

**MIL-STD-1170 (MU)**

10 NOVEMBER 1964

**MILITARY STANDARD**

**VISUAL STANDARDS AND COMPARISON METHODS  
FOR EVALUATING GRAIN CONFIGURATION  
IN 7.62 MM CARTRIDGE CASES**



**FSC 1305**

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10 November 1964

DEPARTMENT OF THE ARMY  
MUNITIONS COMMAND

Visual Standards and Comparison Methods for Evaluating Grain Configuration  
in 7.62 MM Cartridge Cases.

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1. This Military Standard has been approved by the U. S. Army Munitions Command and is to be used to supplement 7.62 MM cartridge specifications.

2. Recommended corrections, additions or deletions should be addressed to the Commanding Officer, U. S. Army Frankford Arsenal, ATTN: SMUFA-J4000, Philadelphia, Pa. 19137.

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#### FOREWORD

This Military Standard forms an integral part of 7.62 MM cartridge specifications to the extent referenced therein. It contains the metallurgical requirements for grain configuration along the sidewall of the cartridge case in the form of photographic standards (Figure 1 thru 6) and provides not only an approved method for preparing test samples but also comparison methods for their evaluation.

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## PHOTOMICROGRAPHS

### Figure

1.	1/4"	from head, magnified 75X
2.	1/2"	" " " "
3.	3/4"	" " " "
4.	1"	" " " "
5.	1 1/4"	" " " "
6.	1 1/2"	" " " "

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1. Scope - This standard defines the metallurgical requirements and also provides the inspection procedures for the evaluation of grain configuration along the sidewall of 7.62 MM cartridge cases. It is to be used to supplement the cartridge specification to the extent referenced therein.

2. Metallurgical requirements.

2.1 Visual grain configuration standards - The visual grain configuration standards (Figure 1 thru 6) denote the allowable variation in grain configuration of 7.62 MM cartridge cases along the sidewall from the head at the distance stated, magnified 75X and are to be used as referenced herein and in the cartridge specification.

3. Inspection procedures.

3.1 Comparison methods - The basic criteria for the determination of acceptable grain configuration is to observe that no grain configuration appears overall coarser than the applicable visual grain configuration standard marked "no coarser" nor finer than the counterpart marked "no finer." This shall be accomplished by one of the following methods:

Method A - Photomicrographs

Method B - Positive transparencies

3.1.1 Method A - Photomicrographs - Test samples prepared in accordance with 3.2 shall be set up in surroundings that will provide the desired photographic effect when the test equipment is adjusted to 75X magnification. One set of photomicrographs shall be taken of each properly prepared test sample, each set consisting of one photomicrograph at every location noted in the cartridge specification. Determination of acceptable cartridge cases shall be made by comparing the photomicrographs of the test samples with the applicable grain configuration standards contained herein.

3.1.2 Method B - Positive transparencies - Test samples prepared in accordance with 3.2 shall be placed in a suitable device that will produce an image of the grain configuration at 75X magnification for each properly prepared test sample at the various locations noted in the cartridge specification. Determination of acceptable cartridge cases shall be made by comparing these images simultaneously with the applicable positive

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transparencies of the grain configuration standards. Positive transparencies, as tools, will be supplied on a need to have basis as part of the inspection equipment list.

3.2 Preparation of test samples - The quantity of cartridges prescribed in the cartridge specification for grain configuration evaluation shall be prepared as follows:

(a) Separate the bullet from the case, remove the propellant and extract the primer.

(b) Prepare a highly polished flat surface approximately 1/8" wide along the length of the case from the head to the shoulder.

(c) Etch the polished flat surface with an acid solution. This can be accomplished through the application of a chromic acid solution. Human contact with the acid solution should be avoided through the use of protective clothing. Daub the solution onto the polished and cleaned flat surface with absorbent surgical cotton, wash immediately thereafter with water and dry thoroughly under a warm airstream. A solution suitable for etching consists of the following:

3400 ml	H <sub>2</sub> O	
280 cc	H <sub>2</sub> SO <sub>4</sub>	(concentrated & chemically pure)
70 gm	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	
140 ml	NaCl	(saturated solution)

4. Document availability - MIL-STD-1170 (MU) will not be distributed through normal channels. Suppliers can secure copies on a need to have basis through the Commanding Officer, U. S. Army Frankford Arsenal, Philadelphia, Pennsylvania, 19137.

Custodian:

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Preparing activity:

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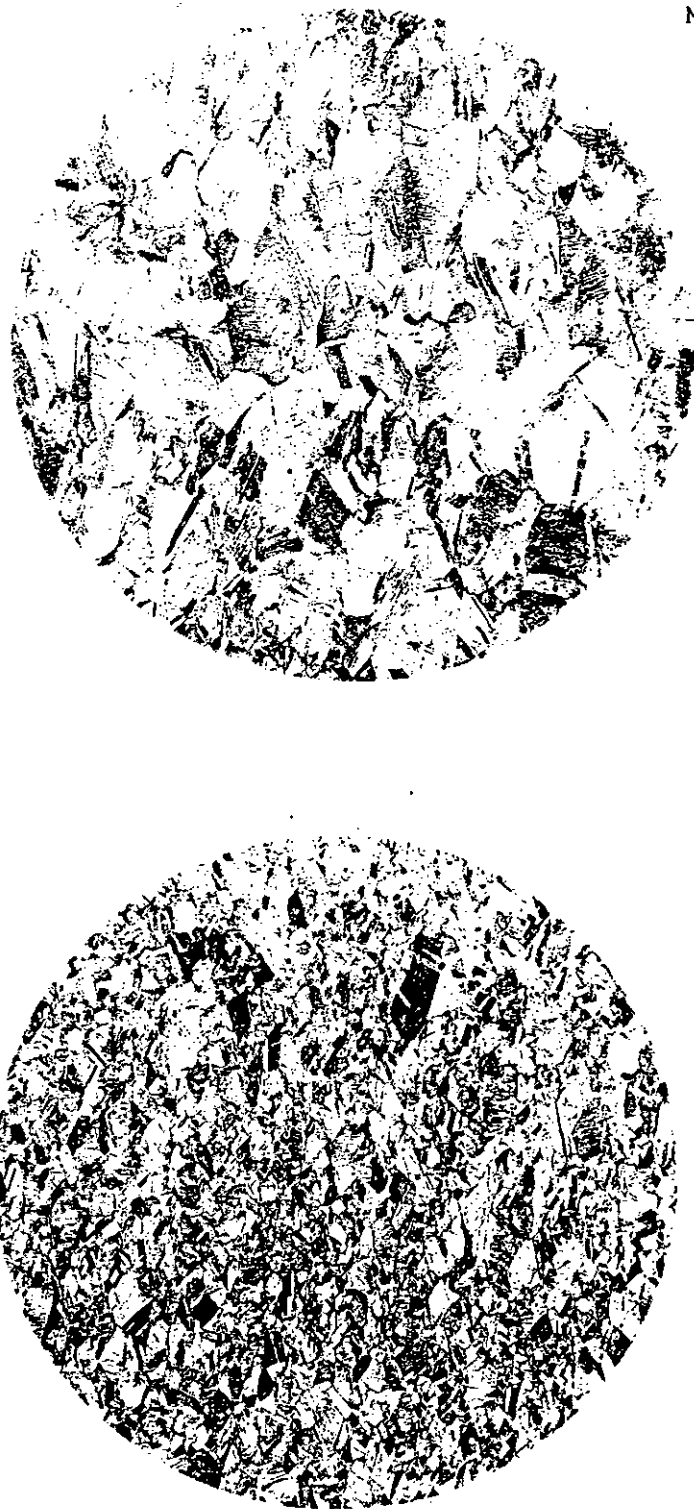


Figure 1. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall (1/4") from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.

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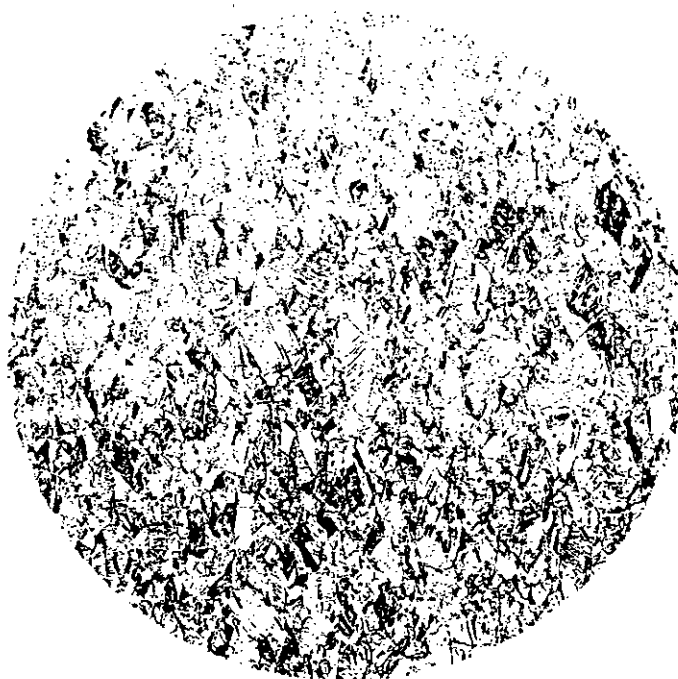
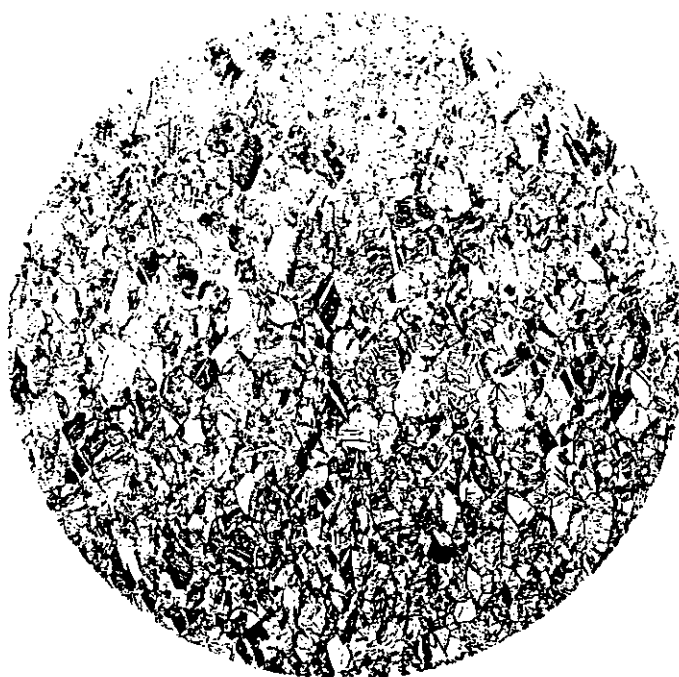
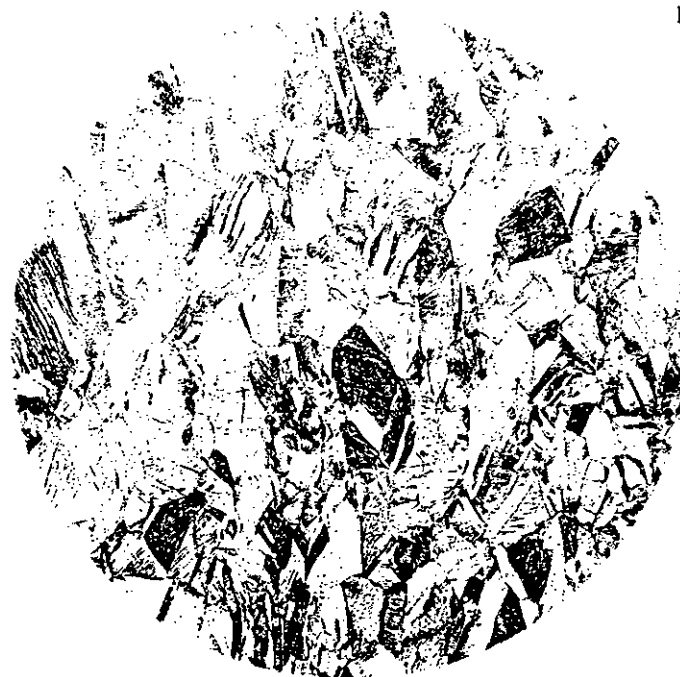


Figure 2. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall (1/2" from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.



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**Figure 3. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall (3/4") from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.**

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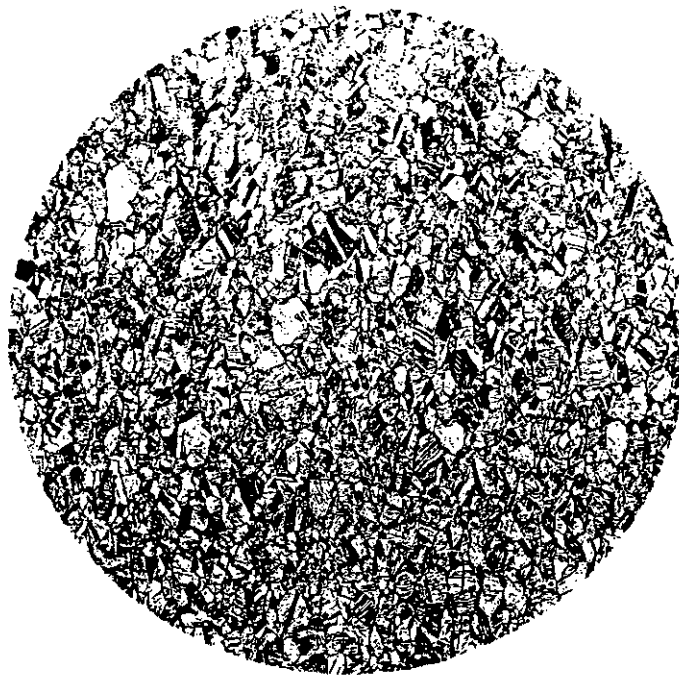


Figure 4. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall (1" from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.

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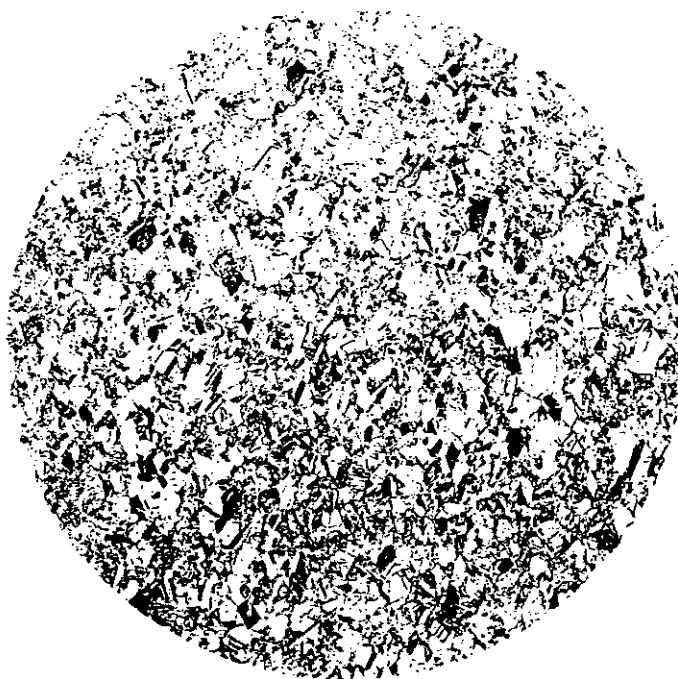
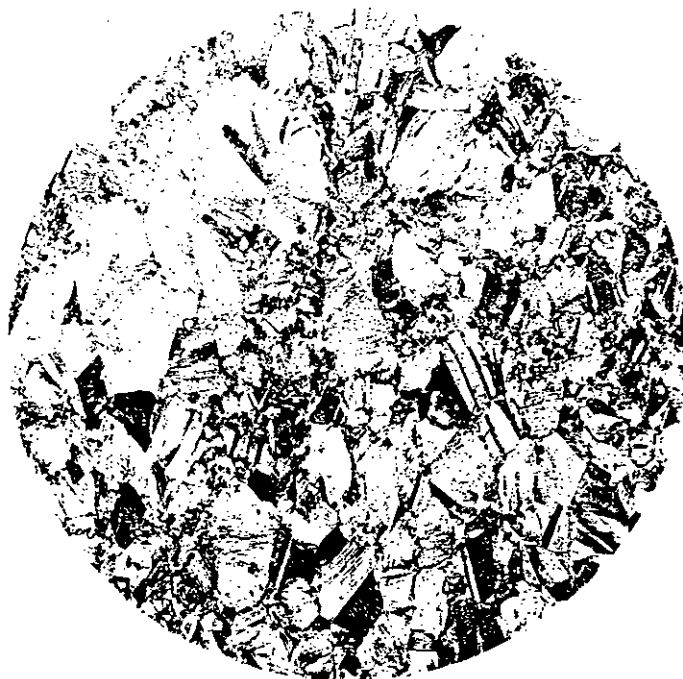


Figure 5. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall ( $1\frac{1}{2}$ " from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.

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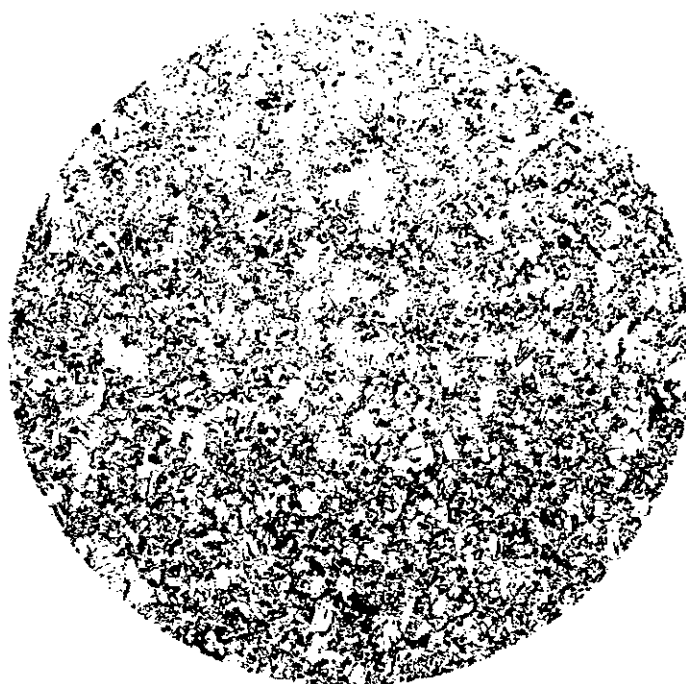
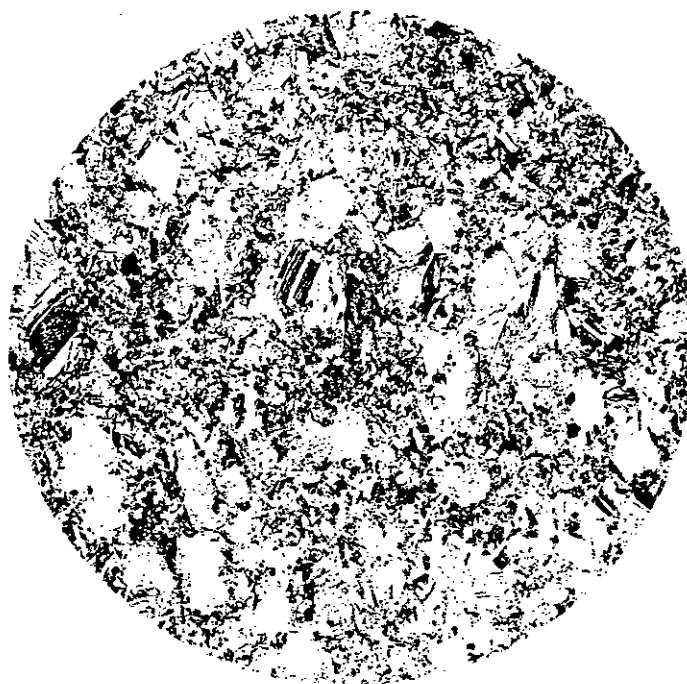


Figure 6. Grain Configuration Standards - Grain configuration of 7.62mm cartridge case along the side wall (1-1/2") from head, projected at 75X, shall be no coarser or no finer than shown in the top and bottom illustrations, respectively.