0197	0.0248	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (83.4/16.6)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (83.4/16.6)

X NO.: 381 ID: Z NO.: SSGT LOAD ORDER NO.: 801

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 8/31/81 LOT NO.:

INITIAL QUANTITY: * BATCH NO.: 8-369-24/25

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

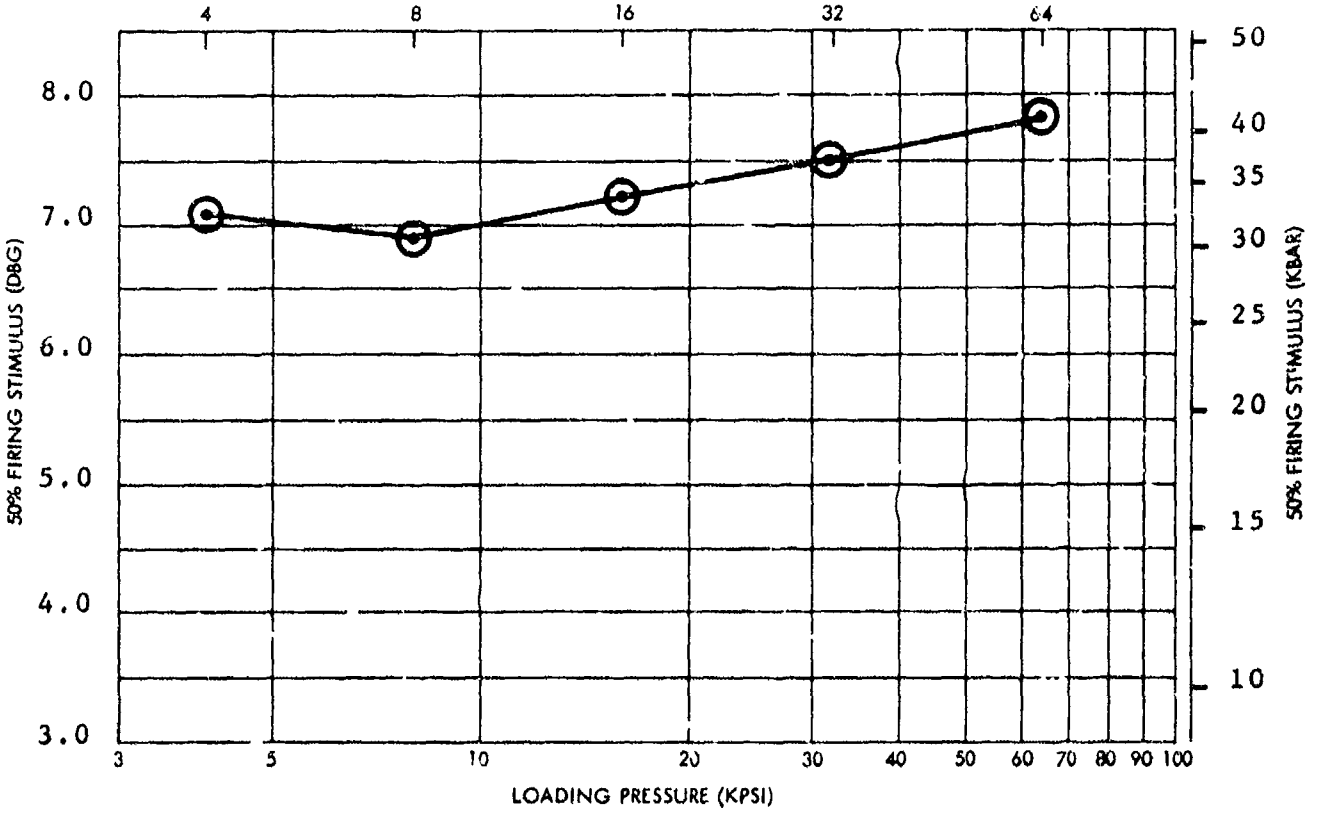
n =

Remarks

*Approximately 200 pounds, made in two 100-pound batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 20.8%. Analysis for % Calcium Stearate was 16.55 ± 0.31.

EXPLOSIVE	RDX/CA-ST (81.3/18.7)	X NO.	384	Date of Test
TMD	1.589	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.454	0.0042	91.5	7.095	0.0638	0.0407	20	
8	1.499	0.0035	94.3	6.900	0.0969	0.0559	20	
16	1.521	0.0020	95.7	7.218	0.0712	0.0423	20	
32	1.532	0.0023	96.4	7.514	0.0404	0.0253	20	
64	1.531	0.0038	96.3	7.832	0.0937	0.0511	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (81.3/18.7)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (81.3/18.7)

X NO.: 384 ID: Z NO.: SSGT LOAD ORDER NO.: 802

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.: 8-369-26/27

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

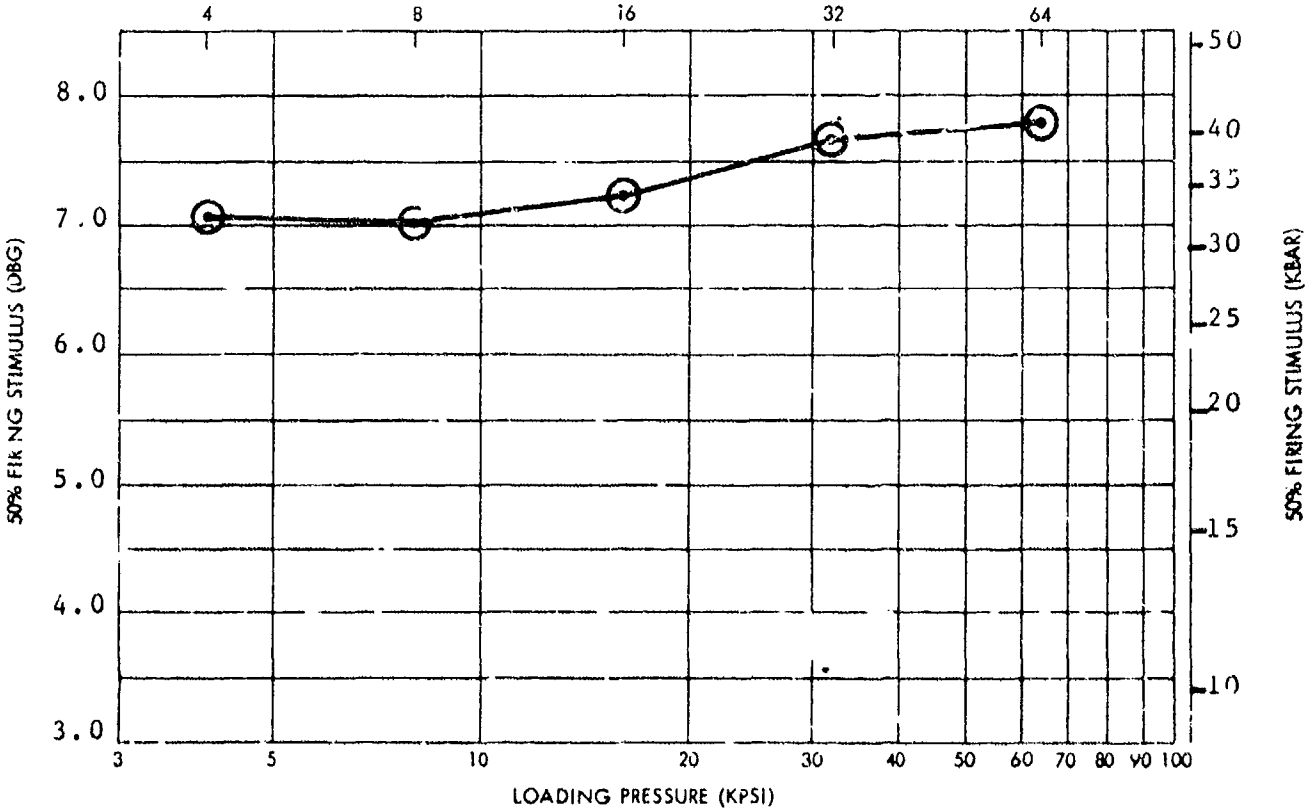
*Approximately 200 pounds, made in two 100-pound batches blended together; manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 23.3%. Analysis for % Calcium Stearate was 18.70 $\pm$ 0.42.

G 1 cc 2

4 Sep 1973

EXPLOSIVE	RDX/CA-ST (78.5/21.5)	X NO.	385	Date of Test 4/62
TMD	1.561	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DRG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.449	0.0028	92.9	7.071	0.0201	0.0187	20	
8	1.487	0.0026	95.2	7.033	0.0818	0.0486	20	
16	1.506	0.0024	96.5	7.243	0.0399	0.0271	20	
32	1.510	0.0020	96.7	7.673	0.0218	0.0197	20	
64	1.516	0.0029	97.1	7.797	0.0201	0.0144	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (78.5/21.5)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (78.5/21.5)

X NO.: 365 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.: 8-369-29

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

Remarks

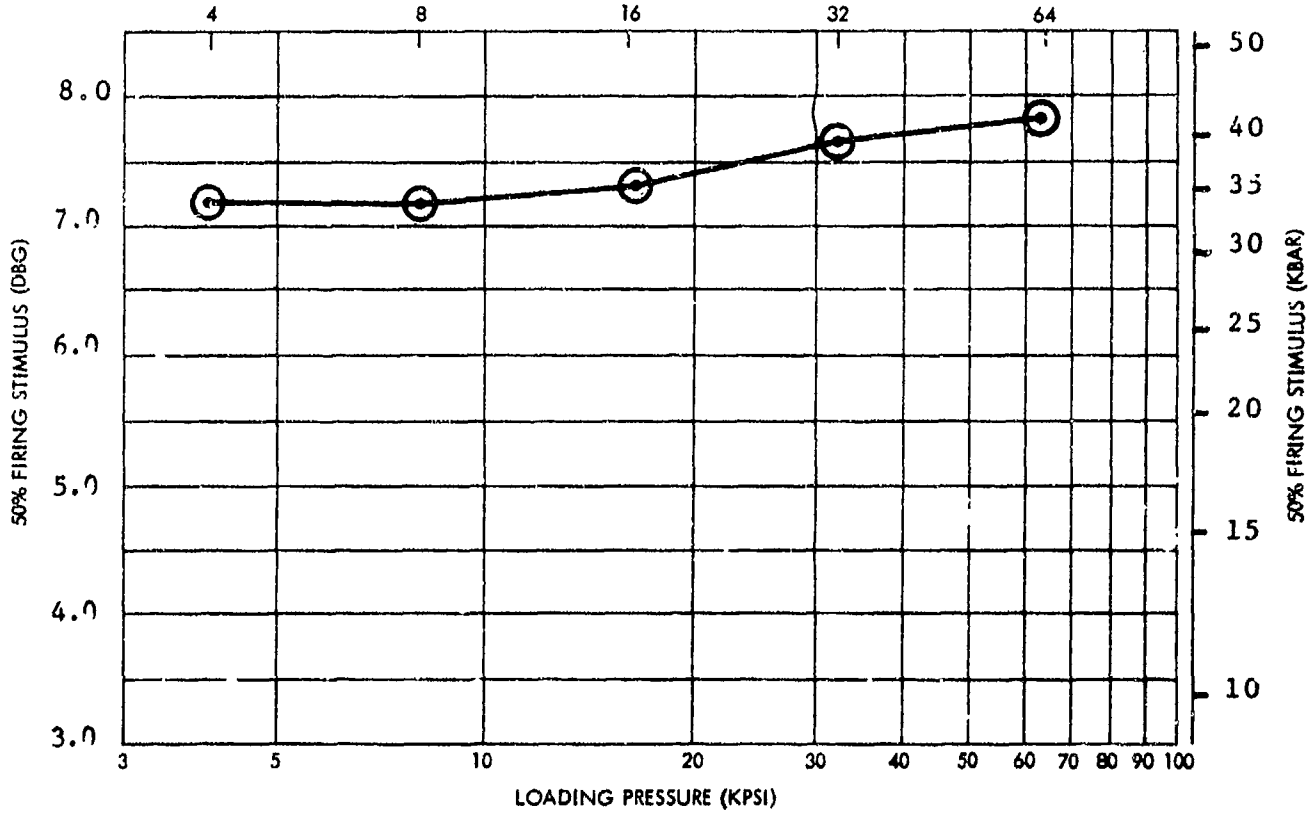
*Approximately 100 pounds, manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 26.0%. Analysis % Calcium Stearate was 21.49 ± 0.47.

G 1 dd 2

4 Sep 1973

EXPLOSIVE	RDX/CA-ST (76.2/23.8)	X NO.	386	Date of Test
TMD	1.539	I. D. NO.	-	4/62

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	g_m	N	
4	1.431	0.0029	93.0	7.195	0.0189	0.0189	20	
8	1.466	0.0020	95.3	7.175	0.0419	0.0253	20	
16	1.484	0.0046	96.4	7.308	0.0727	0.0429	20	
32	1.488	0.0024	96.7	7.653	0.0229	0.0160	20	
64	1.493	0.0026	97.0	7.834	0.0347	0.0230	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (76.2/23.8)

Gleel

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (76.2/23.8)

X NO.: 386 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: BATCH NO.: 8-369-29

MANUFACTURED BY:

Holston Ordnance Works
Kingsport, Tenn.

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

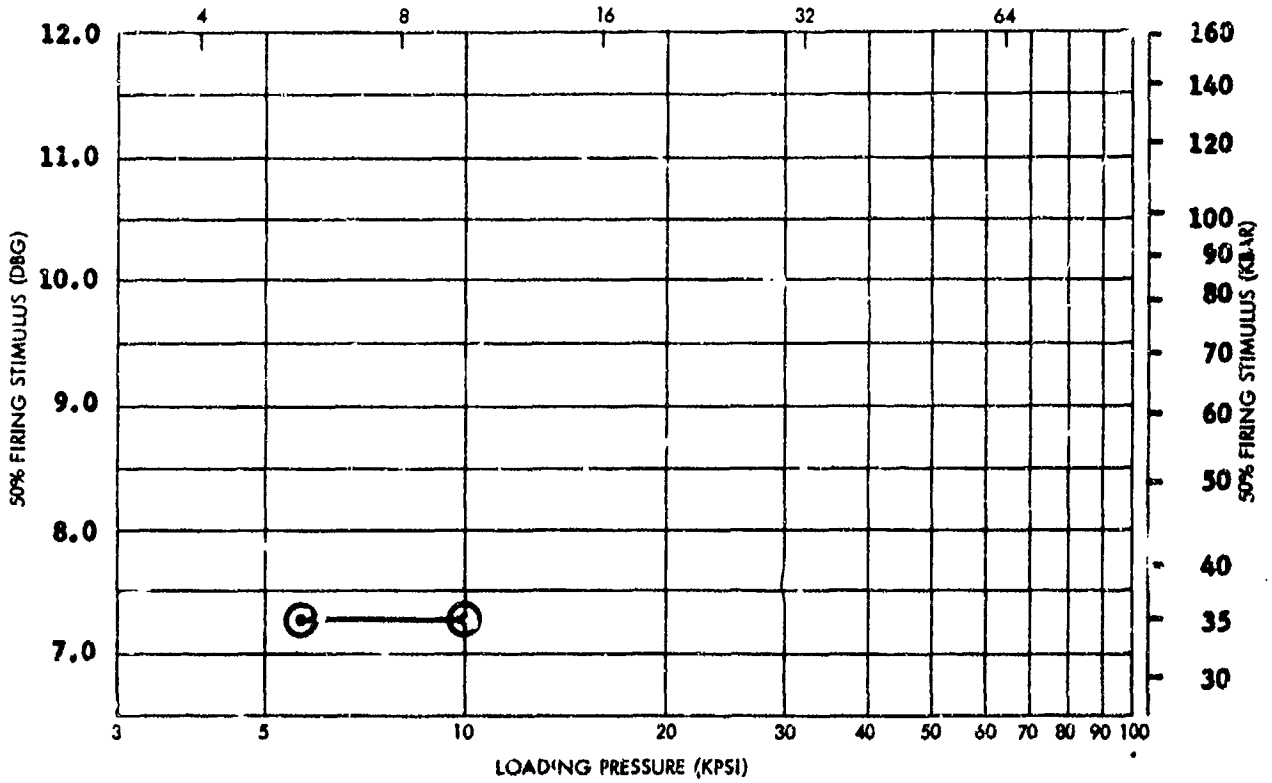
n =

Remarks

*Approximately 100 pounds, manufactured for NOL Corona. NOL-WO received 1 pound for calibration. Specified Calcium Stearate content was 28.0%. Analysis for % Calcium Stearate was 23.75 ± 0.37.

EXPLOSIVE	RDX/CA-ST (74/26)	X NO.	291	Date of Test
TMD	-	I. D. NO.	-	9/59

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
5.63	1.465	.0041	-	7.288	0.1474	0.0489	46	
10	1.479	.0156	-	7.210	0.1314	0.0463	42	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST (74/26)

Glffl

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (74.0/26.0)

X NO.: 291 ID: Z NO.: 212 SSGT LOAD ORDER NO.:

SOURCE: See Note (1)

CHEMICAL NAME:

DAT. RECEIVED: 8/26/58 LOT NO.:

INITIAL QUANTITY: 10 pounds BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 318

IMPACT SENSITIVITY (ẍ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẍ = cm

s = log units

n =

Remarks

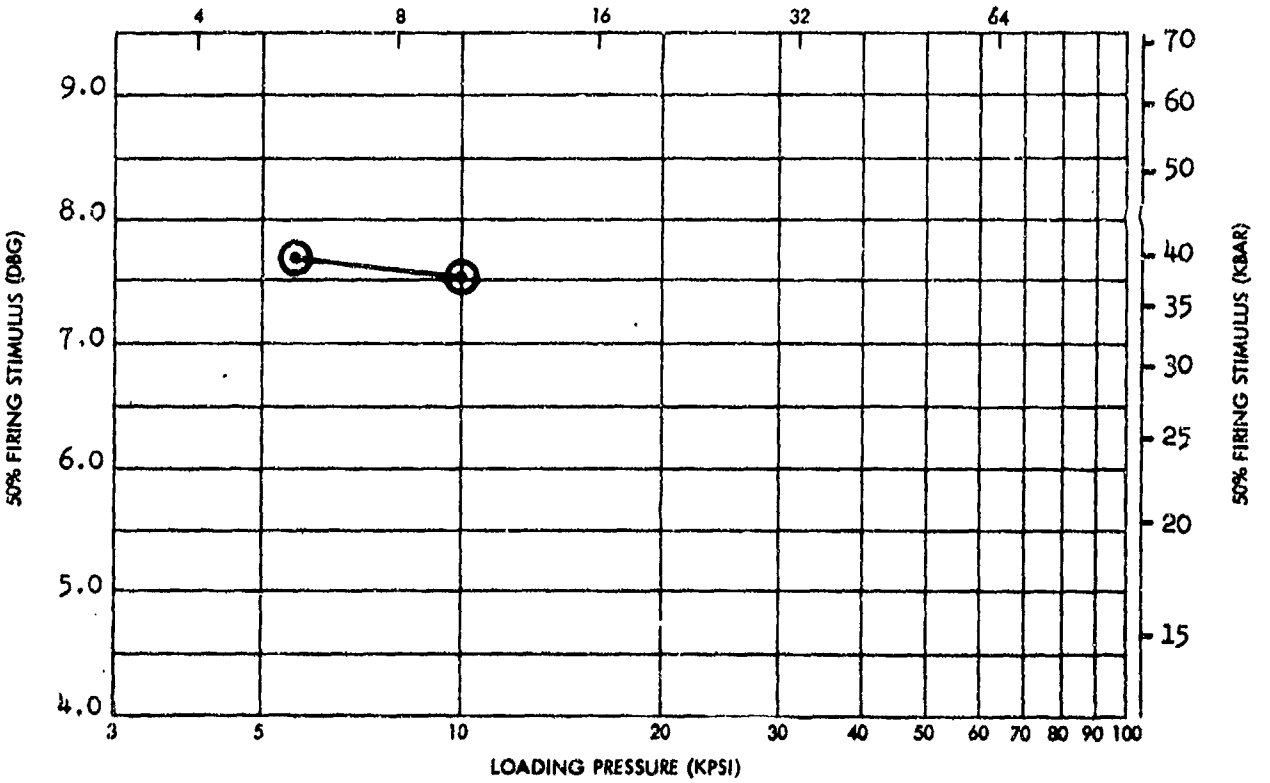
(1) RDX X NO. 189 "Chemical Precipitation Method. For additional information refer to sample preparation book Bldg 312* (sic) pg. 78."

*Probably it should be Bldg 318, not Bldg 312.

EXPLOSIVE	RDX/CA-ST, (71.2/28.8)	X NO.	219	Date of Test 9/59
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	ϵ_m	N	
5.7	1.427	0.0081	-	7.677	0.0706	0.0271	46	(1)
10.0	1.448	0.0105	-	7.519	0.1582	0.0647	48	

(1) Date of test - 9/60



SMALL SCALE GAP TEST (SSGT) DATA
RDX/CA-ST, (71.2/28.8)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Calcium Stearate (71.2/28.8)

X NO.: 219 ID: Z NO.: 279 SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 10/15/55 LOT NO.:

INITIAL QUANTITY: 5 kilograms BATCH NO.:

MANUFACTURED BY:

NOL: EP Division

IMPACT SENSITIVITY (ℵ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℵ = cm

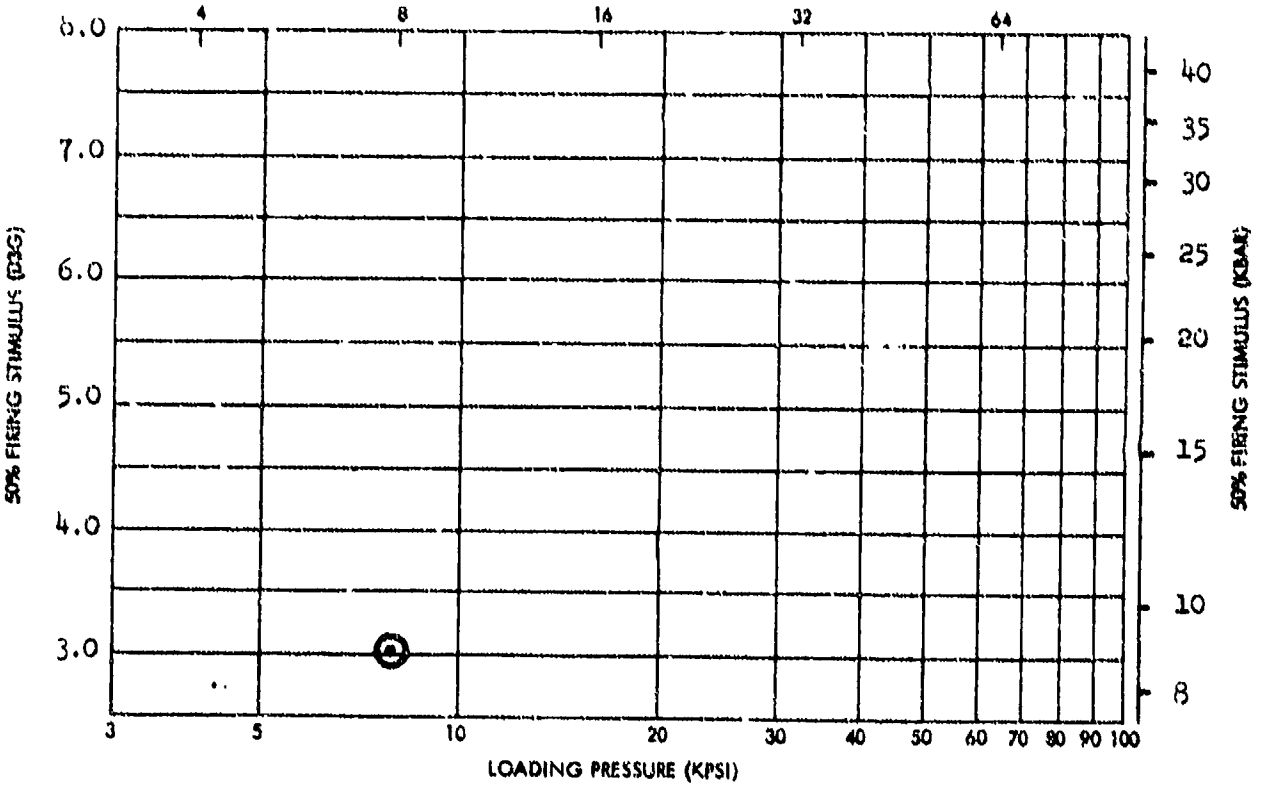
s = log units

n =

Remarks

EXPLOSIVE	PETN/DATB (75/25)	X NO.	507	Date of Test
TMD	"	I. D. NO.	"	1/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³) AVG.	σ	% TMD	SENSITIVITY (DBQ) AVG.	σ	σ_m	N	REMARKS
8	1.450	0.0076	"	3.011	0.0198	0.0139	20	



SMALL SCALE GAP TEST (SSGT) DATA

PETN/DATB (75/25)

G2a1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/DATB (75/25)*

X NO.: 507 ID: Z NO.: 609 SSGT LOAD ORDER NO.: 1009

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/8/64 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

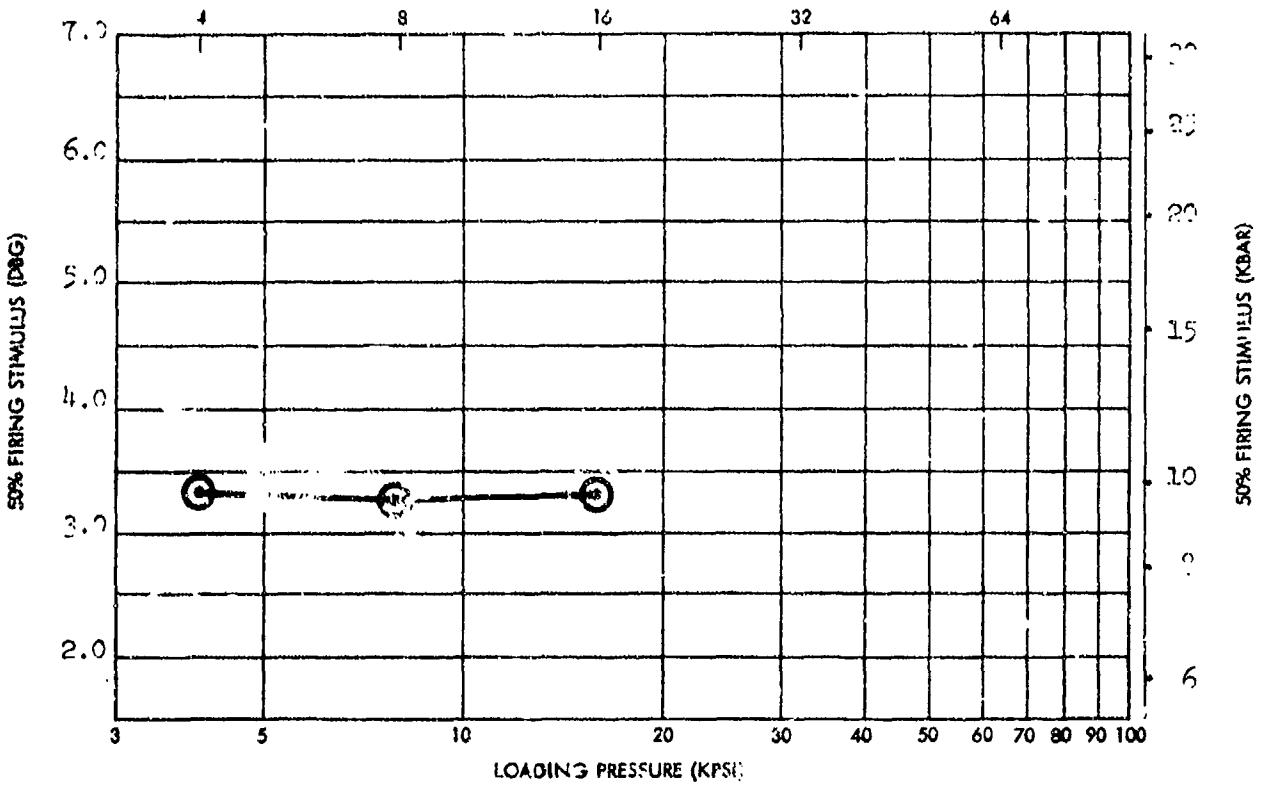
Remarks

*Used PETN (X321) and DATB (X331); see Data Packs B4b and D1e. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	PETN/DATB (50/50)	X NO.	505
TMD	-	I. D. NO.	-

Date of Test
12/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.514	0.0035	-	3.333	0.0223	0.0254	20	
8	1.415	0.0076	-	3.2[illegible]	0.0420	0.0382	20	
16	1.527	0.0015	-	3.304	0.0361	0.0250	20	



SMALL SCALE GAP TEST (SSGT) DATA
PETN/DATB (50/50)

G2b1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/DATB (50/50)*

X NO.: 505 ID: Z NO.: 607 SSGT LOAD ORDER NO.: 999

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/8/64 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

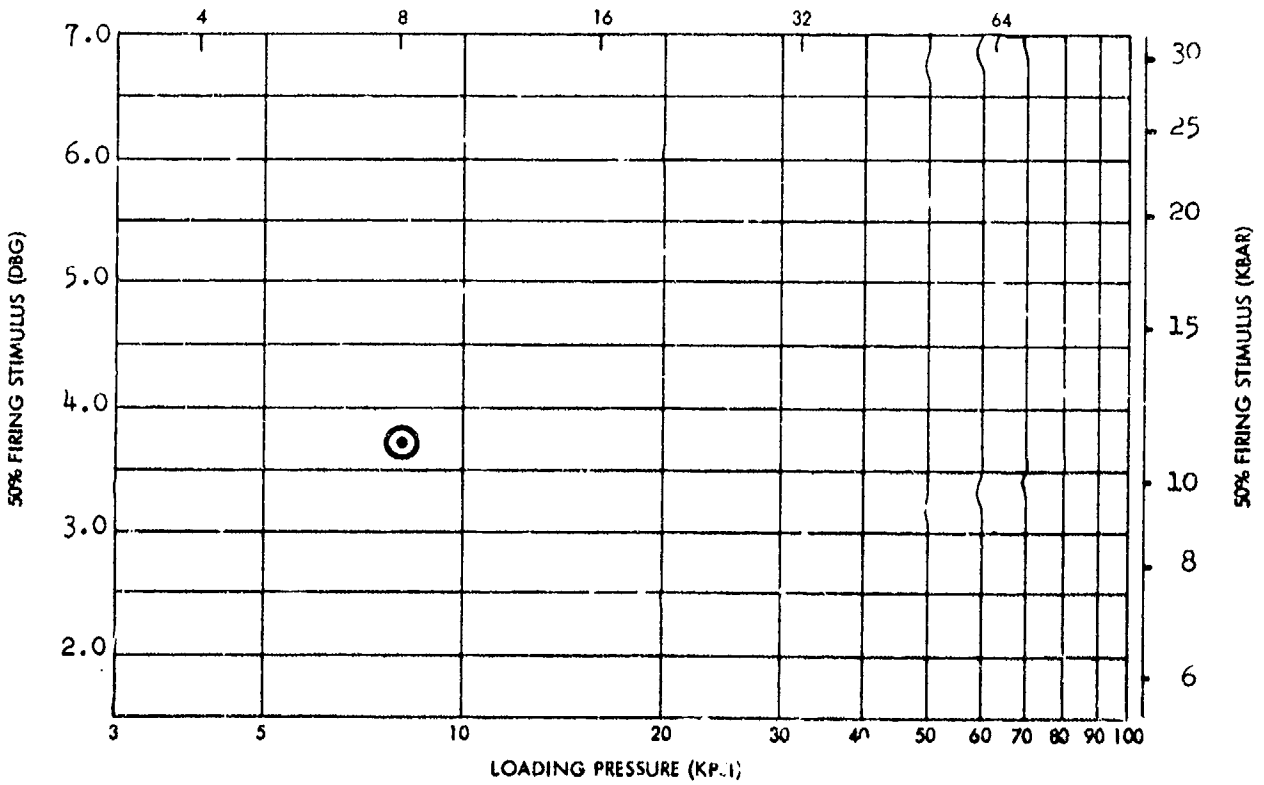
Remarks

*Used PETN (X321) and DATB (X331); see Data Packs B4b and D1e. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	PETN/DATB (25/75)	X NO.	506
TMD	-	I. D. NO.	-

Date of Test 12/64

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.378	0.0059	-	3.745	0.0036	0.0026	19	



SMALL SCALE GAP TEST (SSGT) DATA
PETN/DATB (25/75)

G2c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/DATB (25/75)*

X NO.: 506 ID: Z NO.: 608 SSGT LOAD ORDER NO.: 1000

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/8/64 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

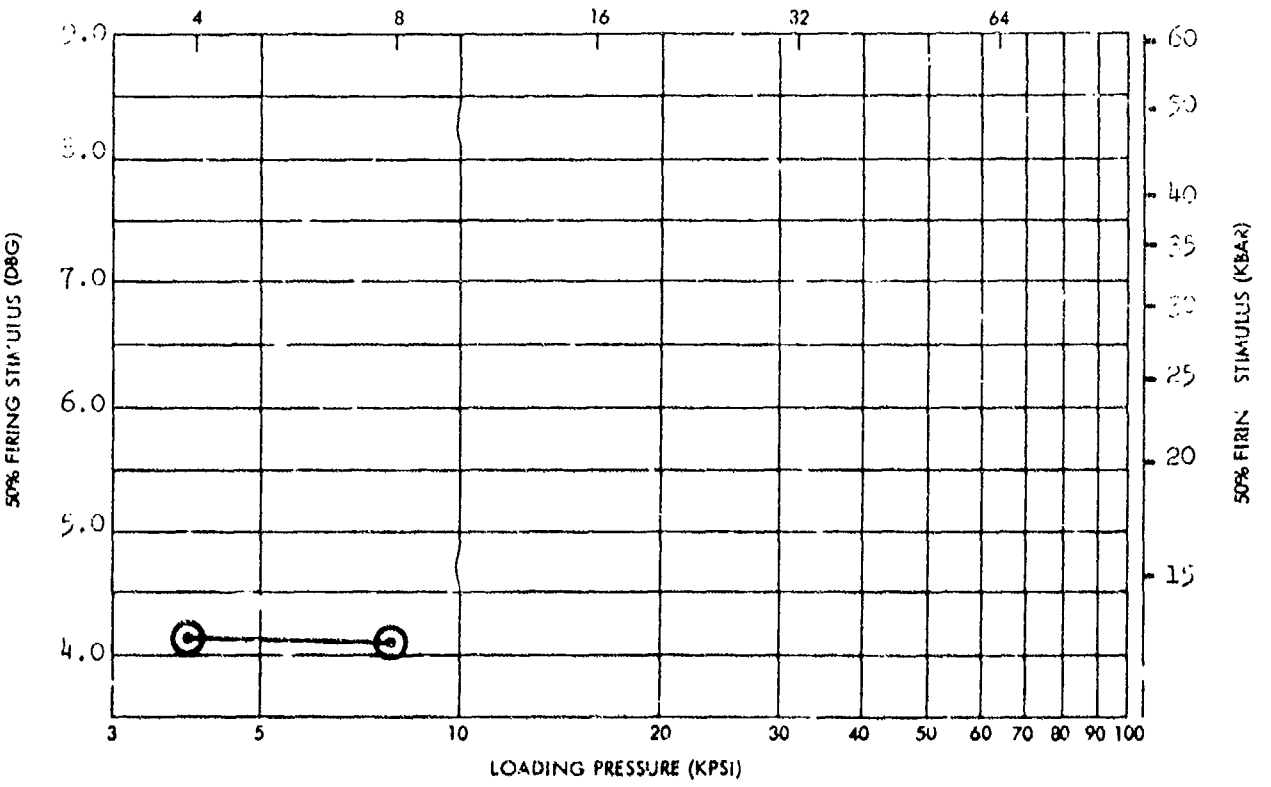
Remarks

*Used PETN (X321) and DATB (X331); see Data Packs B4b and D1e. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	PETN/DATB (15/85)	X NO.	555	Date of Test 1/65
TMD	-	I. D. NO.	-	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.255	0.0062	-	4.135	0.0075	0.0082	21	
8	1.362	0.0037	-	4.118	-	-	21	(1)

(1) No mixed response zone



SMALL SCALE GAP TEST (SSGT) DATA
PETN/DATB (15/85)

G2d1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/DATB (15/85)*

X NO.: 555 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 3/66 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

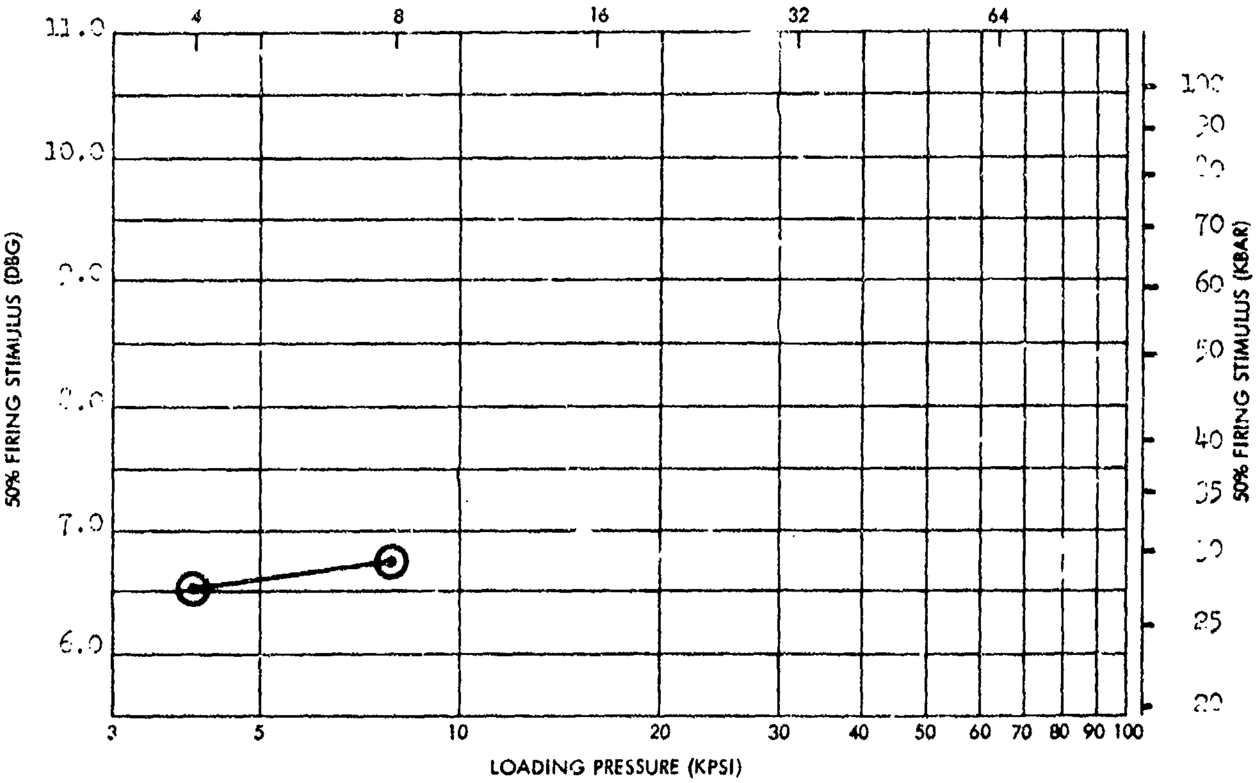
Remarks

*Used PETN (X321) and DATB (X331); see Data Packs B4b and D1e. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	PETN/DATB (5/95)	X NO.	556
TMD	-	I. D. NO.	-

Date of Test
1/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
4	1.[illegible]	0.[illegible]	-	6.5[illegible]	0.0354	0.[illegible]	23	
[illegible]	1.[illegible]	0.0045	-	6.750	0.0[illegible]	0.0155	2[illegible]	



SMALL SCALE GAP TEST (SSGT) DATA
PETN/DATB (5/95)

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/DATB (5/95)*

X NO.: 556 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 3/66 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

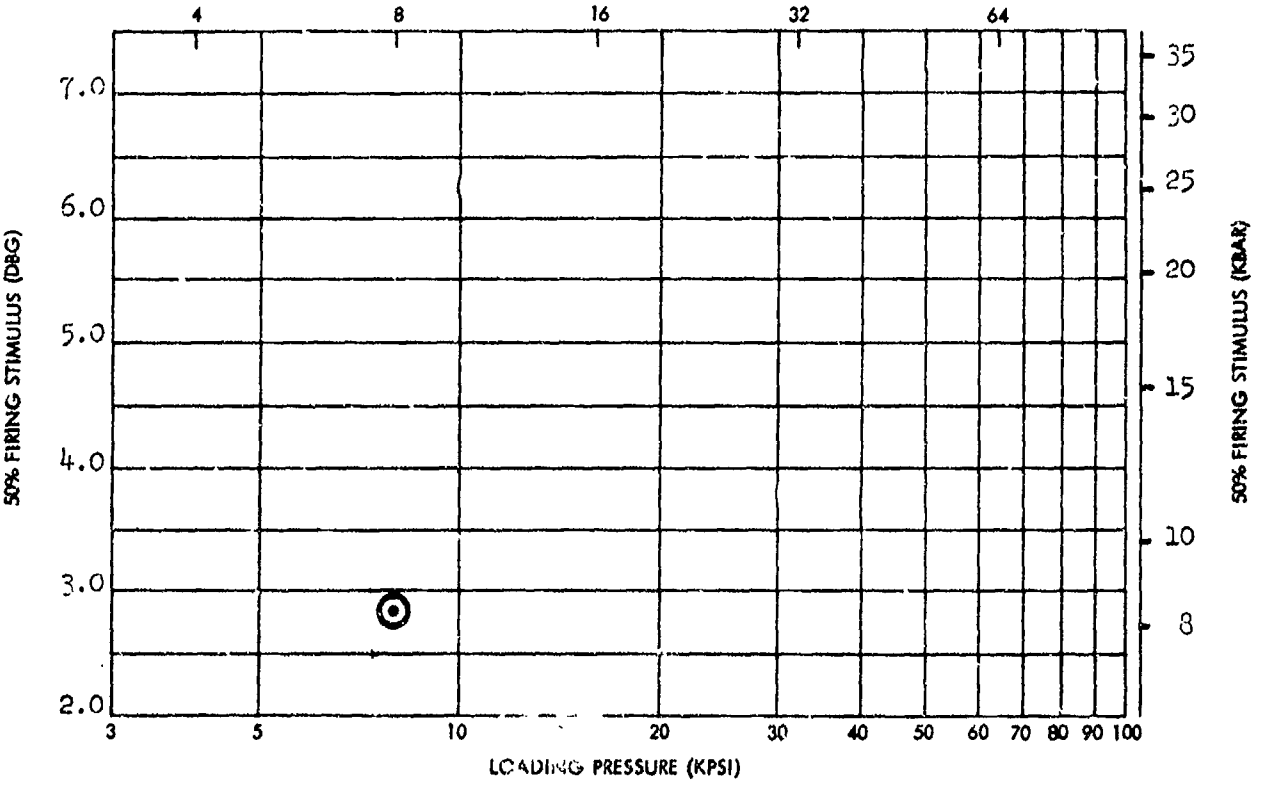
Remarks

*Used PETN (X321) and DATB (X331); see Data Packs B4b and D1e. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	PETN/TATB (50/50)	X NO.	508
TMD	-	I. D. NO.	-

Date of Test
1/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
3	1.601	0.0040	-	2.848	0.0876	0.0400	20	



SMALL SCALE GAP TEST (SSGT) DATA
PETN/TATB (50/50)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: PETN/TATB (50/50)*

X NO.: 508 ID: Z NO.: SSGT LOAD ORDER NO.: 1010

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/8/64 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

n =

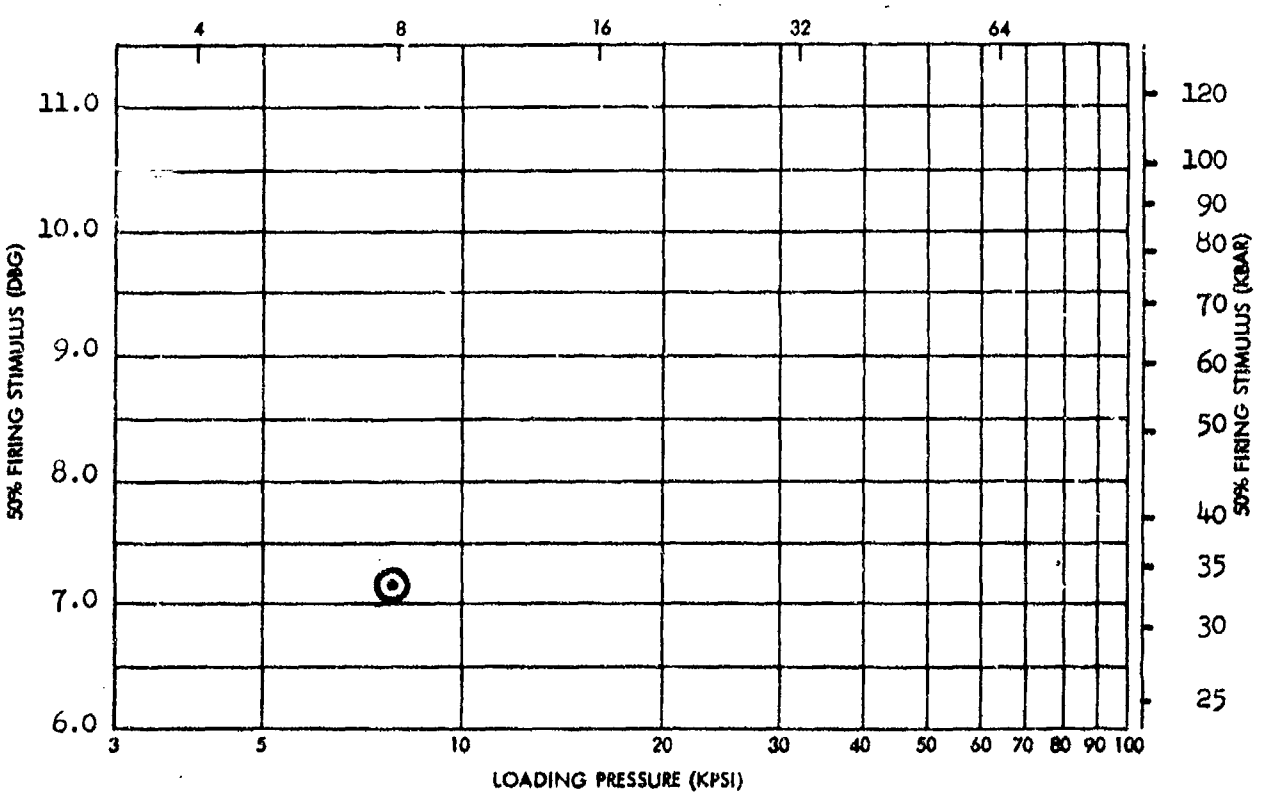
Remarks

*Used PETN (X321) and TATB (X406); see Data Packs B4b and D2b. Materials dried overnight at 50°C and then dry blended for 1 hour.

EXPLOSIVE	DATB/TATP (50/50)	X NO.	509
TMD	-	I. D. NO.	-

Date of Test
1/65

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.522	0.0100	-	7.142	0.0216	0.0186	20	



SMALL SCALE GAP TEST (SSGT) DATA
DATB/TATB (50/50)

CHEMICAL DATA

EXPLOSIVE NAME: DATB/TATB (50/50)*

X NO.: 509 ID: Z NO.: 611 SSGT LOAD ORDER NO.: 1011

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 12/8/64 LOT NO.:

INITIAL QUANTITY: BATCH NO.:

MANUFACTURED BY:

NOL: WE Division
Bldg 335

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

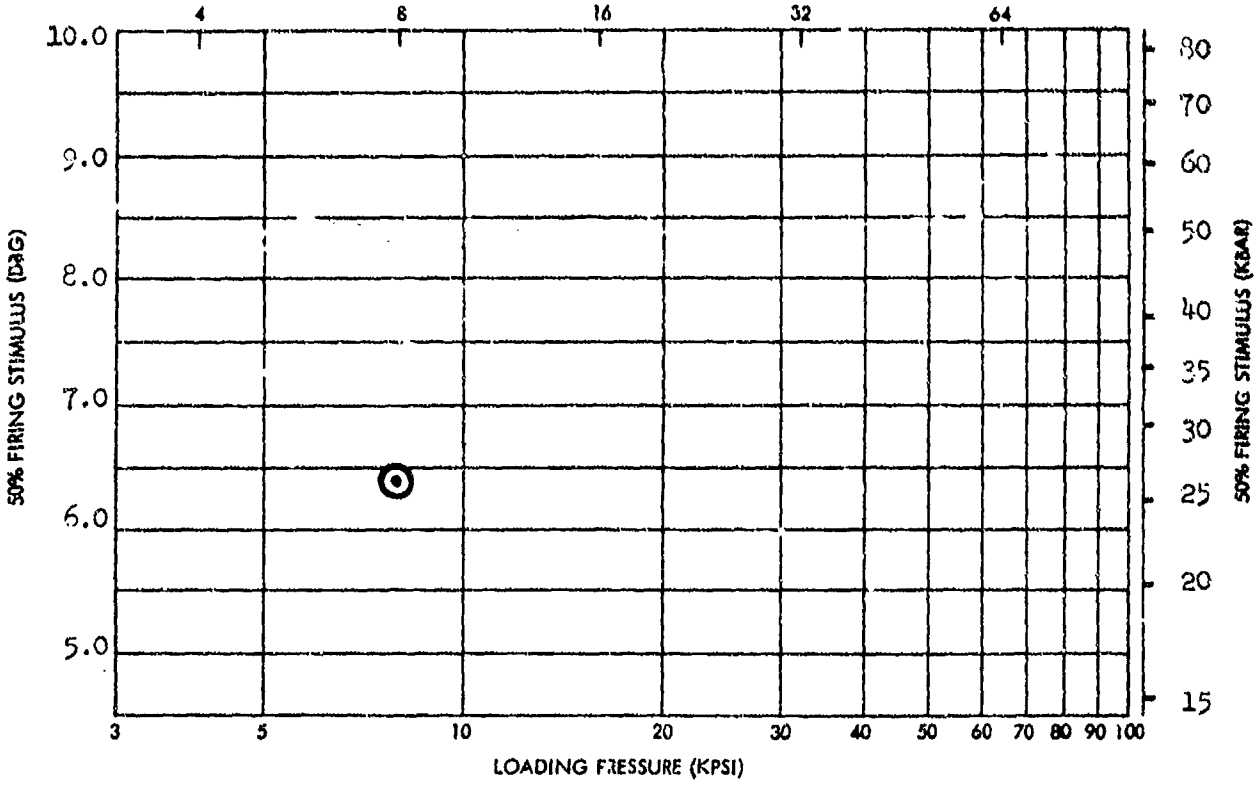
n =

Remarks

*Used DATB (X331) and TATB (X406); see Data Packs D1e and D2b. Materials dried overnight @ 50°C and then dry blended for 1 hour.

EXPLOSIVE	DATB/HNS-II (75/25)	X NO.	369	Date of Test 6/68
TMD	"	I. D. NO.	"	

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	σ		AVG.	σ	σm	N	
8	1.374	0.0029	-	6.393	0.0195	0.0144	23	



SMALL SCALE GAP TEST (SSGT) DATA
DATB/HNS-II (75/25)

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: DATB/HNS-II (75/25)*

X NO.: 569 ID: S NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 6/8/66 LOT NO.:

INITIAL QUANTITY: 100 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division

IMPACT SENSITIVITY (ℓ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℓ = cm

s = log units

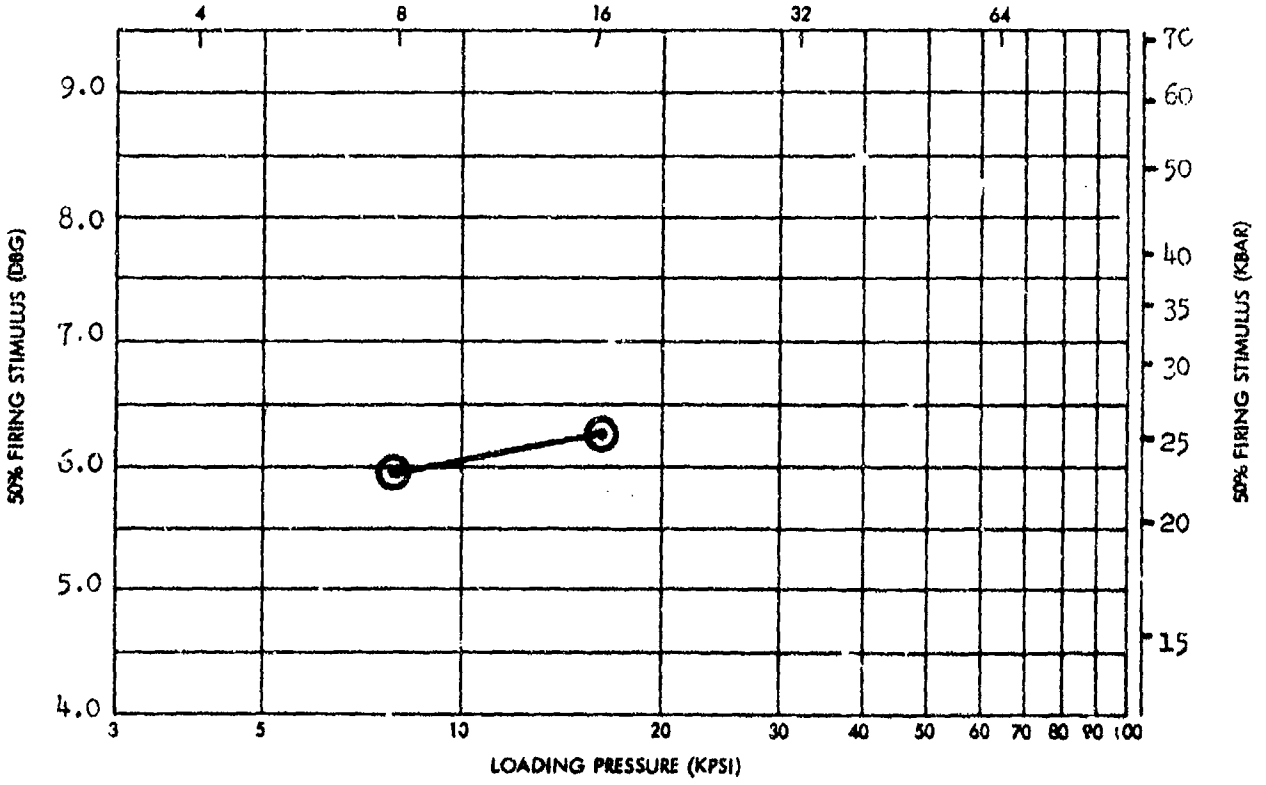
n =

Remarks

*Used DATB (X331) and HNS-II (X550); see Data Packs D1e and D8d. Materials dry-blended for 2 hours.

EXPLOSIVE	DATB/HNS-II (50/50)	X NO.	566	Date of Test
TMD	-	I. D. NO.	-	5/66

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.401	0.0093	-	5.948	0.0344	0.0266	20	
16	1.540	0.0050	-	6.254	0.0106	0.0096	20	



SMALL SCALE GAP TEST (SSGT) DATA
DATB/HNS-II (50/50)

CHEMICAL DATA

EXPLOSIVE NAME: DATB/HNS-II (50/50)*

X NO.: 566 ID: Z NO.: SSGT LOAD ORDER NO.:

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: 5/18/66 LOT NO.:

INITIAL QUANTITY: 200 grams BATCH NO.:

MANUFACTURED BY:

NOL: WE Division

IMPACT SENSITIVITY (x̄ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

x̄ = cm

s = log units

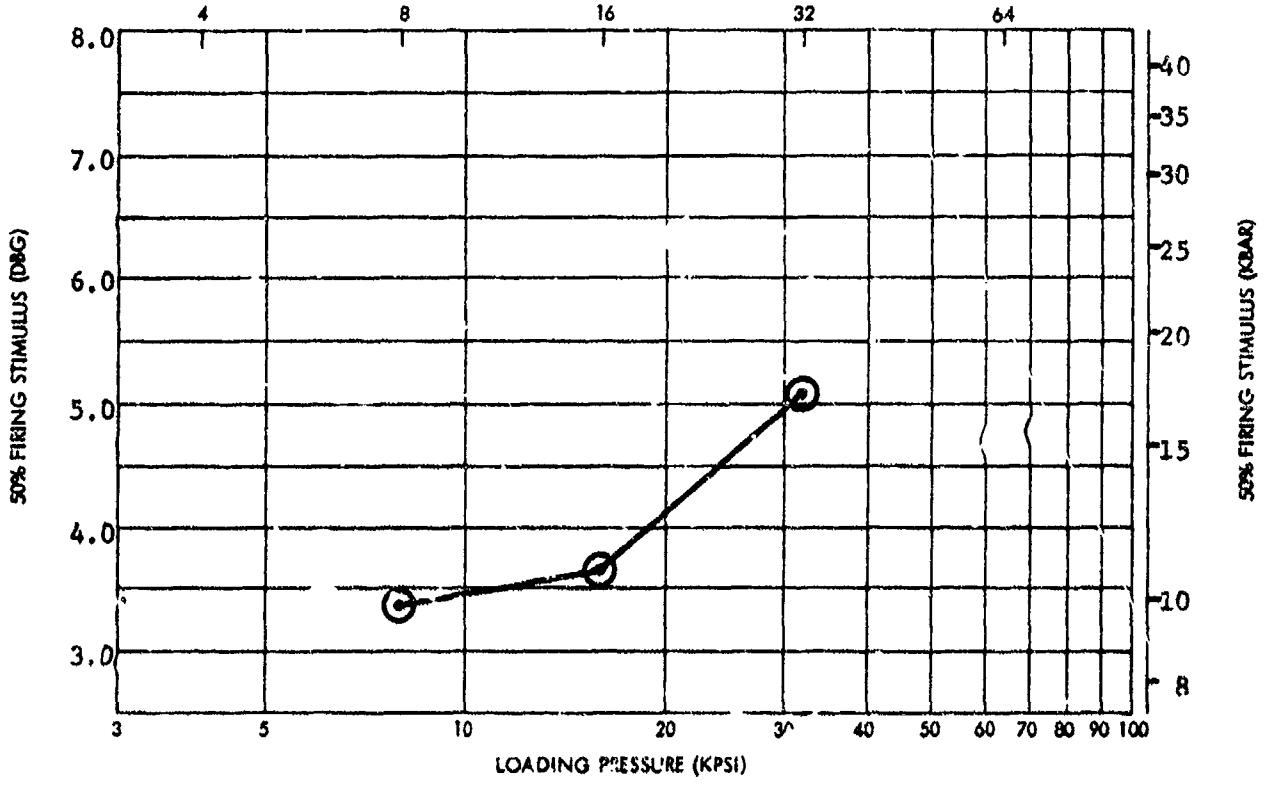
n =

Remarks

*Used DATB (X331) and HNS-II (X550); see Data Packs D1e and D8d. Materials dry-blended for 2 hours.

EXPLOSIVE	RDX/ST-AC (99.7/0.3)	X NO.	822	Date of Test
TMD	1.797	I. D. NO.	1670	11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.570	0.0081	87.4	3.340	0.0317	0.0211	20	
16	1.652	0.0099	91.9	3.641	0.1200	0.0634	20	
32	1.734	0.0045	96.5	5.095	0.1406	0.0686	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/ST-AC (99.7/0.3)

G6a1 4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (99.7/0.3)

X NO.: 822 ID: 1670 Z NO.: SSGT LOAD ORDER NO.: 1379, 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 1, SMUPA-IB, 8616-1

MANUFACTURED BY:

Picatinny Arsenal
Dover, N. J.

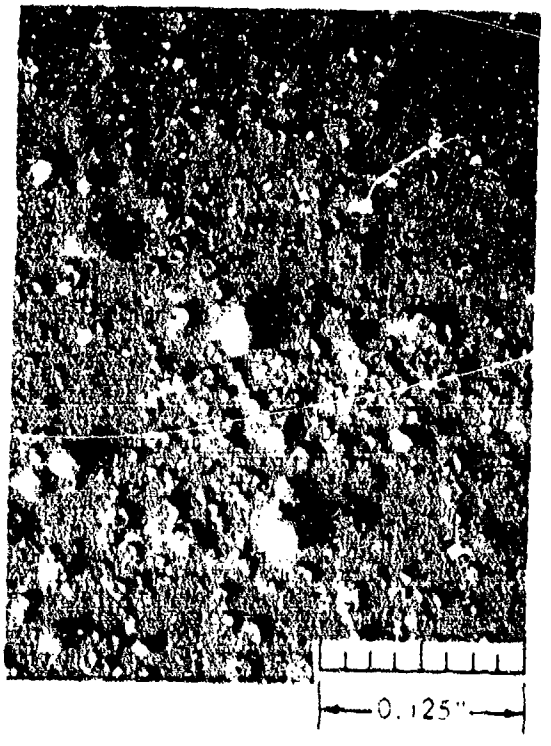
IMPACT SENSITIVITY ($ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$ = cm

s = log units

n =

Remarks



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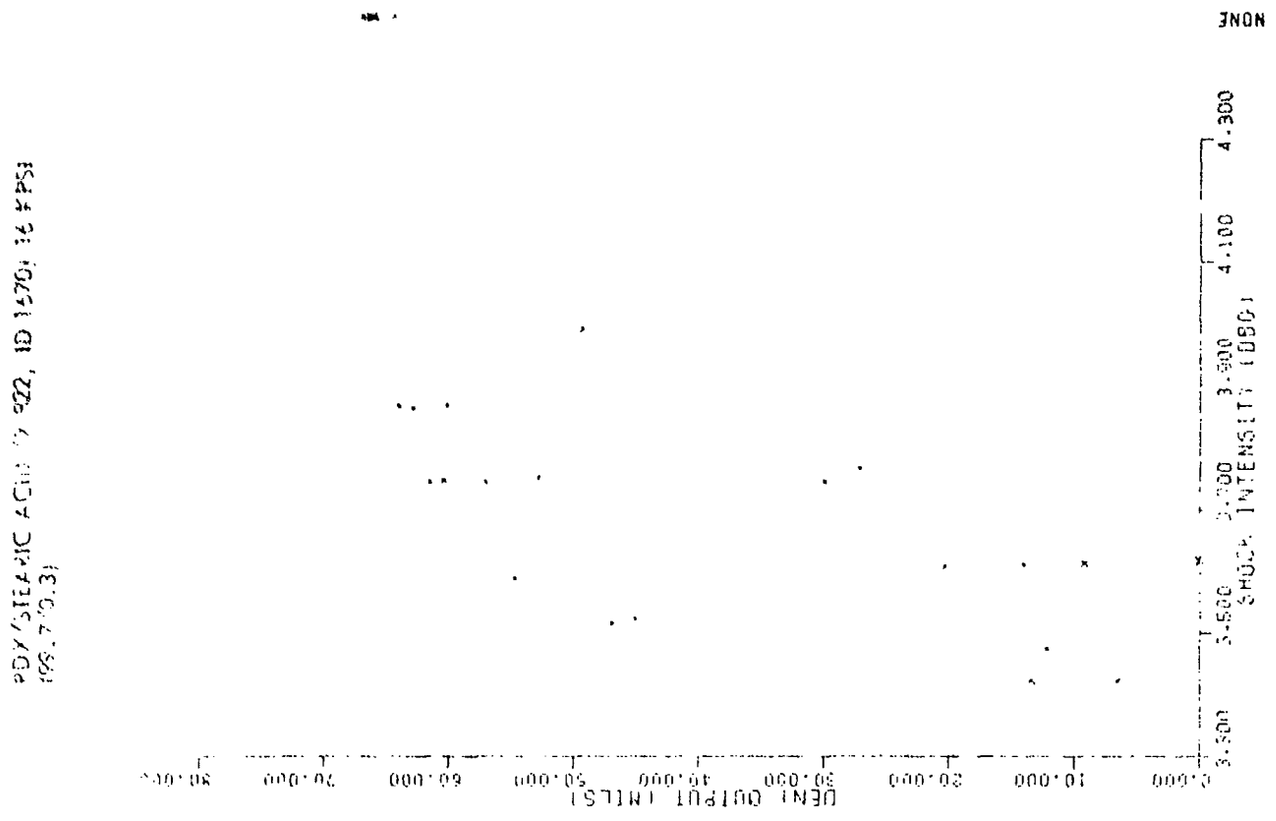
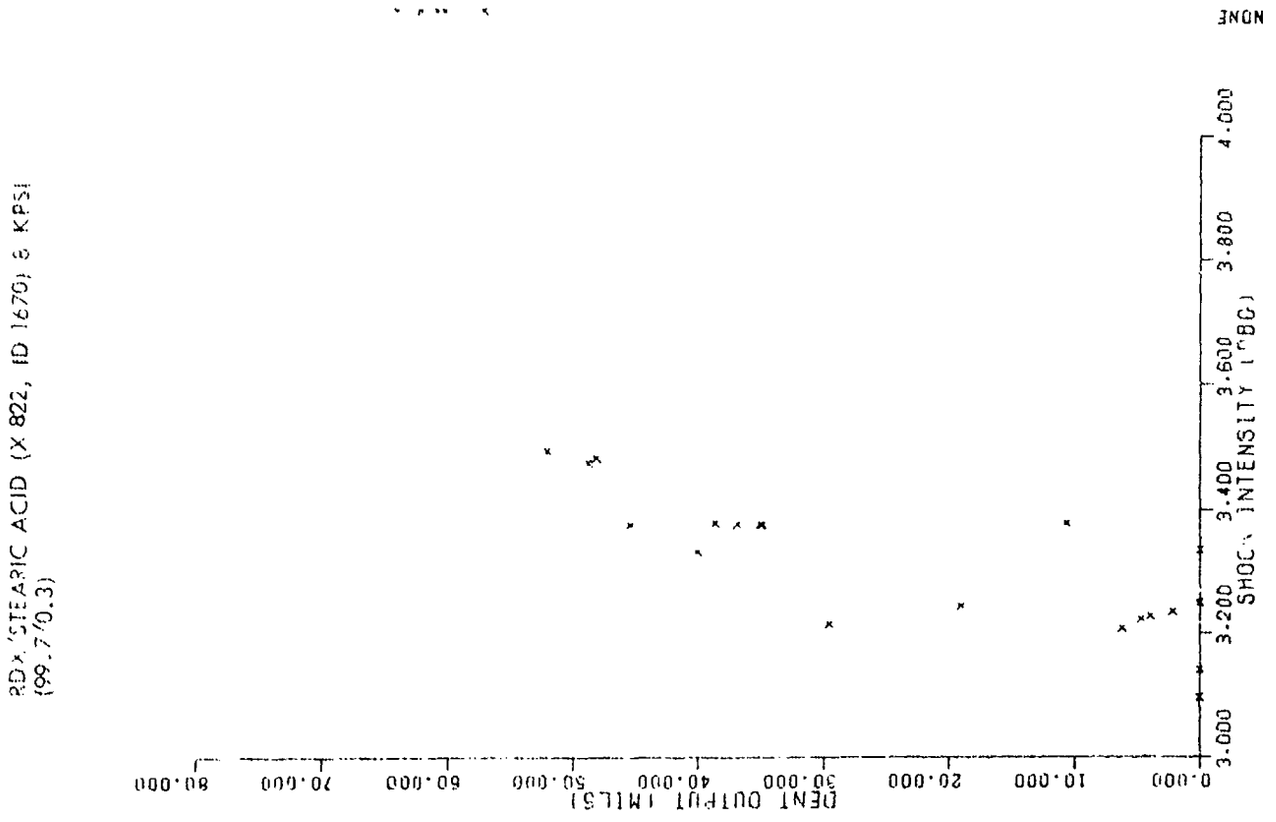
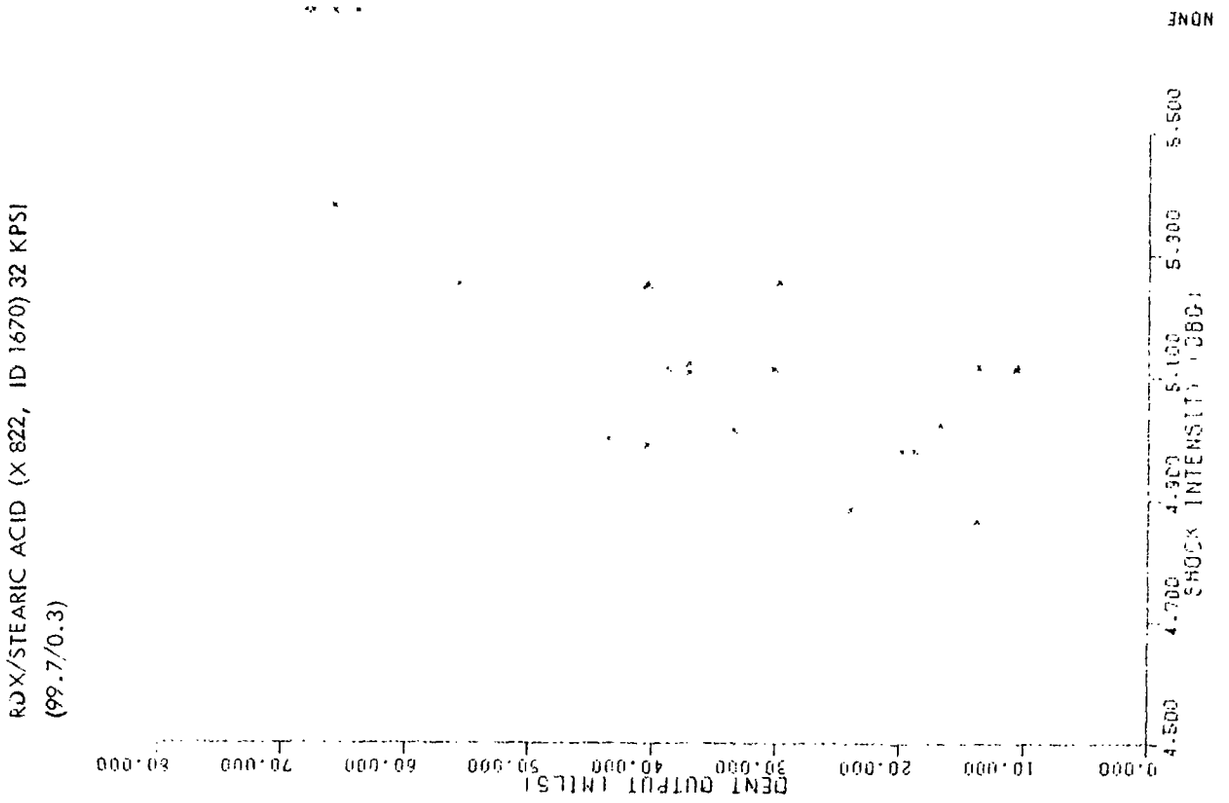
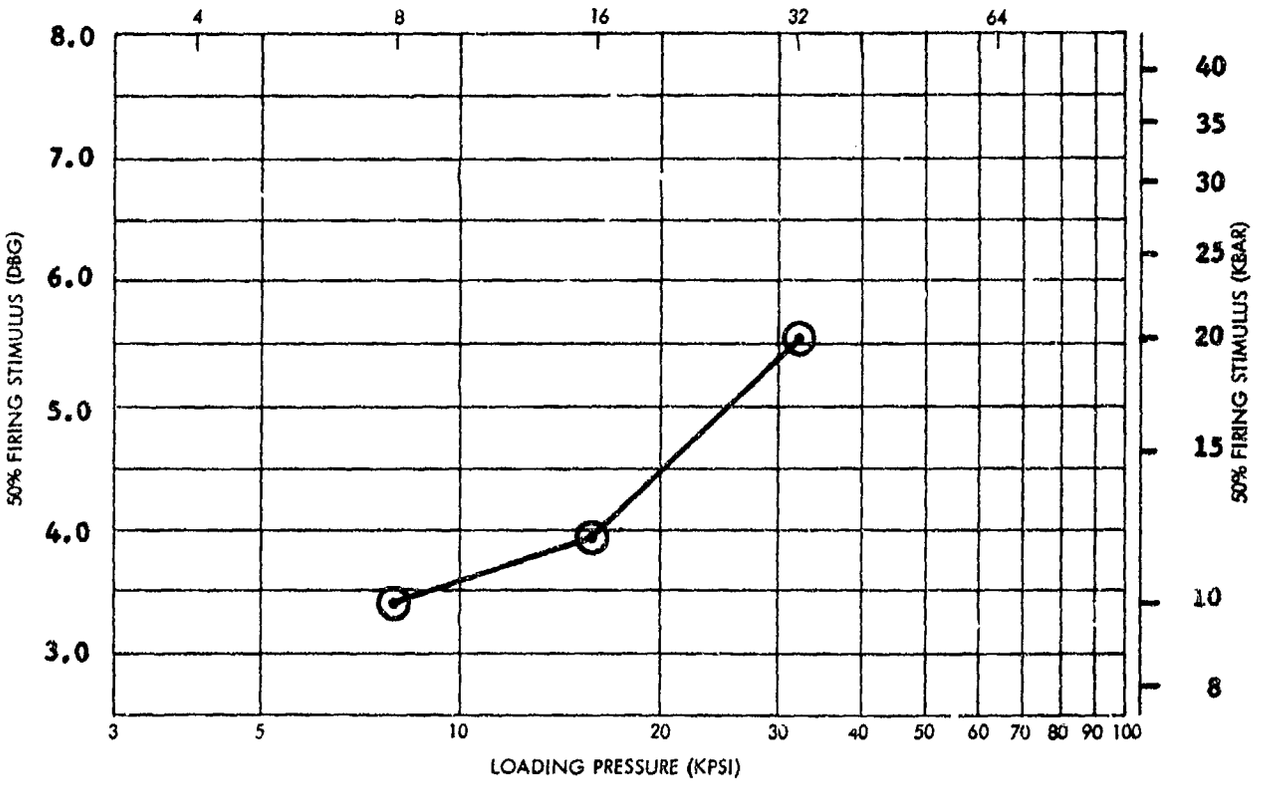

RDX/STEARIC ACID (X 822, ID 1670) 8 KPSI
(99.7/0.3)
NONE
SHOCK INTENSITY (GPa)
DENT DEPTH (MILS)


RDX/STEARIC ACID (X 822, ID 1670) 8 KPSI
(99.7/0.3)
NONE
SHOCK INTENSITY (GPa)
DENT DEPTH (MILS)


RDX/STEARIC ACID (X 822, ID 1670) 32 KPSI
(99.7/0.3)
NONE
4.500
4.700
4.900
5.100
5.300
5.500
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

EXPLOSIVE	RDX/ST-AC (99.4/0.6)	X NO.	823	Date of Test
TMD	1.792	I. D. NO.	1671	11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.605	0.0025	89.5	3.398	0.0503	0.0291	20	
16	1.673	0.0035	93.3	3.939	0.0253	0.0214	20	
32	1.738	0.0023	97.0	5.522	0.1076	0.0556	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/ST-AC (99.4/0.6)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (99.4/0.6)

X NO.: 823 ID: 1671 Z NO.: SSGT LOAD ORDER NO.: 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 2, SMUPA-1B, 8616-2

MANUFACTURED BY:

Picatinny Arsenal
Dover, N. J.

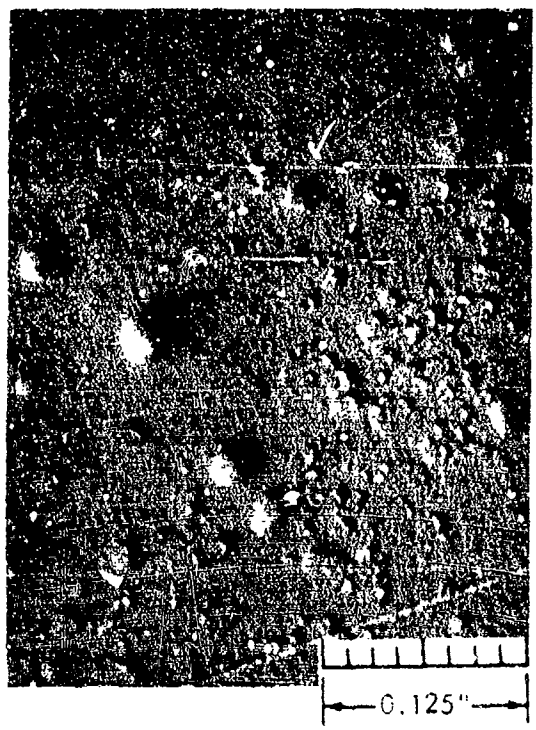
IMPACT SENSITIVITY (ℌ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ℌ = cm

s = log units

n =

Remarks



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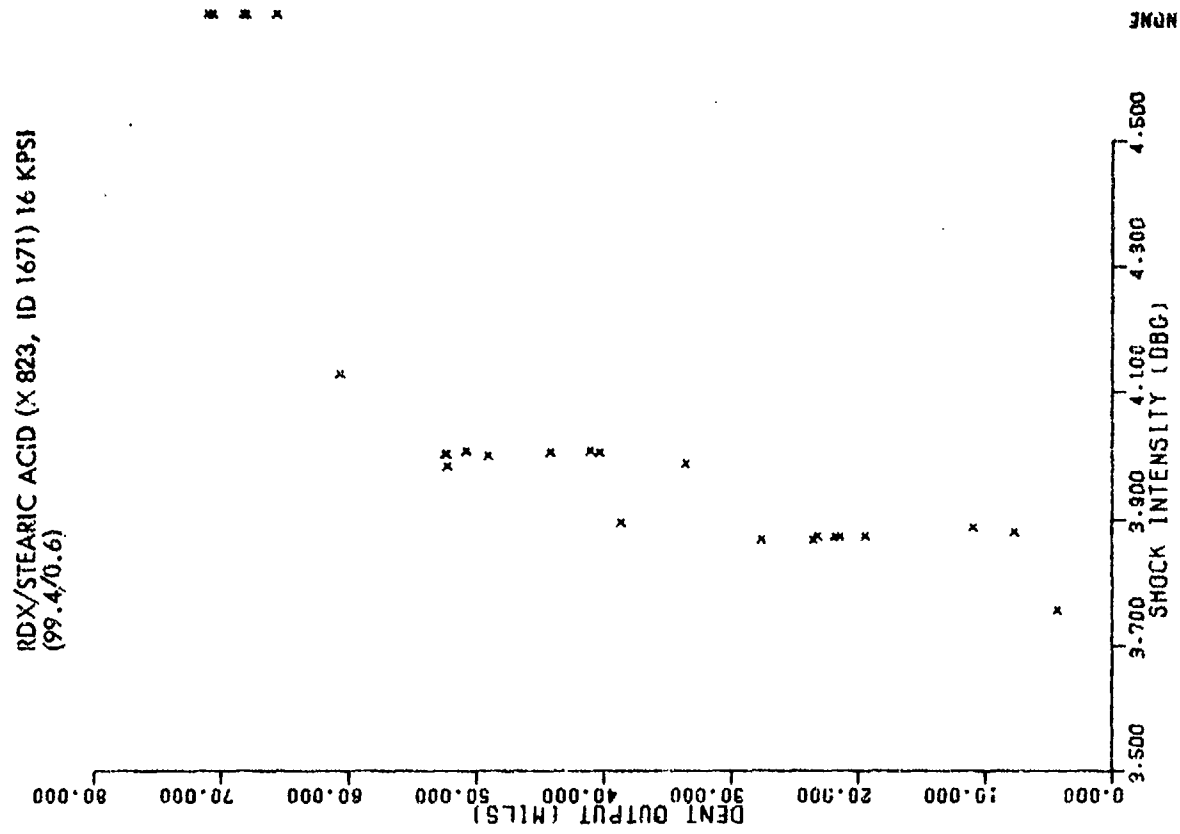
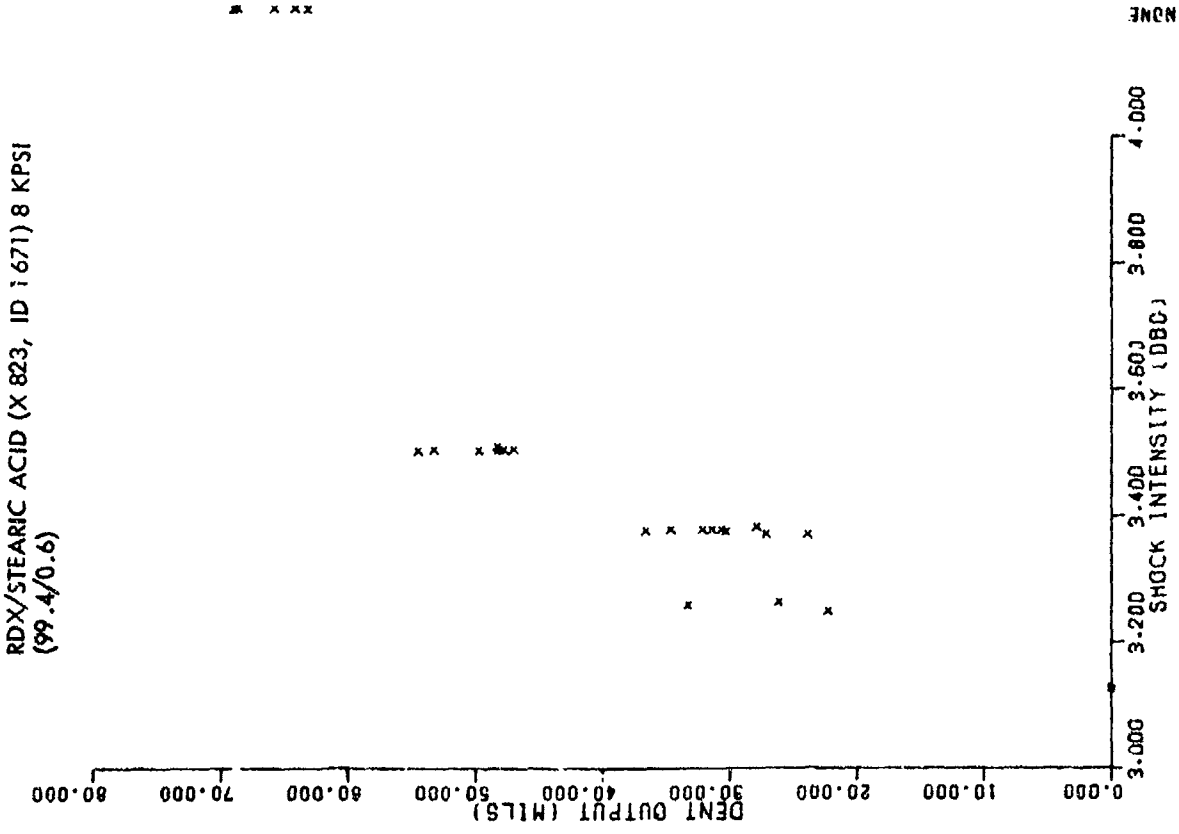
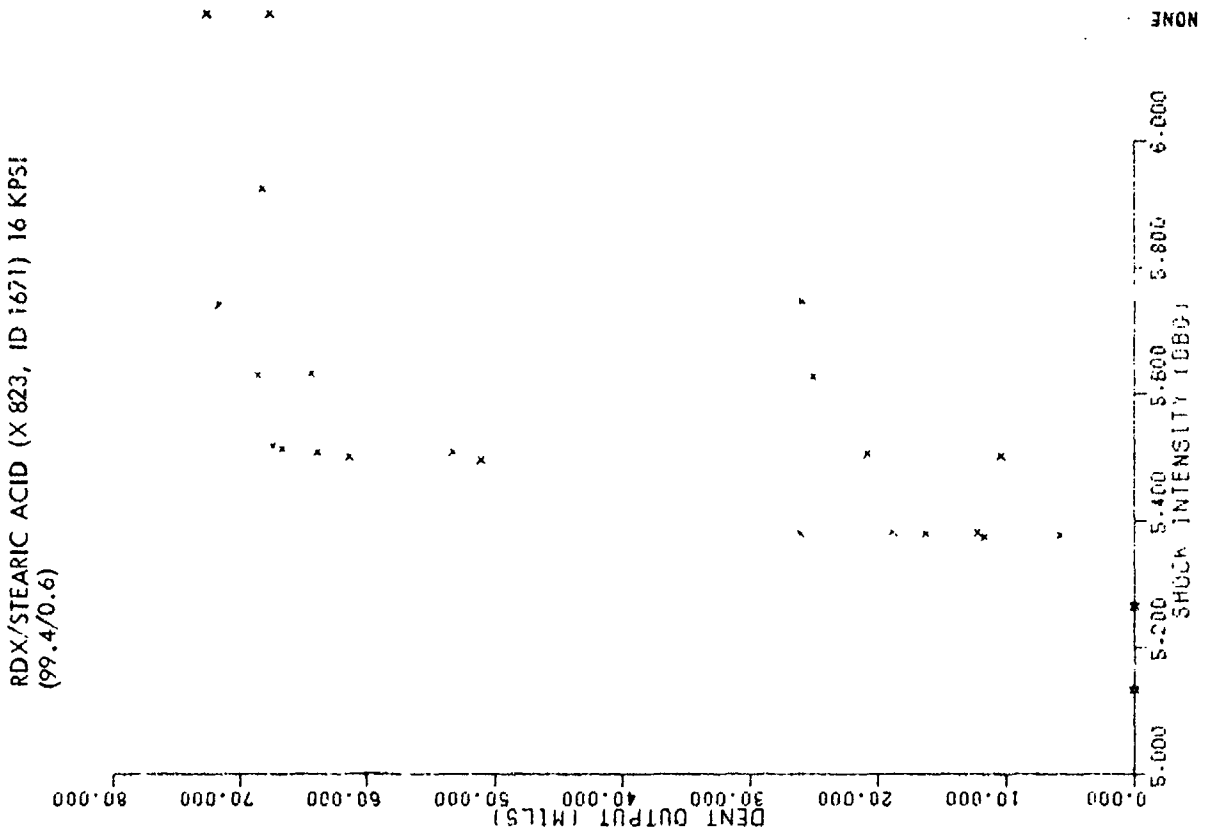
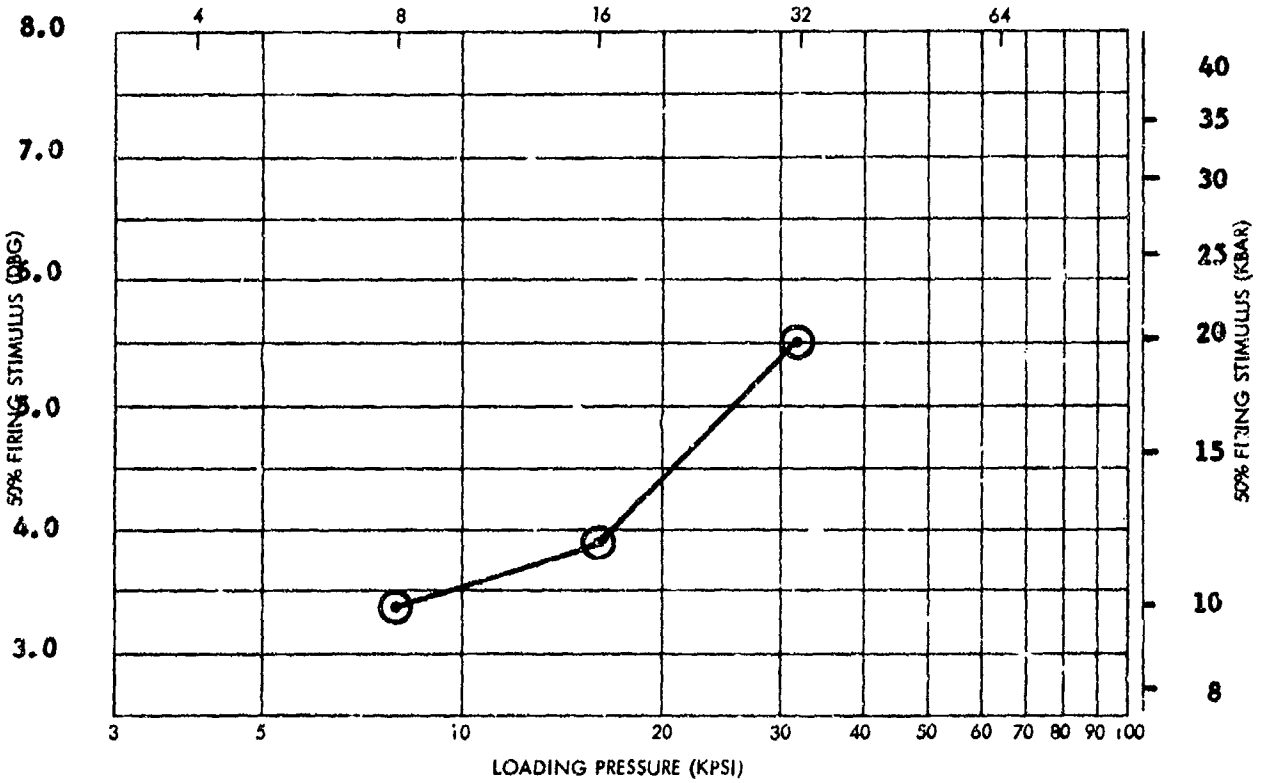

RDX/STEARIC ACID (X 823, ID 1671) 16 KPSI
(99.4/0.6)
NONE
SHOCK INTENSITY (DBC)
3.500
3.700
3.900
4.100
4.300
4.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


RDX/STEARIC ACID (X 823, ID 1671) 8 KPSI
(99.4/0.6)
NONE
SHOCK INTENSITY (DBC)
3.000
3.200
3.400
3.600
3.800
4.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


RDX/STEARIC ACID (X 823, ID 1671) 16 KPSI
(99.4/0.6)
NONE
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (GPa)
5.000
5.200
5.400
5.600
5.800
6.000

EXPLOSIVE	RDX/ST-AC (99.2/0.8)	X NO.	824	Date of Test
TMD	1.739	I. D. NO.	1672	11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.579	0.0064	88.3	3.369	0.0206	0.0148	20	
16	1.649	0.0050	92.2	3.901	0.0723	0.0405	20	
32	1.729	0.0044	96.6	5.505	0.0337	0.0230	20	



SMALL SCALE GAP TEST (SSGT) DATA

RDX/ST-AC (99.2/0.8)

G6c1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (99.2/0.8)

X NO.: 824 ID: 1672 Z NO.: SSGT LOAD ORDER NO.: 1379, 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 3, SMUPA-IB, 8616-3

MANUFACTURED BY:

Picatinny Arsenal
Dover, N. J.

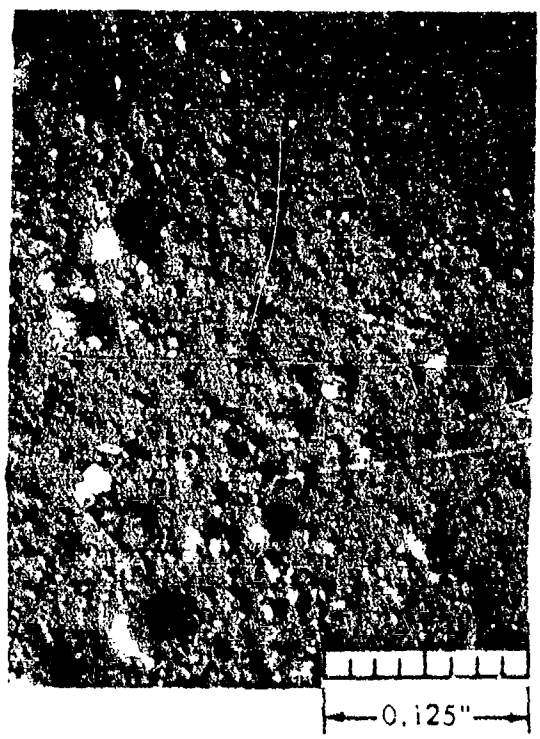
IMPACT SENSITIVITY (50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks



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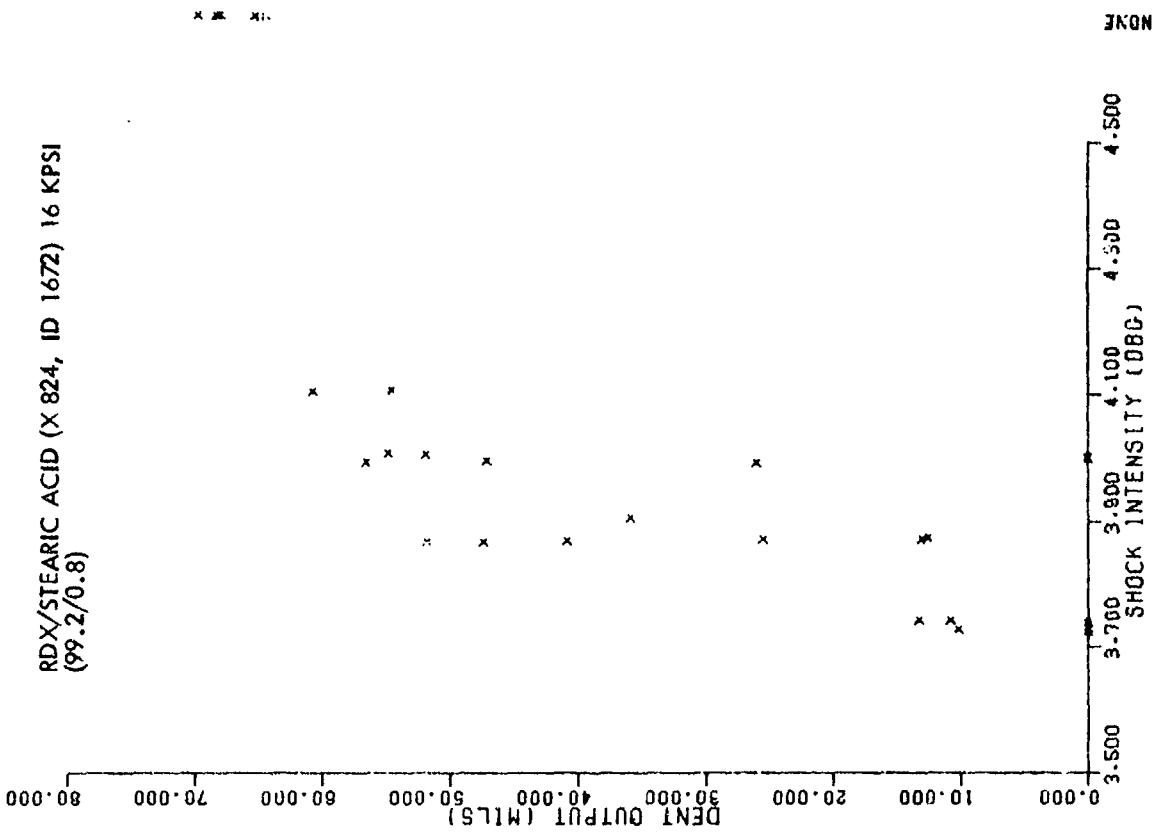
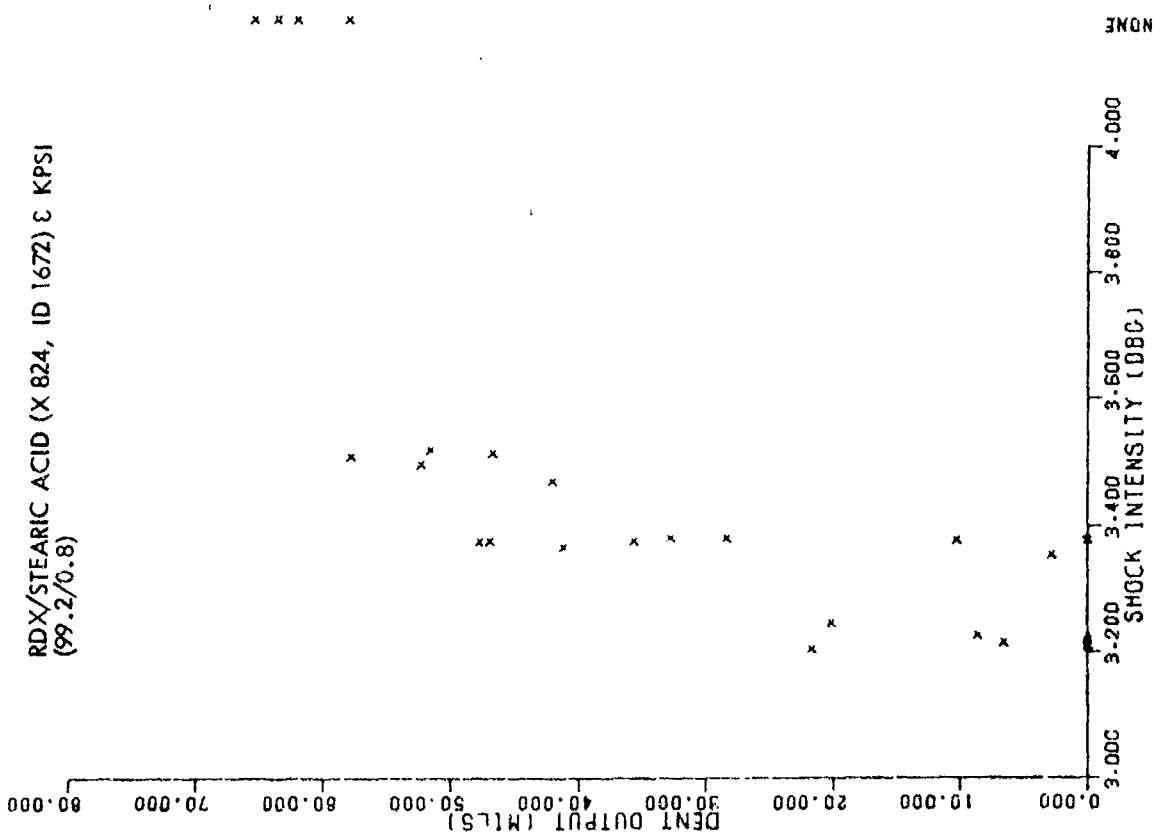
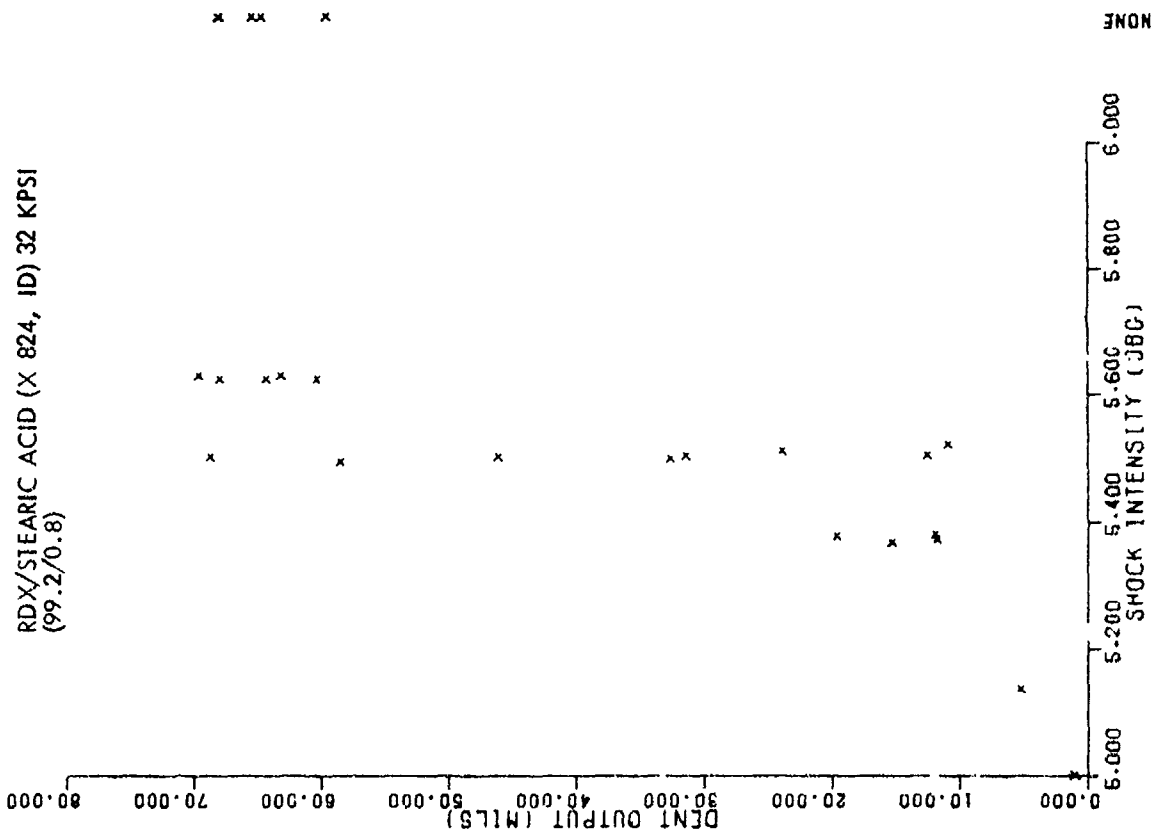

RDX/STEARIC ACID (X 824, ID 1672) 16 KPSI
(99.2/0.8)
NONE
SHOCK INTENSITY (DBC)
3.500
3.700
3.900
4.100
4.300
4.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

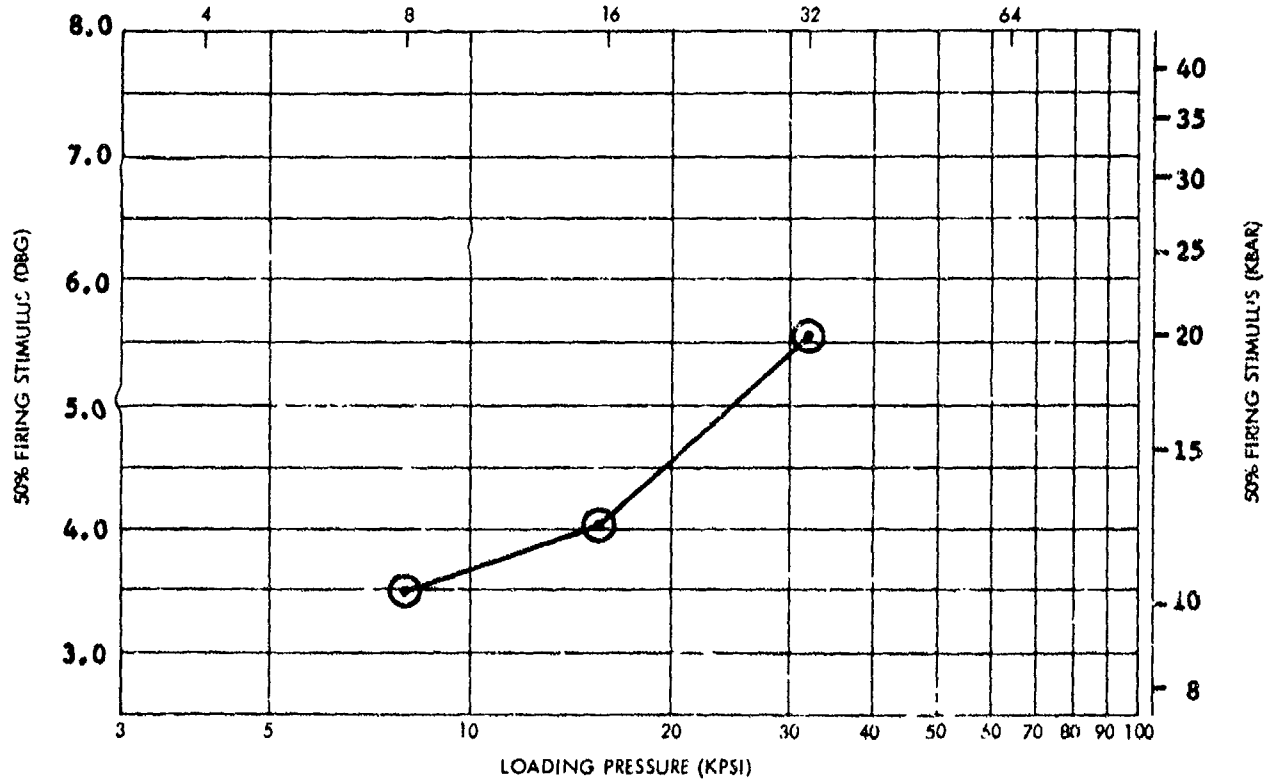

RDX/STEARIC ACID (X 824, ID 1672) 8 KPSI
(99.2/0.8)
NONE
SHOCK INTENSITY (DBC)
3.000
3.200
3.400
3.600
3.800
4.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


RDX/STEARIC ACID (X 824, ID) 32 KPSI
(99.2/0.8)
NONE
SHOCK INTENSITY (JBC)
6.000
5.800
5.600
5.400
5.200
6.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

EXPLOSIVE	RDX/ST-AC (98.8/1.2)	X NO.	825
TMD	1.782	I. D. NO.	1673

Date of Test
11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.599	0.0016	89.7	3.476	0.0181	0.0289	20	
16	1.664	0.0123	93.4	4.016	0.0185	0.0199	20	
32	1.731	0.0042	97.1	5.557	0.0663	0.0375	20	



SMALL SCALE GAP TEST (SSGT) DATA
RDX/ST-AC (98.8/1.2)

G6d1

4 Sep 1973

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (98.8/1.2)

X NO.: 825 ID: 1673 Z NO.: SSGT LOAD ORDER NO.: 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 4, SMUPA-IB, 8616-4

MANUFACTURED BY:

Picatinny Arsenal
Dover, N. J.

IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks

G 6 d 2

4 Sep 1973

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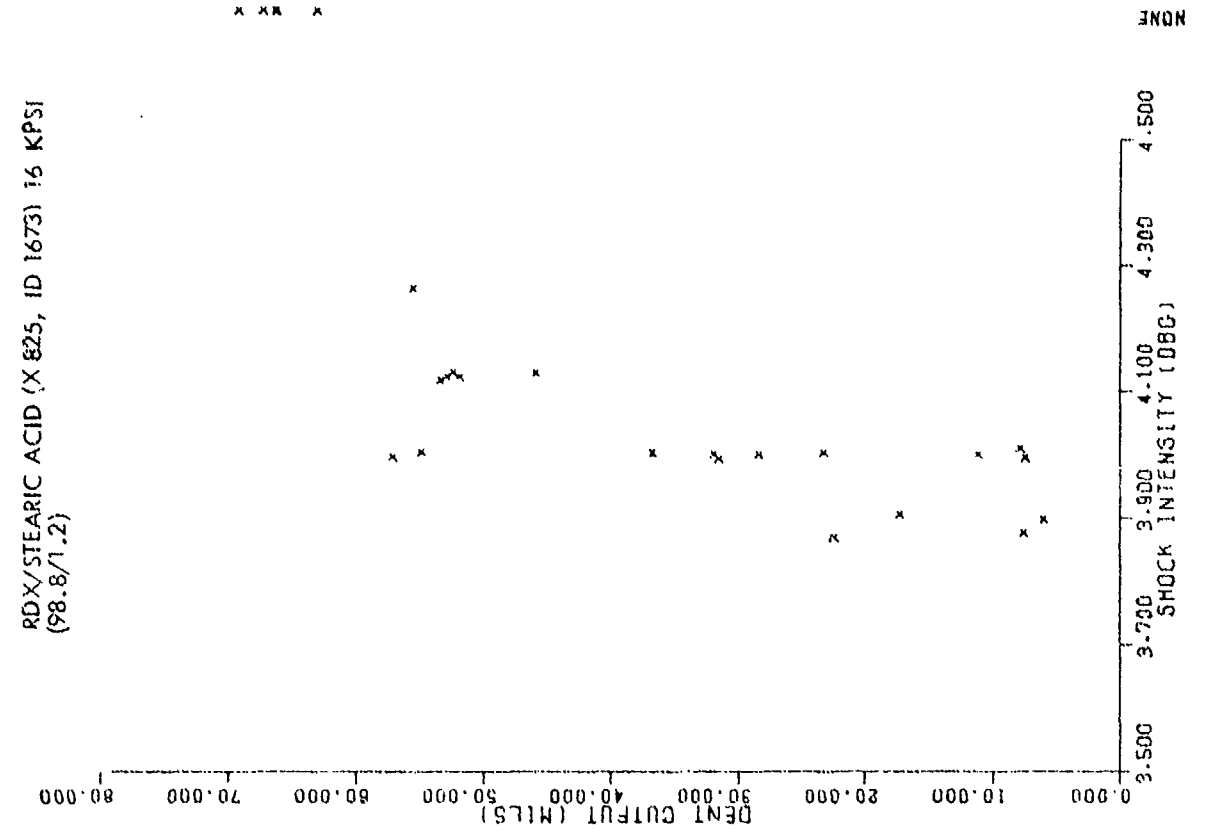
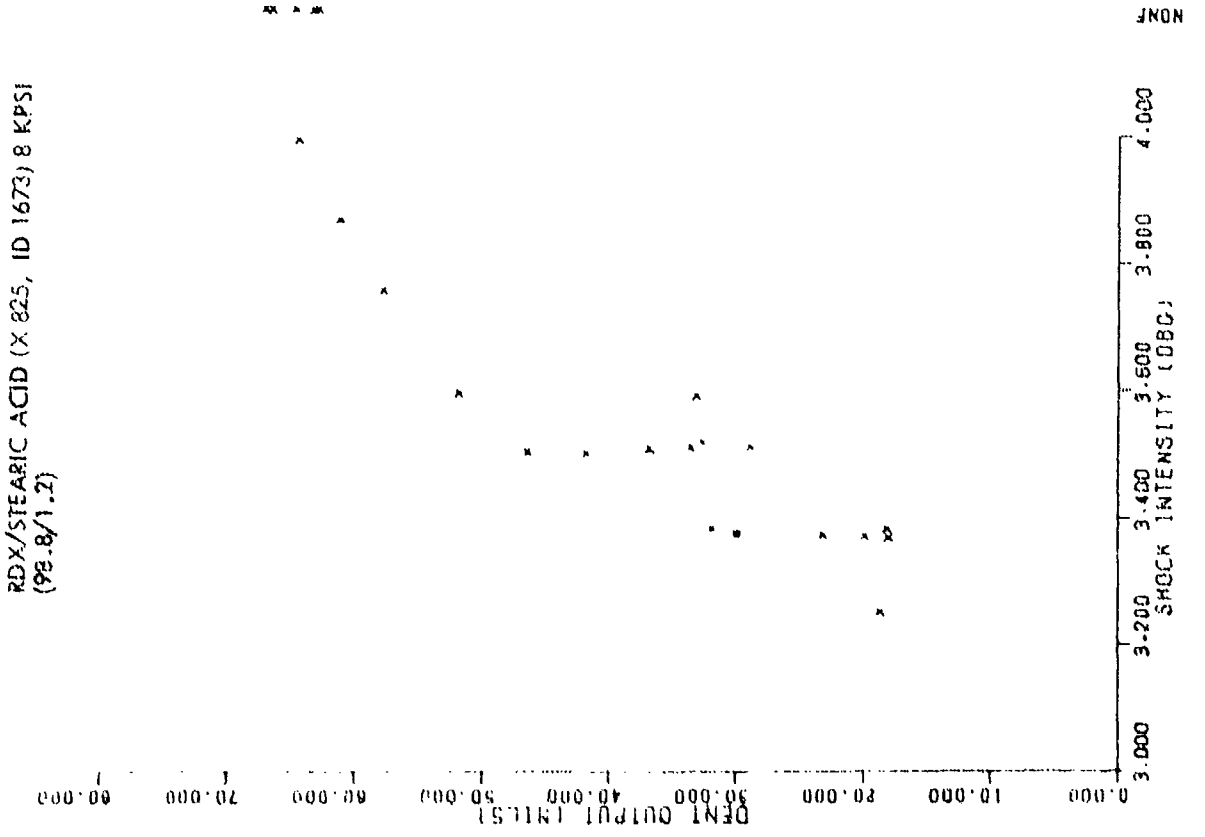
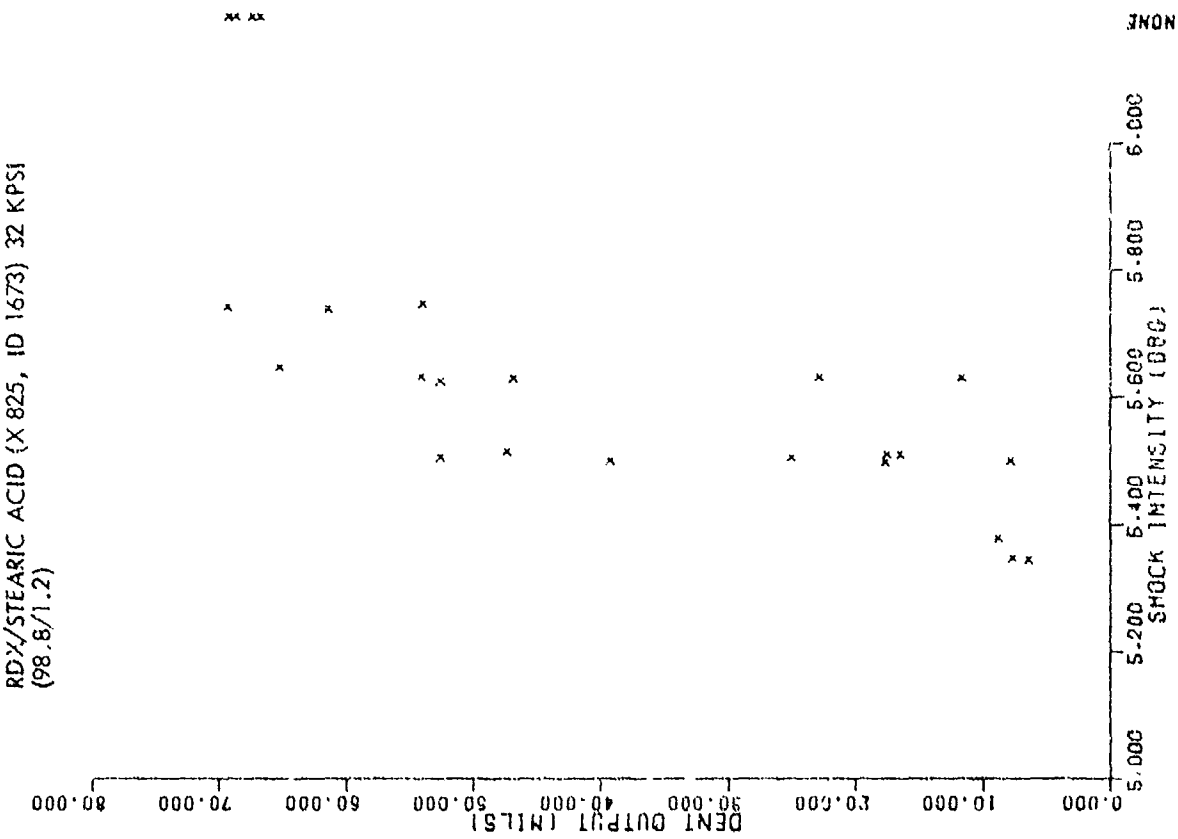
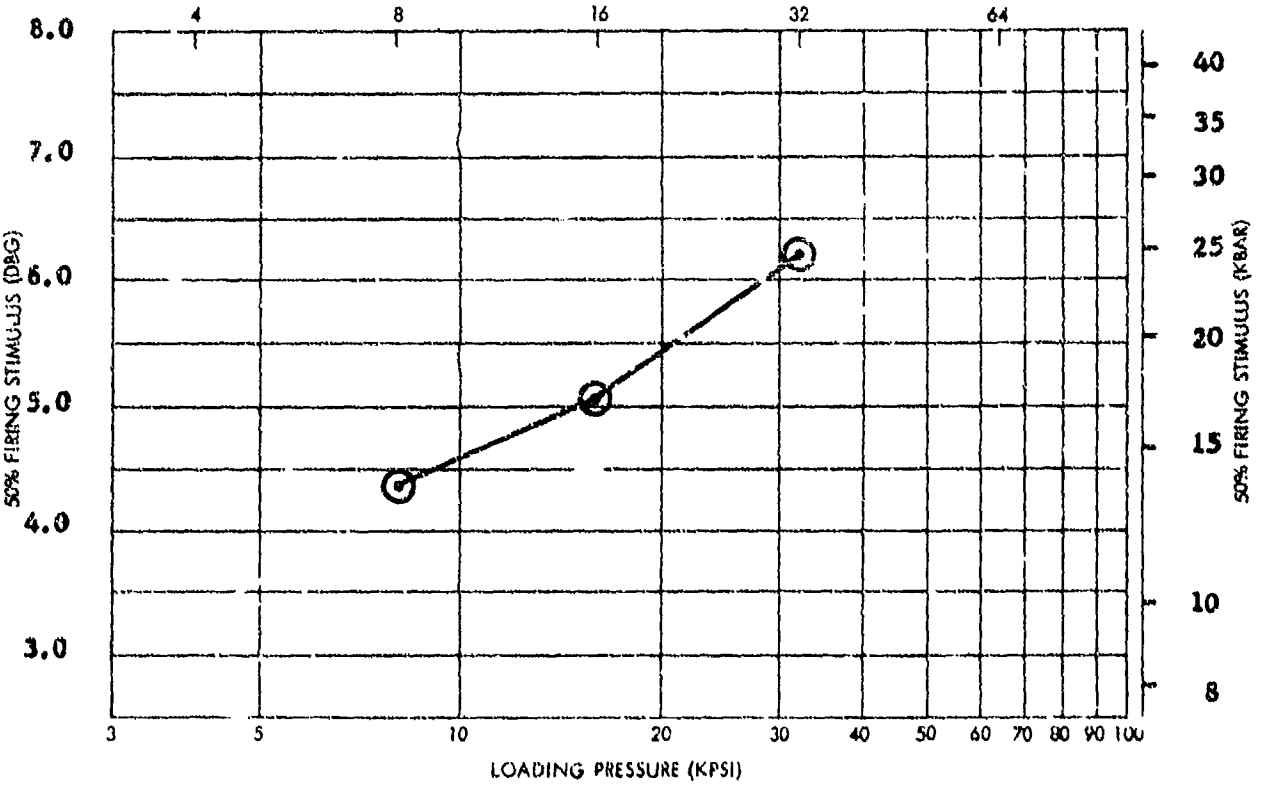

RDX/STEARIC ACID (X 825, ID 1673) 16 KPSI
(98.8/1.2)
NONE
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (DBG)
3.500
3.700
3.900
4.100
4.300
4.500


RDX/STEARIC ACID (X 825, ID 1673) 8 KPSI
(98.8/1.2)
NONE
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
SHOCK INTENSITY (DBG)
3.000
3.200
3.400
3.600
3.800
4.000


RDX/STEARIC ACID (X 825, ID 1673) 32 KPSI
(98.8/1.2)
NONE
SHOCK INTENSITY (GPa)
5.000
5.200
5.400
5.600
5.800
6.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

EXPLOSIVE	RDX/ST-AC (96.7/3.3)	X NO.	826	Date of Test
TMD	1.749	I. D. NO.	1674	11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM^3)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.589	0.0087	90.8	4.358	0.0554	0.0318	20	
16	1.656	0.0049	94.7	5.091	0.0496	0.0290	20	
32	1.714	0.0039	98.0	6.228	0.0212	0.0158	20	



SMALL SCALE GAP TEST (SSGT) DATA

RDX/ST-AC (96.7/3.3)

NOLTR 73-132

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (96.7/3.3)

X NO.: 826 ID: 1674 Z NO.: SSGT LOAD ORDER NO.: 1379, 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 5, SMUPA, 8616-5

MANUFACTURED BY:

Picatinny Ar enal
Dover, N. J.

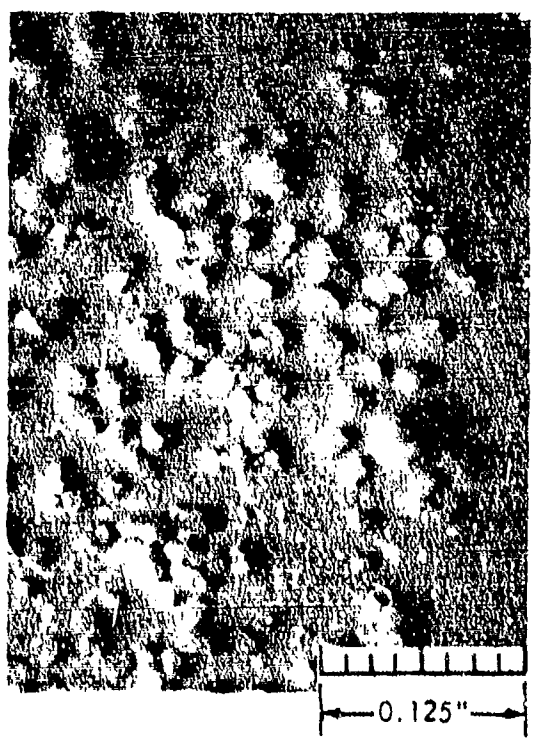
IMPACT SENSITIVITY ($\bar{x}$ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

$\bar{x}$ = cm

s = log units

n =

Remarks



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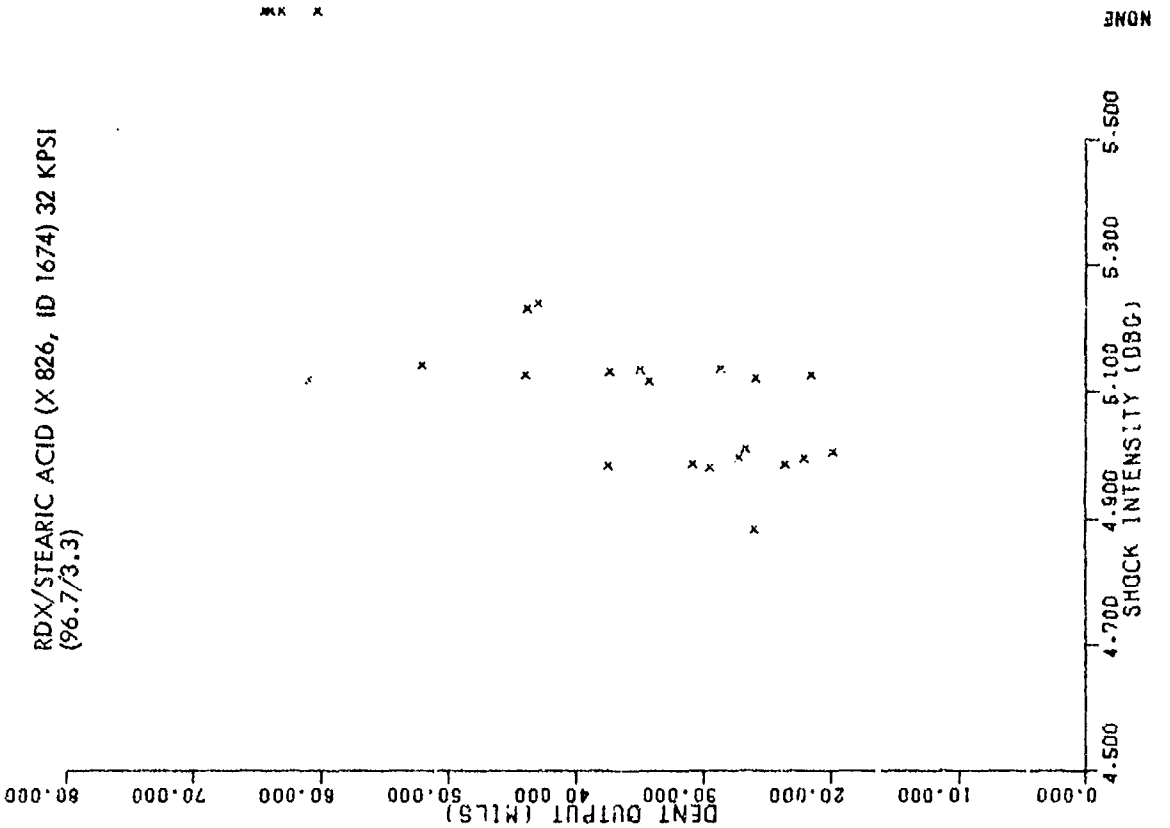
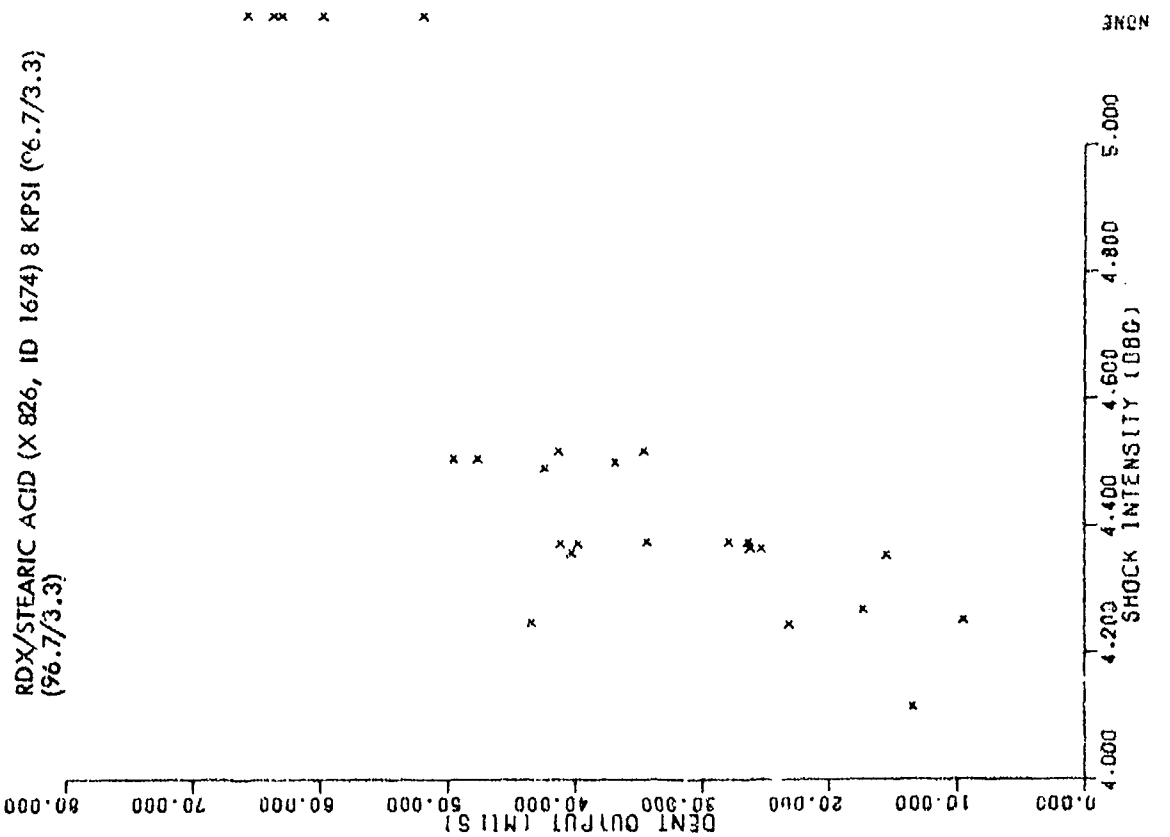
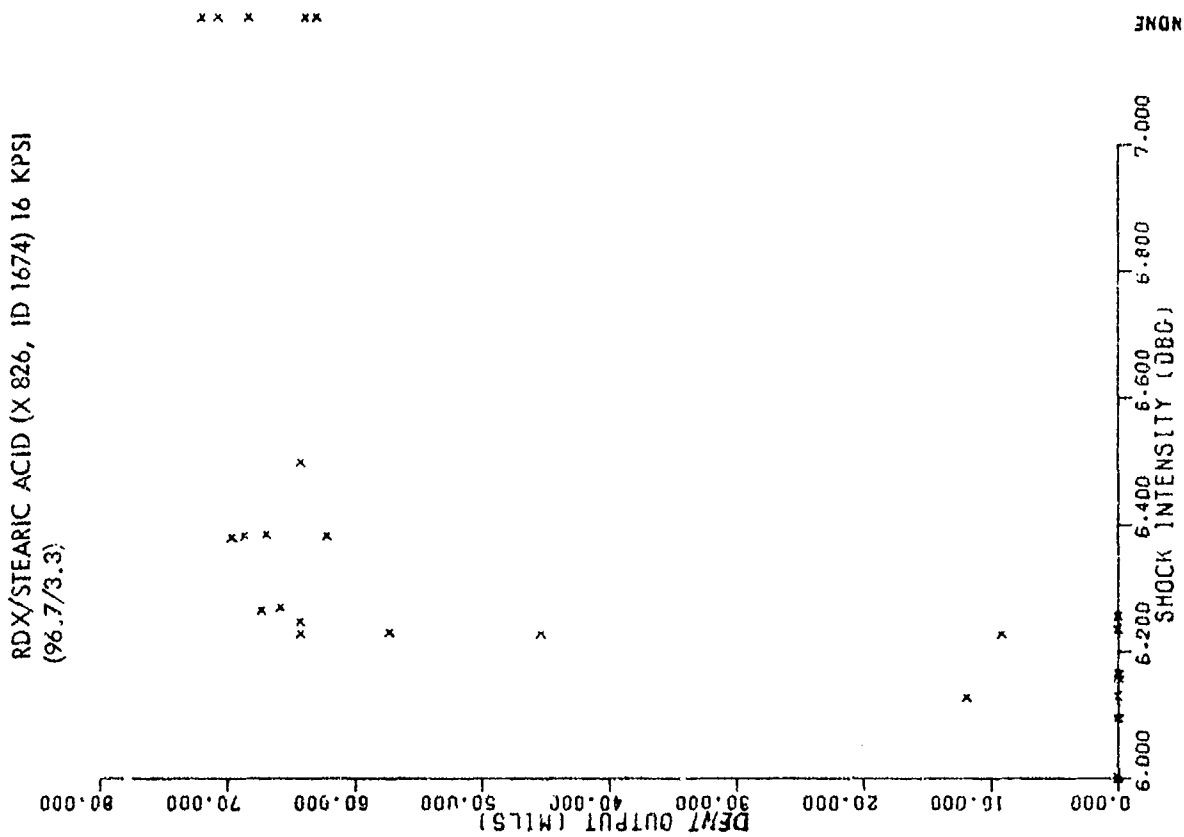

RDX/STEARIC ACID (X 826, ID 1674) 32 KPSI
(96.7/3.3)
DENT OUTPUT (MILS)
SHOCK INTENSITY (DBG)
NONE
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
4.500
4.700
4.900
5.100
5.300
5.500

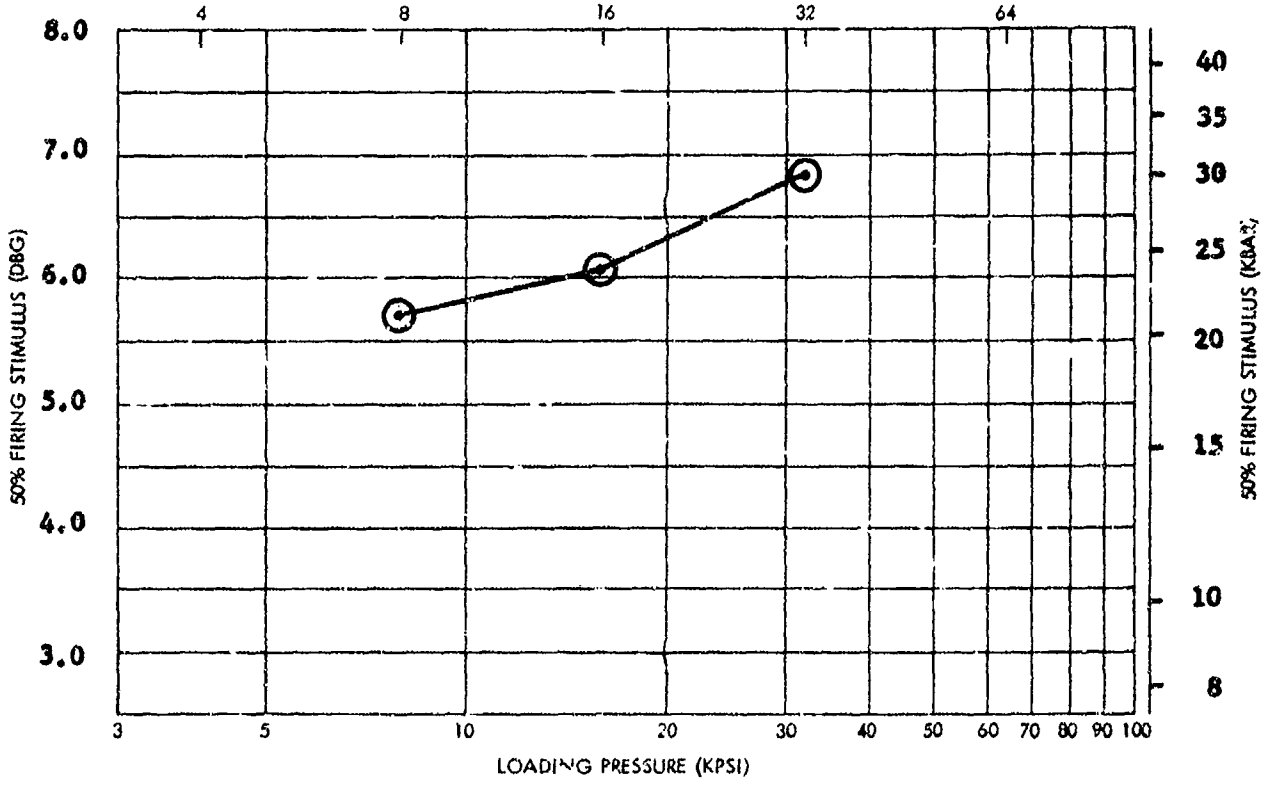

RDX/STEARIC ACID (X 826, ID 1674) 8 KPSI (96.7/3.3)
(96.7/3.3)
DENT OUTPUT (MILS)
SHOCK INTENSITY (DBG)
NONE
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
4.000
4.200
4.400
4.600
4.800
5.000


RDX/STEARIC ACID (X 826, ID 1674) 16 KPSI
(96.7/3.3)
DENT OUTPUT (MILS)
SHOCK INTENSITY (DBC)
NONE
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
6.000
6.200
6.400
6.600
6.800
7.000

EXPLOSIVE	RDX/ST-AC (90.3/9.7)	X NO.	827	Date of Test
TMD	1.655	I. D. NO.	1675	11/72

LOADING PRESSURE (KPSI)	DENSITY (GM/CM³)		% TMD	SENSITIVITY (DBG)				REMARKS
	AVG.	s		AVG.	g	s_m	N	
8	1.577	0.0024	95.3	5.718	0.0215	0.0185	20	
16	1.626	0.0031	97.9	6.056	0.0459	0.0318	20	
32	1.659	0.0023	100.2 (1)	6.736	0.0220	0.0215	20	

(1) Experimental error



SMALL SCALE GAP TEST (SSGT) DATA
RDX/ST-AC (90.3/9.7)

CHEMICAL DATA

EXPLOSIVE NAME: RDX/Stearic Acid (90.3/9.7)

X NO.: 827 ID: 1675 Z NO.: SSGT LOAD ORDER NO.: 1379, 1381

SOURCE:

CHEMICAL NAME:

DATE RECEIVED: LOT NO.:

INITIAL QUANTITY: 2 pounds BATCH NO.: 6, SMUPA-IB, 8616-6

MANUFACTURED BY:

Picatinny Arsenal
Dover, N. J.

IMPACT SENSITIVITY (ẋ or 50% point)
(Type 12 Tools; 2.5 Kg wt; Sandpaper)
DATE OF TEST

ẋ = cm

s = log units

n =

Remarks

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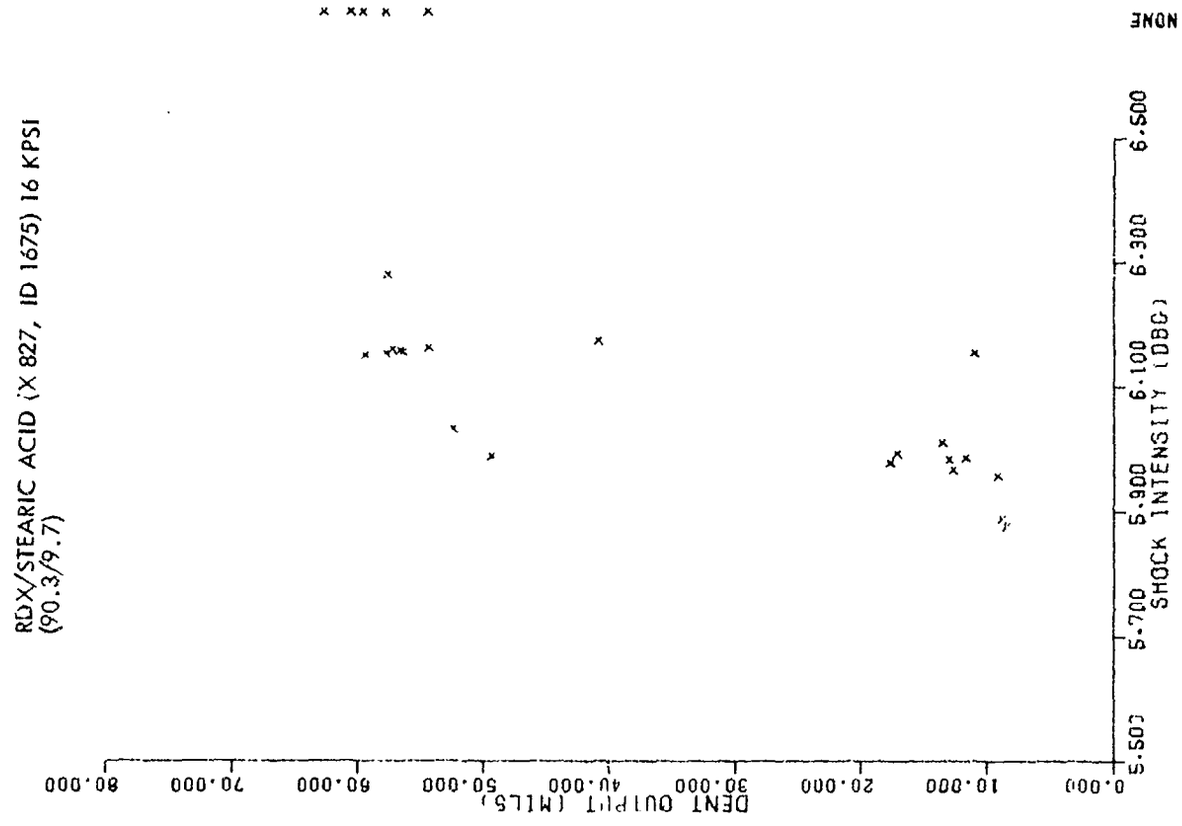
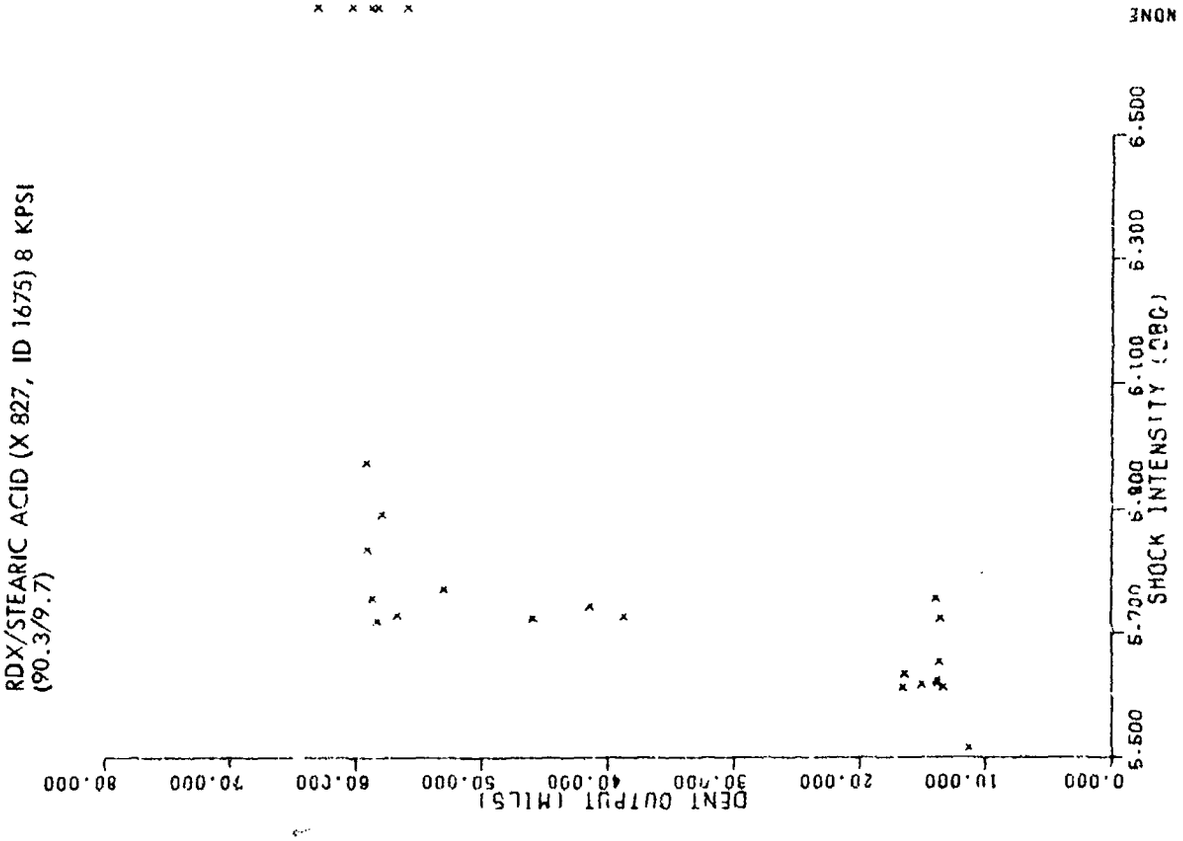

RDX/STEARIC ACID (X 827, ID 1675) 16 KPSI
(90.3/9.7)
NONE
SHOCK INTENSITY (DBC)
6.500
6.300
6.100
5.900
5.700
5.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000


RDX/STEARIC ACID (X 827, ID 1675) 8 KPSI
(90.3/9.7)
NONE
SHOCK INTENSITY (DBC)
6.500
6.300
6.100
5.900
5.700
5.500
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

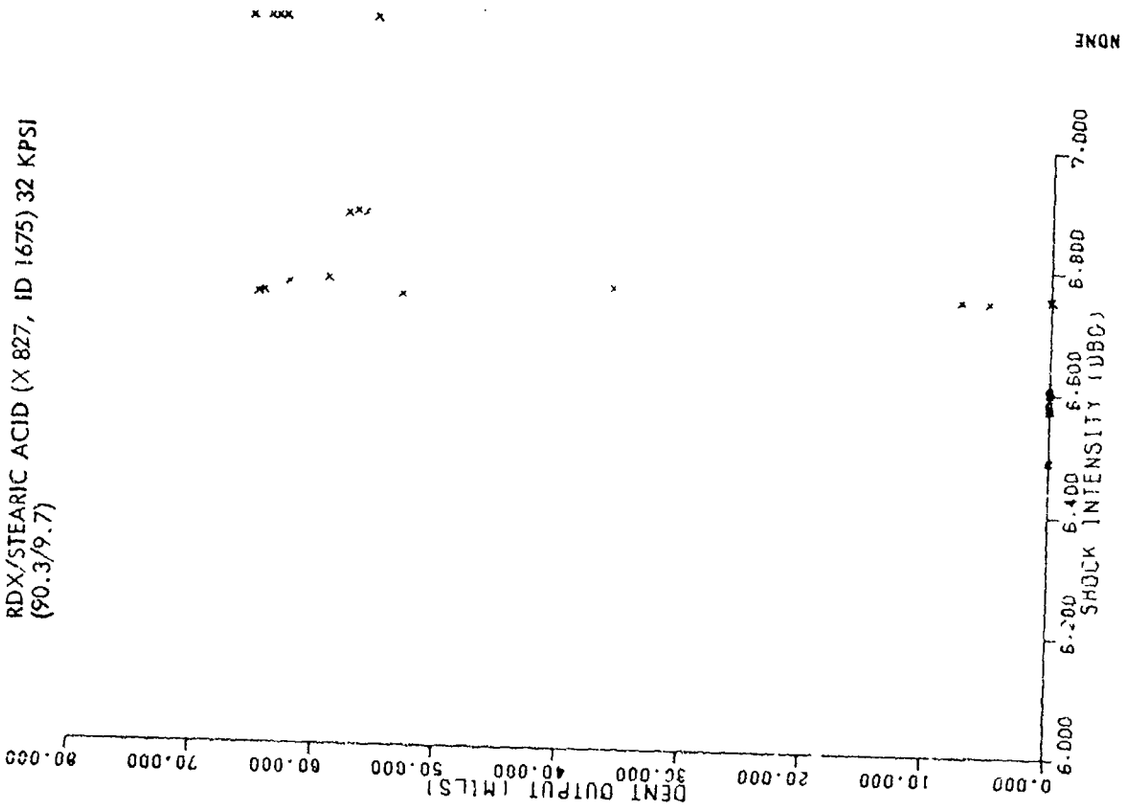

RDX/STEARIC ACID (X 827, ID 1675) 32 KPSI
(90.3/9.7)
NONE
SHOCK INTENSITY (UBC)
6.000
6.200
6.400
6.600
6.800
7.000
DENT OUTPUT (MILS)
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000

TABLE H-1 PROCEDURE TO COMPUTE THE SHOCK STRENGTH (s_L OR s_G) NEEDED TO CAUSE A RESPONSE OF A PARTICULAR PROBABILITY

NORMAL P_G	u	LOGISTIC P_L
→1	6.0	0.9975
→1	5.5	0.9959
→1	5.0	0.9933
0.9999966	4.5	0.9890
0.999968	4.0	0.9820
0.99977	3.5	0.9707
0.9987	3.0	0.9526
0.9938	2.5	0.9241
0.9773	2.0	0.8808
0.9713	1.9	0.8699
0.9641	1.8	0.8582
0.9554	1.7	0.8455
0.9452	1.6	0.8320
0.9332	1.5	0.8176
0.9192	1.4	0.8022
0.9032	1.3	0.7858
0.8849	1.2	0.7685
0.8643	1.1	0.7503
0.8413	1.0	0.7311
0.8159	0.9	0.7110
0.7881	0.8	0.6900
0.7580	0.7	0.6682
0.7258	0.6	0.6457
0.6915	0.5	0.6225
0.6554	0.4	0.5987
0.6179	0.3	0.5744
0.5793	0.2	0.5498
0.5398	0.1	0.5250
0.5000	0.0	0.5000

LOGISTIC DISTRIBUTION

FOR A PROBABILITY P_L:

1. FIND THE CORRESPONDING VALUE OF u;
2. s_L = AVG + u·g WHERE AVG AND g ARE EXPRESSED IN DBg.

FOR A PROBABILITY (1-P_L)

1. FIND THE CORRESPONDING VALUE OF u;
2. s_L = AVG - u·g.

GAUSSIAN DISTRIBUTION

FOR A PROBABILITY P_G:

1. FIND THE CORRESPONDING VALUE OF u;
2. s_G = AVG + u·s.

FOR A PROBABILITY (1-P_G):

1. FIND THE CORRESPONDING VALUE OF u;
2. s_G = AVG − u·s.

SAMPLE CALCULATION

EXPERIMENTAL DATA: 50% POINT = 5.615 DBg; g = 0.088

REQUIREMENTS: LOGISTIC DISTRIBUTION; PROBABILITY = 0.9900

s_L = 5.615 + (4.616)(0.00.)

= 5.652

NOTE:

1. u IS THE NORMALIZED VARIATE.
2. AVG IS THE SHOCK STRENGTH FOR FIFTY PERCENT RESPONSE.
3. THIS TABLE CAN BE USED IN AN INVERSE MANNER TO ESTIMATE FUNCTIONING PROBABILITIES.

TABLE H-2 BARRIER THICKNESS (MILS) AS A FUNCTION OF SHOCK STRENGTH FOR DBg RANGE .00 TO 5.99

SHOCK STRENGTH (DBG)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
1.00	794.3	792.5	790.7	788.9	787.0	785.2	783.4	781.6	779.8	778.0
1.10	776.2	774.5	772.7	770.9	769.1	767.4	765.5	763.8	762.1	760.3
1.20	758.6	756.8	755.1	753.4	751.6	749.8	748.2	746.4	744.7	743.0
1.30	741.3	739.6	737.9	736.2	734.5	732.8	731.1	729.5	727.8	726.1
1.40	724.4	722.8	721.1	719.4	717.8	716.1	714.5	712.9	711.2	709.6
1.50	707.9	706.3	704.7	703.1	701.5	699.8	698.2	696.6	695.0	693.4
1.60	691.8	690.2	688.7	687.1	685.5	683.9	682.3	680.8	679.2	677.6
1.70	676.1	674.5	673.0	671.4	669.9	668.3	666.8	665.3	663.7	662.2
1.80	660.7	659.2	657.7	656.1	654.6	653.1	651.6	650.1	648.6	647.1
1.90	645.7	644.2	642.7	641.2	639.7	638.3	636.8	635.3	633.9	632.4
2.00	631.0	629.5	628.1	626.6	625.2	623.7	622.3	620.9	619.4	618.0
2.10	616.6	615.2	613.8	612.4	610.9	609.5	608.1	606.7	605.3	603.9
2.20	602.6	601.2	599.8	598.4	597.0	595.7	594.3	592.9	591.5	590.2
2.30	588.8	587.5	586.1	584.8	583.4	582.1	580.8	579.4	578.1	576.8
2.40	575.4	574.1	572.8	571.5	570.2	568.9	567.5	566.2	564.9	563.6
2.50	562.3	561.0	559.8	558.5	557.2	555.9	554.6	553.4	552.1	550.8
2.60	549.5	548.3	547.0	545.8	544.5	543.3	542.0	540.8	539.5	538.3
2.70	537.0	535.8	534.6	533.3	532.1	530.9	529.7	528.4	527.2	526.0
2.80	524.8	523.6	522.4	521.2	520.0	518.8	517.6	516.4	515.2	514.0
2.90	512.9	511.7	510.5	509.3	508.2	507.0	505.8	504.7	503.5	502.3
3.00	501.2	500.0	498.9	497.7	496.6	495.5	494.3	493.2	492.0	490.9
3.10	489.8	488.7	487.5	486.4	485.3	484.2	483.1	481.9	480.8	479.7
3.20	478.6	477.5	476.4	475.3	474.2	473.2	472.1	471.0	469.9	468.8
3.30	467.7	466.7	465.6	464.5	463.4	462.4	461.3	460.3	459.2	458.1
3.40	457.1	456.0	455.0	453.9	452.9	451.9	450.8	449.8	448.7	447.7
3.50	446.7	445.7	444.6	443.6	442.6	441.6	440.6	439.5	438.5	437.5
3.60	436.5	435.5	434.5	433.5	432.5	431.5	430.5	429.5	428.5	427.6
3.70	426.6	425.6	424.6	423.6	422.7	421.7	420.7	419.8	418.8	417.8
3.80	416.9	415.9	415.0	414.0	413.0	412.1	411.1	410.2	409.3	408.3
3.90	407.4	406.4	405.5	404.6	403.6	402.7	401.8	400.9	399.9	399.0
4.00	398.1	397.2	396.3	395.4	394.5	393.6	392.6	391.7	390.9	389.9
4.10	389.0	388.2	387.3	386.4	385.5	384.6	383.7	382.8	381.9	381.1
4.20	380.2	379.3	378.4	377.6	376.7	375.8	375.0	374.1	373.3	372.4
4.30	371.5	370.7	369.8	369.0	368.1	367.3	366.4	365.6	364.8	363.9
4.40	363.1	362.2	361.4	360.6	359.7	358.9	358.1	357.3	356.5	355.6
4.50	354.8	354.0	353.2	352.4	351.6	350.8	349.9	349.1	348.3	347.5
4.60	346.7	345.9	345.1	344.3	343.6	342.8	342.0	341.2	340.4	339.6
4.70	338.8	338.1	337.3	336.5	335.7	335.0	334.2	333.4	332.7	331.9
4.80	331.1	330.4	329.6	328.9	328.1	327.3	326.6	325.8	325.1	324.3
4.90	323.6	322.8	322.1	321.4	320.6	319.9	319.2	318.4	317.7	317.0
5.00	316.2	315.5	314.8	314.1	313.3	312.6	311.9	311.2	310.5	309.7
5.10	309.0	308.3	307.6	306.9	306.2	305.5	304.8	304.1	303.4	302.7
5.20	302.0	301.3	300.6	299.9	299.2	298.5	297.9	297.2	296.5	295.8
5.30	295.1	294.4	293.8	293.1	292.4	291.7	291.1	290.4	289.7	289.1
5.40	288.4	287.7	287.1	286.4	285.8	285.1	284.4	283.8	283.1	282.5
5.50	281.8	281.2	280.5	279.9	279.3	278.6	278.0	277.3	276.7	276.1
5.60	275.4	274.8	274.2	273.5	272.9	272.3	271.6	271.0	270.4	269.8
5.70	269.2	268.5	267.9	267.3	266.7	266.1	265.5	264.9	264.2	263.6
5.80	263.0	262.4	261.8	261.2	260.6	260.1	259.4	258.8	258.2	257.6
5.90	257.0	256.4	255.9	255.3	254.7	254.1	253.5	252.9	252.3	251.8

TABLE H-3 BARRIER THICKNESS (MILS) AS A FUNCTION OF SHOCK STRENGTH FOR DBg RANGE 6.00 TO 10.99

SHOCK STRENGTH (DBG)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
6.00	251.2	250.6	250.0	249.5	248.9	248.3	247.7	247.2	246.6	246.0
6.10	245.5	244.9	244.3	243.8	243.2	242.7	242.1	241.5	241.0	240.4
6.20	239.9	239.3	238.8	238.2	237.7	237.1	236.6	236.0	235.5	235.0
6.30	234.4	233.9	233.3	232.8	232.3	231.7	231.2	230.7	230.1	229.6
6.40	229.1	228.6	228.0	227.5	227.0	226.5	225.9	225.4	224.9	224.4
6.50	223.9	223.4	222.8	222.3	221.8	221.3	220.8	220.3	219.8	219.3
6.60	218.8	218.3	217.8	217.3	216.8	216.3	215.8	215.3	214.8	214.3
6.70	213.8	213.3	212.8	212.3	211.8	211.3	210.9	210.4	209.9	209.4
6.80	208.9	208.4	208.0	207.5	207.0	206.5	206.1	205.6	205.1	204.6
6.90	204.2	203.7	203.2	202.8	202.3	201.8	201.4	200.9	200.4	200.0
7.00	199.5	199.1	198.6	198.2	197.7	197.2	196.8	196.3	195.9	195.4
7.10	195.0	194.5	194.1	193.6	193.2	192.8	192.3	191.9	191.4	191.0
7.20	190.5	190.1	189.7	189.2	188.8	188.4	187.9	187.5	187.1	186.6
7.30	186.2	185.8	185.4	184.9	184.5	184.1	183.7	183.2	182.8	182.4
7.40	182.0	181.6	181.1	180.7	180.3	179.9	179.5	179.1	178.6	178.2
7.50	177.8	177.4	177.0	176.6	176.2	175.8	175.4	175.0	174.6	174.2
7.60	173.8	173.4	173.0	172.6	172.2	171.8	171.4	171.0	170.6	170.2
7.70	169.8	169.4	169.0	168.7	168.3	167.9	167.5	167.1	166.7	166.3
7.80	166.0	165.6	165.2	164.8	164.4	164.1	163.7	163.3	162.9	162.6
7.90	162.2	161.8	161.4	161.1	160.7	160.3	160.0	159.6	159.2	158.9
8.00	158.5	158.1	157.8	157.4	157.0	156.7	156.3	156.0	155.6	155.2
8.10	154.9	154.5	154.2	153.8	153.5	153.1	152.8	152.4	152.1	151.7
8.20	151.4	151.0	150.7	150.3	150.0	149.6	149.3	148.9	148.6	148.3
8.30	147.9	147.6	147.2	146.9	146.6	146.2	145.9	145.5	145.2	144.9
8.40	144.5	144.2	143.9	143.5	143.2	142.9	142.6	142.2	141.9	141.6
8.50	141.3	140.9	140.6	140.3	140.0	139.6	139.3	139.0	138.7	138.4
8.60	138.0	137.7	137.4	137.1	136.8	136.5	136.1	135.8	135.5	135.2
8.70	134.9	134.6	134.3	134.0	133.7	133.4	133.0	132.7	132.4	132.1
8.80	131.8	131.5	131.2	130.9	130.6	130.3	130.0	129.7	129.4	129.1
8.90	128.8	128.5	128.2	127.9	127.6	127.4	127.1	126.8	126.5	126.2
9.00	125.9	125.6	125.3	125.0	124.7	124.5	124.2	123.9	123.6	123.3
9.10	123.0	122.7	122.5	122.2	121.9	121.6	121.3	121.1	120.8	120.5
9.20	120.2	119.9	119.7	119.4	119.1	118.9	118.6	118.3	118.0	117.8
9.30	117.5	117.2	116.9	116.7	116.4	116.1	115.9	115.6	115.3	115.1
9.40	114.8	114.6	114.3	114.0	113.8	113.5	113.2	113.0	112.7	112.5
9.50	112.2	111.9	111.7	111.4	111.2	110.9	110.7	110.4	110.2	109.9
9.60	109.6	109.4	109.1	108.9	108.6	108.4	108.1	107.9	107.6	107.4
9.70	107.2	106.9	106.7	106.4	106.2	105.9	105.7	105.4	105.2	105.0
9.80	104.7	104.5	104.2	104.0	103.8	103.5	103.3	103.0	102.8	102.6
9.90	102.3	102.1	101.9	101.6	101.4	101.2	100.9	100.7	100.5	100.2
10.00	100.0	99.8	99.5	99.3	99.1	98.9	98.6	98.4	98.2	97.9
10.10	97.7	97.5	97.3	97.1	96.8	96.6	96.4	96.2	95.9	95.7
10.20	95.5	95.3	95.1	94.8	94.6	94.4	94.2	94.0	93.8	93.5
10.30	93.3	93.1	92.9	92.7	92.5	92.3	92.0	91.8	91.6	91.4
10.40	91.2	91.0	90.8	90.6	90.4	90.2	89.9	89.7	89.5	89.3
10.50	89.1	88.9	88.7	88.5	88.3	88.1	87.9	87.7	87.5	87.3
10.60	87.1	86.9	86.7	86.5	86.3	86.1	85.9	85.7	85.5	85.3
10.70	85.1	84.9	84.7	84.5	84.3	84.1	83.9	83.8	83.6	83.4
10.80	83.2	83.0	82.8	82.6	82.4	82.2	82.0	81.8	81.7	81.5
10.90	81.3	81.1	80.9	80.7	80.5	80.4	80.2	80.0	79.8	79.6

TABLE H-4 BARRIER THICKNESS (MILS) AS A FUNCTION OF SHOCK STRENGTH FOR DBg RANGE -4.0 TO +14.9

SHOCK STRENGTH (DBG)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
-4.0	2511.9	2570.4	2630.3	2691.5	2754.2	2818.4	2884.0	2951.2	3020.0	3090.3
-3.0	1995.3	2041.7	2089.3	2138.0	2187.8	2238.7	2290.9	2344.3	2398.8	2454.7
-2.0	1584.9	1621.8	1659.5	1698.1	1737.8	1778.3	1819.7	1862.1	1905.5	1949.8
-1.0	1258.9	1288.2	1318.3	1349.0	1380.4	1412.5	1445.4	1479.1	1513.6	1548.8
-0.0	1000.0	1023.3	1047.1	1071.5	1096.5	1122.0	1148.2	1174.9	1202.3	1230.3
0.0	1000.0	977.2	955.0	933.3	912.0	891.3	871.0	851.1	831.8	812.9
1.0	794.3	776.2	758.6	741.3	724.4	707.9	691.8	676.1	660.7	645.7
2.0	631.0	616.6	602.6	588.8	575.4	562.3	549.5	537.0	524.8	512.9
3.0	501.2	489.8	478.6	467.7	457.1	446.7	436.5	426.6	416.9	407.4
4.0	398.1	389.0	380.2	371.5	363.1	354.8	346.7	338.8	331.1	323.5
5.0	316.2	309.0	302.0	295.1	288.4	281.8	275.4	269.2	263.0	257.0
6.0	251.2	245.5	239.9	234.4	229.1	223.9	218.8	213.8	208.9	204.2
7.0	199.5	195.0	190.5	186.2	182.0	177.8	173.8	169.8	166.0	162.2
8.0	158.5	154.9	151.4	147.9	144.5	141.3	138.0	134.9	131.8	128.8
9.0	125.9	123.0	120.2	117.5	114.8	112.2	109.6	107.2	104.7	102.3
10.0	100.0	97.7	95.5	93.3	91.2	89.1	87.1	85.1	83.2	81.3
11.0	79.4	77.6	75.9	74.1	72.4	70.8	69.2	67.6	66.1	64.6
12.0	63.1	61.7	60.3	58.9	57.5	56.2	55.0	53.7	52.5	51.3
13.0	50.1	49.0	47.9	46.8	45.7	44.7	43.7	42.7	41.7	40.7
14.0	39.8	38.9	38.0	37.2	36.3	35.5	34.7	33.9	33.1	32.4

TABLE H-5 DETAILED TABLE OF PROBABILITIES AS A FUNCTION OF THE LOGISTIC VARIATE, L

L	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
-19.	.00000056	.00000051	.00000046	.00000042	.00000038	.00000034	.00000031	.00000028	.00000025	.00000023
-18.	.00000152	.00000138	.00000125	.00000113	.00000102	.00000092	.00000084	.00000076	.00000068	.00000062
-17.	.00000414	.00000375	.00000339	.00000307	.00000278	.00000251	.00000227	.00000206	.00000186	.00000168
-16.	.00001125	.00001018	.00000921	.00000834	.00000754	.00000683	.00000618	.00000559	.00000506	.00000459
-15.	.00003059	.00002768	.00002505	.00002266	.00002051	.00001855	.00001679	.00001519	.00001375	.00001244
-14.	.00008315	.00007524	.00006808	.00006160	.00005574	.00005043	.00004564	.00004129	.00003736	.00003381
-13.	.00022603	.00020452	.00018506	.00016745	.00015151	.00013710	.00012405	.00011224	.00010156	.00009190
-12.	.00061442	.00055595	.00050304	.00045517	.00041186	.00037266	.00033720	.00030511	.00027608	.00024980
-11.	.00167014	.00151121	.00136740	.00123728	.00111954	.00101300	.00091660	.00082938	.00075045	.00067904
-10.	.00453979	.00410779	.00371689	.00336320	.00304316	.00275357	.00249154	.00225444	.00203991	.00184579
-9.	.01233946	.01116533	.01010292	.00914159	.00827172	.00748462	.00677241	.00612797	.00554485	.00501722
-8.	.03353501	.03034470	.02745782	.02484551	.02248168	.02034270	.01840719	.01665581	.01507104	.01363703
-7.	.09110512	.08244347	.07460288	.06750827	.06108794	.05527786	.05002011	.04526222	.04095672	.03706061
-6.	.24726232	.22378485	.20253204	.18329340	.16588011	.15011823	.13585200	.12293966	.11125360	.10067708
-5.	.66928509	.60598015	.54862989	.49668017	.44962732	.40701377	.36842399	.33348073	.30184163	.27319608
-4.	1.79862100	1.63024994	1.47740317	1.33869178	1.21284350	1.09869426	.99518019	.90132987	.81625712	.73915413
-3.	4.74258732	4.31072549	3.91657228	3.55711893	3.22954647	2.93122308	2.65969936	2.41270214	2.18812709	1.98403057
-2.	11.92029220	10.90968212	9.97504891	9.11279610	8.31726965	7.58581800	6.91384203	6.29733561	5.73241759	5.21535631
-1.	26.89414214	24.97398944	23.14752165	21.41650170	19.78161114	18.24255238	16.79816149	15.44652651	14.18510649	13.01084744
-0.	50.00000000	47.50208125	45.01660027	42.55748372	40.13123399	37.75406688	35.43436938	33.18122278	31.00255189	28.90504974
0.	50.00000000	52.49791875	54.98339973	57.44425168	59.86876601	62.24593312	64.56563062	66.81877722	68.99744811	71.09495026
1.	73.10585786	75.02601056	76.85247835	78.58349830	80.21838886	81.75744762	83.20183851	84.55347349	85.81489351	86.98915256
2.	88.07970780	89.09031788	90.02495109	90.88770390	91.68273035	92.41418200	93.08615797	93.70266439	94.26758241	94.78464369
3.	95.25741268	95.68927451	96.08342772	96.44288107	96.77045353	97.06877692	97.34030064	97.58729786	97.81187291	98.01596943
4.	98.20137900	98.36975006	98.52259683	98.66130822	98.78715650	98.90130574	99.00481981	99.09867013	99.18374286	99.26084587
5.	99.33071491	99.39401985	99.45137011	99.50331983	99.55037268	99.59298623	99.63157601	99.66651927	99.69815837	99.72680292
6.	99.75273768	99.77621515	99.79747726	99.81670611	99.83411989	99.84988177	99.86414800	99.87706014	99.88874640	99.89932292
7.	99.90889488	99.91755753	99.92538712	99.93249173	99.93891206	99.94472214	99.94997989	99.95473778	99.95904378	99.96293939
8.	99.96646499	99.96965530	99.97254219	99.97515449	99.97751832	99.97965730	99.98159291	99.98334419	99.98492896	99.98636257
9.	99.98766054	99.98883467	99.98989708	99.99085841	99.99172828	99.99251538	99.99322759	99.99387203	99.99445515	99.99498278
10.	99.99546021	99.99589221	99.99628311	99.99663680	99.99695684	99.99724643	99.99750846	99.99774556	99.99796009	99.99815421
11.	99.99832986	99.99848879	99.99863260	99.99876272	99.99888046	99.99898700	99.99908340	99.99917062	99.99924955	99.99932096
12.	99.99938558	99.99944405	99.99949696	99.99954483	99.99958814	99.99962734	99.99966280	99.99969489	99.99972392	99.99975020
13.	99.99977397	99.99979548	99.99981494	99.99983255	99.99984849	99.99986290	99.99987595	99.99988776	99.99989846	99.99990810
14.	99.99991685	99.99992476	99.99993192	99.99993840	99.99994426	99.99994957	99.99995436	99.99995871	99.99996264	99.99996619
15.	99.99996941	99.99997232	99.99997495	99.99997734	99.99997949	99.99998145	99.99998321	99.99998481	99.99998625	99.99998755
16.	99.99998875	99.99998982	99.99999079	99.99999166	99.99999246	99.99999317	99.99999382	99.99999441	99.99999494	99.99999542
17.	99.99999586	99.99999625	99.99999661	99.99999693	99.99999722	99.99999749	99.99999773	99.99999794	99.99999814	99.99999832
18.	99.99999848	99.99999862	99.99999875	99.99999887	99.99999898	99.99999908	99.99999916	99.99999924	99.99999932	99.99999938
19.	99.99999944	99.99999949	99.99999954	99.99999958	99.99999962	99.99999966	99.99999969	99.99999972	99.99999975	99.99999977