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MILITARY STANDARD

FASTENER TEST METHODS

METHOD 30,

SHEET PULL-UP OF BLIND FASTENERS



FSC 53GP

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DEPARTMENT OF DEFENSE
WASHINGTON, DC 20301

Fastener Test Methods, Method 30, Sheet Pull-up of Blind Fasteners

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FOREWORD

This standard sets forth a standard test method to determine and evaluate sheet pull-up capabilities of blind fasteners.

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1. SCOPE

1.1 Applicability. This method covers the procedures and equipment to be used for evaluating the sheet pull-up capability of blind fasteners at room temperature.

2. REFERENCED DOCUMENTS

Not applicable.

3. DEFINITIONS

Not applicable.

4. GENERAL REQUIREMENTS

4.1 Test apparatus.

4.1.1 Low load force dynamometer. Low load force dynamometer or equivalent with an accuracy within ± 1 percent of the full range (e.g. Dillion Force Gauge Model X or equivalent). See Figures 2 and 3 for a typical calibration set up.

4.1.2 Testing machine. Universal test machine or other load indicating devices.

4.2 Test specimen.

4.2.1 Configuration. The specimen configuration shall be as shown in Figure 1 or Figure 2. Figure 2 specimen shall be used when fastener requires an "end load" to maintain installation tool contact with manufactured head of fastener.

4.2.1.1 Material. The specimen material shall be as specified by procuring activity to suit requirements of specific fastener.

4.2.1.2 Top sheet. The top sheet shall be a minimum of 0.020-inch thicker than the depth of the countersink for flush head fasteners.

4.2.2 Holes. The fastener hole shall be match-drilled perpendicular to the sheet surface within one (1) degree. The edges of the hole shall be deburred by using a flat deburr tool, stone or equivalent to ensure a sharp edge. The edges shall not be chamfered, radiused or broken but must remain sharp. When countersinking is required, the countersink shall be concentric with the hole within 0.002 F.I.M. (Full Indicator Movement) and the depth shall be such that the installed fastener is flush within $+0.002 -0.005$ -inch. In cases where the top sheet thickness cannot be adjusted to accommodate the various fastener

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grips, a spacer (washer) may be inserted between the manufactured head of the fastener and the top sheet. The spacer diameter at the point of contact with the top sheet shall be equal to the bearing diameter of the fastener head (+0.010/-0.000) and be similar to the material of the specimen. The tests shall be performed in both minimum and maximum recommended hole size within limits of +0.0005-inch.

5. DETAIL REQUIREMENTS

5.1 Test procedure.

5.1.1 Installation. The fastener shall be installed in the test specimen according to the fastener manufacturer's recommended installation procedure.

5.1.2 Gap measurement. The gap closure shall be verified by the use of a 0.002-inch feeler gage. If the feeler gage tends to stick or wedge between the sheets when attempting to contact the fastener shank, the gap will be considered closed. If the feeler gage contacts the shank without interference, progressively thicker feeler gages may be used to determine the amount of gap remaining.

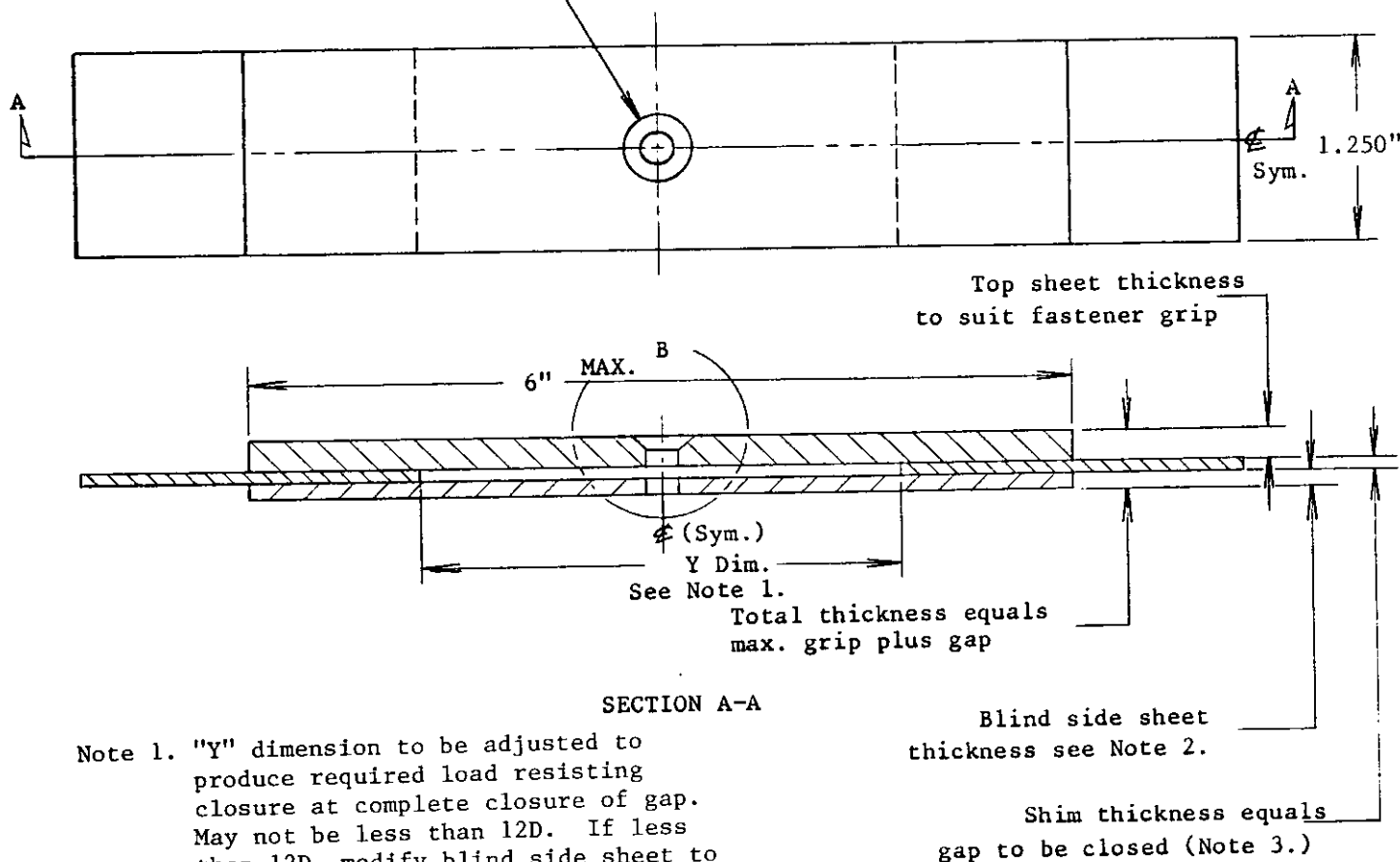
6. NOTES

6.1 Test report. The test report shall contain the following data:

- a. Sheet material and condition or strength level.
- b. Fastener part and lot number tested.
- c. Measured hole size.
- d. Specimen size including thickness and type.
- e. Apparatus used for calibration.
- f. Description and dimensions of spacer (washer) used (when necessary).
- g. Any condition or procedures that would influence test data.
- h. Amount of gap remaining, if determined.
- i. "Y" dimension, shim thickness and calibrated gap closure load.

Material: As specified to suit requirements
of specific fastener

Hole Dia. "D" (Min. or Max. fastener hole size ± 0.0005 ")
(When testing protruding head fastener omit
countersink shown.)



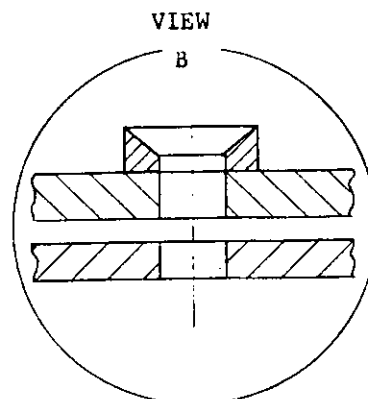
Note 1. "Y" dimension to be adjusted to produce required load resisting closure at complete closure of gap. May not be less than 12D. If less than 12D, modify blind side sheet to provisions of Note 2. Maintain shim location with any applicable method to prevent movement of shims.

Note 2. Nominal .062" sheet thickness for take-up loads to 50 lbs. Thickness and material of sheet may be varied to suit take-up requirements of specific fasteners.

Note 3. Gap to be closed to suit requirements of specific fastener.

Blind side sheet
thickness see Note 2.

Shim thickness equals
gap to be closed (Note 3.)

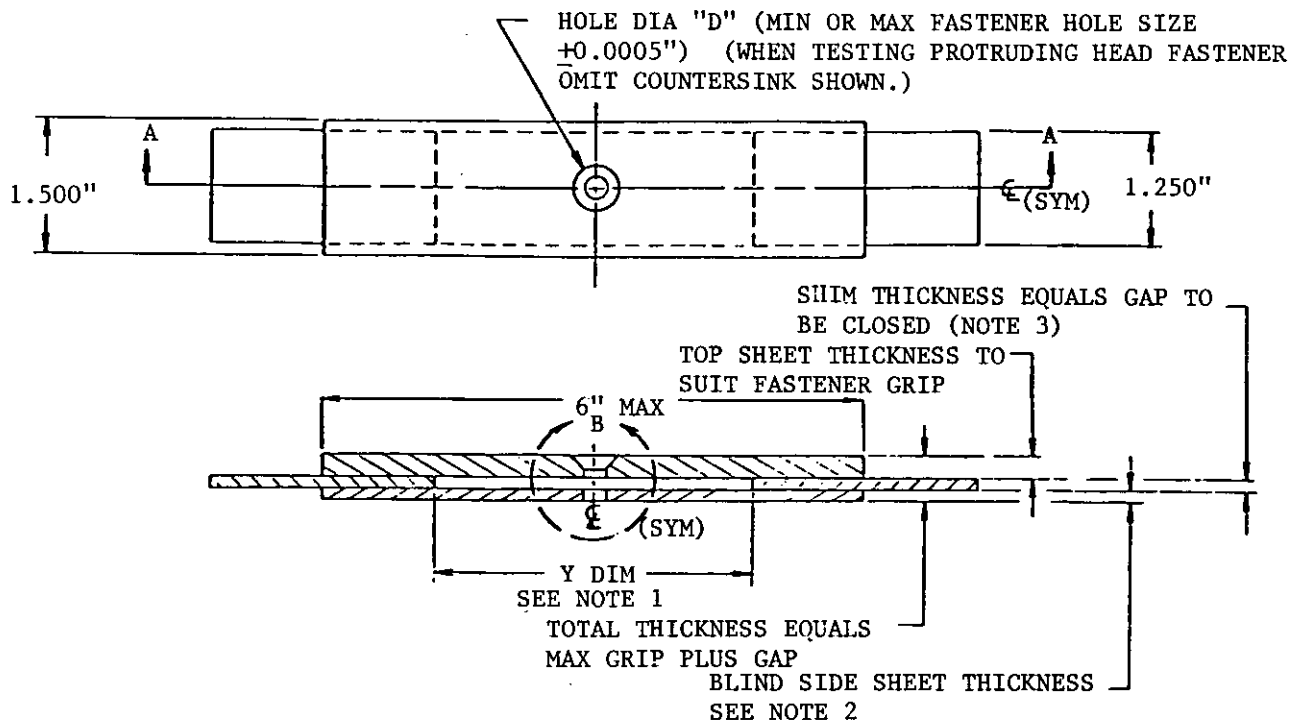


Spacer to accommodate
grip (optional)

FIGURE 1. Test specimen
configuration A.

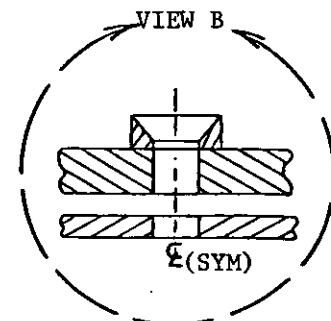
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MATERIAL: AS SPECIFIED TO SUIT REQUIREMENTS OF SPECIFIC FASTENER



SECTION A-A

- NOTE 1. "Y" DIM TO BE ADJUSTED TO PRODUCE REQUIRED LOAD RESISTING CLOSURE AT COMPLETE CLOSURE OF GAP. MAY NOT BE LESS THAN 12D. IF LESS THAN 12D, MODIFY BLIND SIDE SHEET TO PROVISIONS OF NOTE 2. MAINTAIN SHIM LOCATION WITH ANY APPLICABLE METHOD TO PREVENT MOVEMENT OF SHIMS.
- NOTE 2. NOMINAL .062" SHEET THICKNESS FOR TAKE-UP LOADS TO 50 LBS. THICKNESS AND MATERIAL OF SHEET MAY BE VARIED TO SUIT TAKE-UP REQTS OF SPECIFIC FASTENERS.
- NOTE 3. GAP TO BE CLOSED TO SUIT REQTS OF SPECIFIC FASTENER.



SPACER TO ACCOMMODATE GRIP (OPTIONAL)

HOLDING FIXTURE

FIGURE 2. Test specimen configuration B.

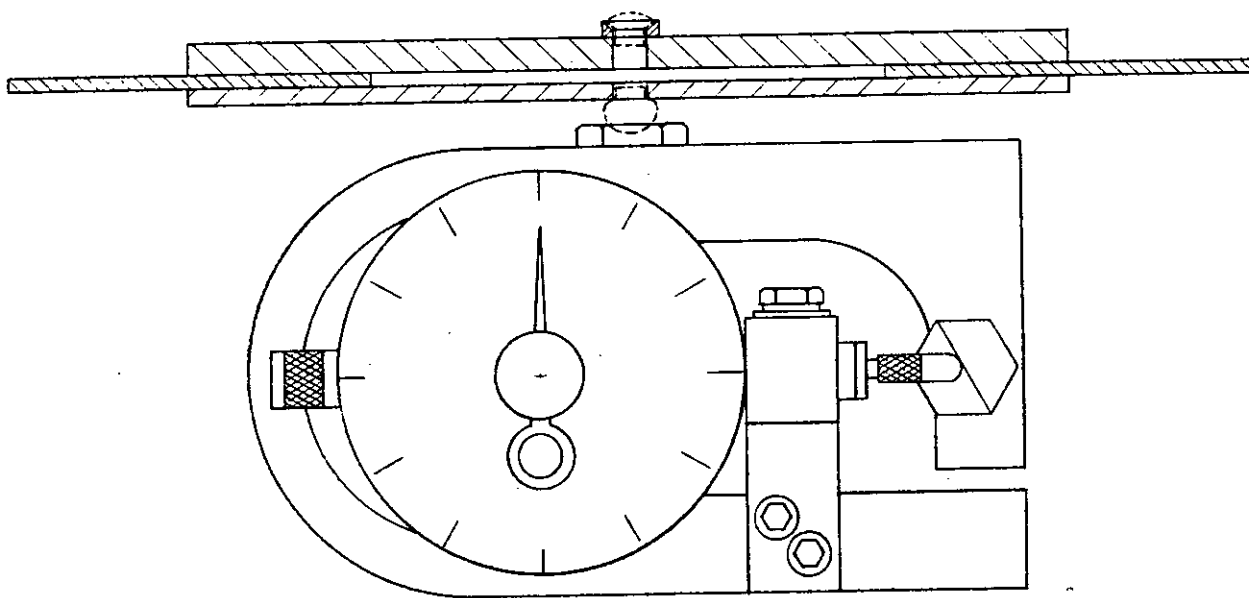


FIGURE 3. Test specimen in typical test fixture prior to application of load.

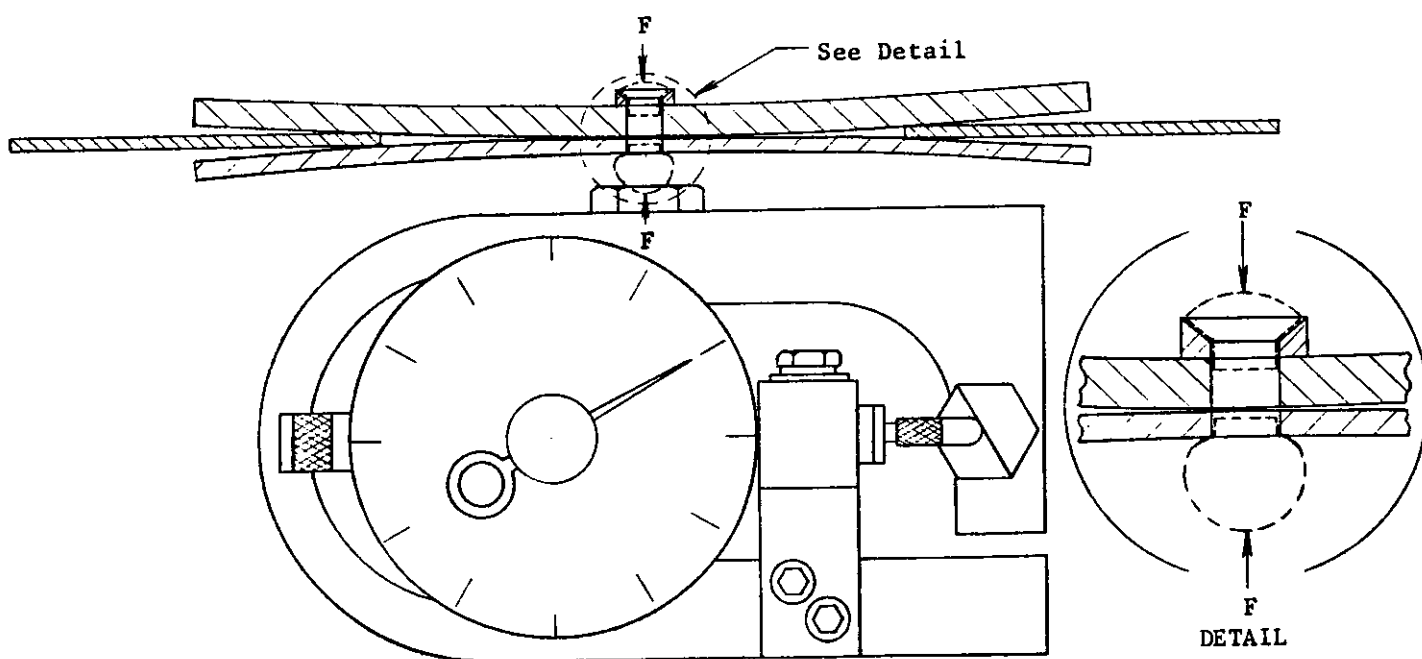


FIGURE 4. Test specimen with load applied via "slugs" representative of manufactured and blind head bearing areas.

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