

METRIC

MIL-S-22664B(SH)
AMENDMENT 1
23 April 1991

MILITARY SPECIFICATION

STEEL STRUCTURAL SHAPE ALLOY, HIGH YIELD
STRENGTH (HY-80 AND HY-100) (METRIC)

This amendment forms a part of MIL-S-22664B(SH), dated 15 March 1988, and is approved for use by all Departments and Agencies of the Department of Defense.

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3.1: Delete and substitute:

"3.1 First article. A sample shall be subjected to first article inspection prior to beginning production for delivery (see 4.4 and 6.3)."

3.2: Delete and substitute:

"3.2 Material. Shapes shall consist of one piece, reduced from a billet to the final section in a hot rolling or extruding operation. The billets shall be hot rolled or forged from ingots, or continuous cast. The steel shall be fully killed using fine grain practice in an electric furnace. Melting practice may include argon-oxygen decarburization (AOD), or ladle refining. The molten steel may be vacuum degassed prior to or during pouring."

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3.5: Delete and substitute:

"3.5 Surface quality. Imperfections such as surface tears, scores, seams, scabs, blisters, laps, excessive scale, and slivers shall be repaired by surface conditioning or welding.

3.5.1 Surface conditioning. Material may be conditioned to remove injurious surface defects by grinding. The ground areas shall be smooth, well blended into the surrounding surface, and the depth shall not be more than permitted by the specified

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minimum tolerances or 1/16 inch (1.5 mm) per inch (including fraction) of dimension concerned, whichever is less. The width of conditioning shall be at least three times its depth and gradually tapered into the defect. Deeper defects may be repaired in accordance with 3.5.2.

3.5.2 Weld repairs. Surface imperfections that are over the specified depth in 3.5.1 for conditioning, may be repaired by chipping or grinding the area to sound metal and, after the forming operations, but prior to heat treating, depositing weld metal from a heat treatable electrode in accordance with an approved procedure. The total of the chipped and ground areas of any piece shall not exceed two percent of the total area of the piece. The weld metal shall be ground flush with the surface. Weld repair after heat treating is prohibited. The depth of the repaired area shall not exceed the following:

<u>Material thickness</u> <u>inches (mm)</u>	<u>Maximum depth of defect below the</u> <u>minimum thickness inches (mm)</u>
Over 3/8 - 1/2 (10-13), incl	1/16 (1.5)
Over 1/2 - 1 (13-25), incl	1/8 (3)
Over 1 - 1-1/4 (25-32), incl	3/16 (5)
Over 1-1/4 - 2-1/4 (32-57), incl	1/4 (6)
Over 2-1/4 - 3-1/2 (57-89), incl	3/8 (10)
Over 3-1/2 (89), incl	1/2 (13)

The procedure for weld repair and inspection shall be prepared in accordance with MIL-STD-1688, or the applicable fabrication document. The applicable fabrication document shall be specified (see 6.2.1). The weld repaired area shall be volumetrically inspected in accordance with the requirements for a weld repair in the fabrication document. "

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3.5.3, line 1: delete "on all shapes".

3.8: Delete and substitute:

"3.8 Internal soundness. Each shape 1/2 inch (13 mm) and over in cross section shall be ultrasonically inspected for freedom from internal defects throughout its entire volume in accordance with 4.7. The following shall be the accept/reject criteria:

(a) Discontinuities resulting in 75 percent or greater loss of back reflection shall be cause for rejection.

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(b) Discontinuities resulting in 50 per cent to less than 75 percent loss in back reflection shall be recorded. Two or more discontinuities occurring in the same plane and within 6-inches (152 mm) of each other shall be cause for rejection providing the indicated area of one or more of the discontinuities is 3/4 inch (19 mm) or larger."

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4.3.1 (b): Delete and substitute:

"(b) Mechanical tests. All shapes from one heat, heat treated in the same furnace at the same time and of the same nominal shape, shall constitute a lot."

4.3.3, lines 1 through 8, delete and substitute:

"4.3.3 Sampling for mechanical tests. From each end of an "as heat treated" shape in a lot at least one sample for longitudinal tension test, one sample for transverse tension test and one sample for six longitudinal Charpy V-notch impact tests shall be taken. Brinell hardness readings shall be taken on each end on all the shapes in a lot. The Brinell hardness shall be within 20 Brinell of the average hardness reported for the shapes which were tested for mechanical properties in the lot. For structural tee shapes the samples shall be taken from each end in the locations specified in figure 2. For other shapes the samples shall be taken from each end in locations specified on the applicable drawings. The following rules shall be used for specifying the locations of samples for mechanical tests:"

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4.3.3(e): Delete and substitute:

"(e) All test specimens shall be taken at a depth of T/2 inches from the heat treated surface for T up to 4 inches (102 mm) inclusive, and T/4 or 2 inches (51 mm), whichever is greater, for T greater than 4 inches (102 mm) where T is defined as the "as quenched" thickness of the thickest section of the shape."

4.3.3 (g): Delete and substitute:

"(g) The test specimens shall be located at least 2-inches (51mm) away from the "as heat treated" end or any gas cut or cold sheared edge, and by not less than the thickest section thickness in the shape from any "as heat treated" edge of the shape."

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4.8.2: last sentence: Delete.

4.8.4: Delete and substitute:

"4.8.4 Macroetch test. Two ends of the "as heat treated" shapes that represent the two ends of one billet shall be tested in accordance with macroetch test of ASTM E 381."

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6.2.1: After 6.2.1 (c), add:

"(d) Applicable fabrication document (see 3.5.2)."

6.3: lines 1 and 2, delete:

"When a first article inspection is required, the item should be a first article sample. The first article should consist of five units."

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Figure 1: Delete and substitute the attached figure 1.

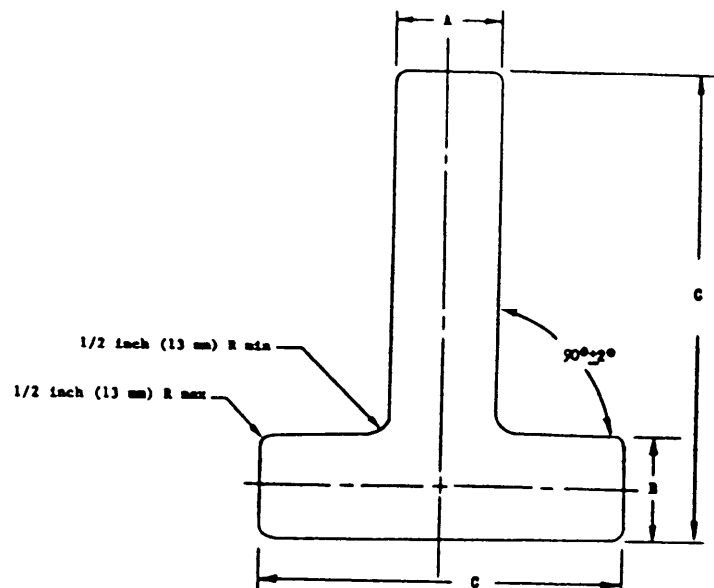
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Figure 2: Delete and substitute the attached figure 2.

Preparing activity:
Navy - SH
(Project 9520-N013)

Review activity:
DISC-ESA

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Web offcenter = $\pm 3/32$ inch (2.4 mm)

Camber and sweep = $1/8 \times \frac{\text{total length of extrusion (inches)}}{5}$ or

$$\left(3 \times \frac{\text{total length of extrusion (mm)}}{16.4} \right)$$

Flange to web squareness = 2 degrees maximum

	A Web thickness ² inches (mm) minimum		B Flange thickness ² inches (mm) minimum			C Flange width or depth of section (total) inches (mm)		Length inches (mm)
	0-0.875, (0-22) incl	Over 0.875 to 1.500, (22-38) incl	Over 0.875 to 1.500, (22-38) incl	Over 1.500 to 2.000, (38-51) incl	Over 2.000 to 2.500, (51-63) incl	0 to 5, (0-127) incl	Over 5 to 15, (127-381) incl	Over 12 inches to 40 ft, (1/3 meter to 12.2 meters) incl
Tolerances inches (mm)	-.025 (-0.6)	-.035 (-0.9)	-.029 (-0.8)	-.035 (-0.9)	-.050 (-1.3)	$\pm 1/16$ (± 1.5)	$\pm 1/8$ (± 3)	-0 +1 (-0 +25)

¹ Over gauge shall be such that the average weight per linear foot (or meter) of any structural tee shall not exceed the ordered dimensional weight by more than 3 percent.

² The thickness of the web and the flange shall be measured at a point not less than 1 inch (25 mm) in from the edge.

FIGURE 1. Dimensional tolerances¹ and nomenclature for structural tee extrusions.

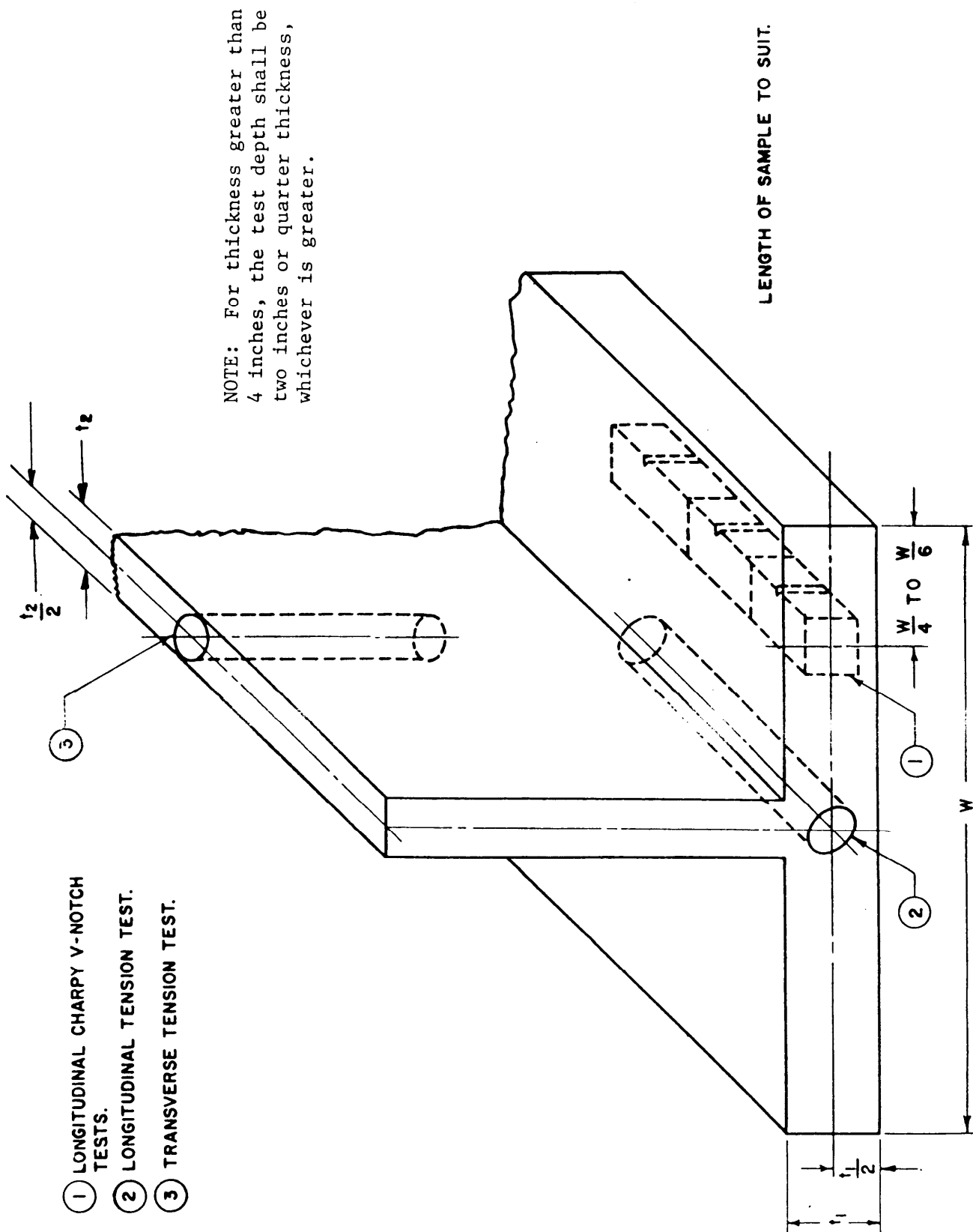
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FIGURE 2. Location of mechanical test coupons for structural tee.