Manufacturer, Exporter, Stockiest, Supplier, Trader for Carbon Steel, Stainless Steel, Alloy Steel And High Nickel Alloy, Nickel Alloy Plate, Sheets And Coils.
Standard Specification for Normalized High-Strength Low-Alloy Structural Steel Plates

This specification is issued under the fixed designation A 633/A 633M: the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last reapproval.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This specification covers normalized K gh-st« ngtf too’-alloy siruc\ural steel plates For welded, riveted, or bolted construction.

1.2 Thus » acriaj is panicuTarly suited For service ation ambient temperatures nf -50 °F [-45 °C] and higher where belch loughncss better than tial expected in as-rolled material of a comparable strength level is desi:ret

1.3 Four grades, designated Grades A, C, D, «ad E ( nially former Specifiction A 633 without a grade desienat ion) are co‘ered by this specification. Grade A provides a minimum yield point of 42 ksi [290 MPa] in thicknesses through 3 in. [100 mm], inclusive and 45.0 ksi (315 MPa) in thicknesses up to 2.50 in. [65 mm], inclusive and 45.0 ksi (315 MPa) in thicknesses up to 1.50 in. [40 mm], inclusive and 55 ksi [380 MPa] in thick noses, o er 4 in. to h

1.4 Current practice nor> sly limit plates Furnished under this specification to the oxsmum thicknesses shown 1.3. The individual manufacturer is consulted on sire limitations for oiber product forms.

1.5 Wneo the seel is to be welded. it is presupposed that a welding procedure suitable for the grade of steel and in ended use or service will be utilized. A0 Appendix X3 of Sge:ification A 6/6M for Informaion 0 utedab\it y.

1.6 The values stated in thish ich-youd units or St units are to be regarded as standard. Wjibin the text, the SI units are shewn in brackets. The values stated in each system are not exact equivalents: therefore, each system must be used independently of the other. Combining values from the two systems may result from not invarinance with this specification.

2. reference\ed Documents

2.1.6 gr5, w standards.


A673/A 673M Specifcaion400 1D7 QBTIT\Dling Procedure For Impact Testing of Slit-uclural Steel

3. General Requirements for Deliveries

3.1 Material furnished under this specification shall conform to the teqo-oiremriu of the current edition of Specifications A 6/A 6M, for the ordered material, unless a conflict exists in which case this specification shall prevail.

4. Manufacture

4.1 Melting Process:

4.1.1 The steel maybe made by any of the flows: in8 processes. oxnn-fic8rttl. basic-osi8v6en, orelectric-Furnace.

4.1.2 The stci stotl b< killed and shall conform to the tfe 8us\enicit Bmin size i-eoiremu of Specification A6/ A6M.

5. Heat TrexMent

5.1 The melt shall be «omat\y< aY heating yos «vitebl\ temperature akirh produces an austenitic struGTf re, b t not exceeding 1700°F [973°C], holding a sufficient time to attain uoiforo h ra throu\at out the material and cooling in air.

5.1.1 Grade E material over 5 in. [75 mm] in thickness shall be double normalized.

5.2 If the purchaser elects to perform the required heat ii-caimepnibe materia! sha\t be accepted on the basis of mill tests made from test coupons heat treated in accordance with the purchase orler zerui\efneo\s. If the test coupon f ept treatment requirements are not indicated on the purchase order, the manufacturer shall heat treat the test coupons under conditions considered «propriate. The manufacturer shall inform the purchaser of the heat-treatment procedure foliu\wcd in hot treating the test coupons at the mill.

6. Chemical Requirements

6.1 The heat anat sis shall conform to the hemenical composition requirements listed in Table 1.

6.2 The steel shall enviorm on produc analysis to the rcru i rmements prescriwe in Table 1, subject to the product analysis tolccrueri in specifca\ion 6/A 6M.

7. Mechanical Requirements

7.1 Tension Tests.—The material as represented by the test specimens shall conform to the requirements listed in Table 2.
A 633/A 633M

### TABLE I  chemical R ulr nan

| Carbon, max: | 1.00-1.35 | 1.15-1.50 | 0.70-1.30 | 1.15-1.50 |
| Manganese:   | 1.00-1.35 | 1.15-1.50 | 1.00-1.80 | 1.15-1.50 |
| Silicon      | 0.15-0.50 | 0.15-0.50 | 0.15-0.50 | 0.15-0.50 |
| Vanadium     | 0.05 max. | 0.05 max. | 0.04-0.11 | 0.01-0.03 |
| Chromium, max| 0.25       | 0.25       | 0.25       | 0.25       |

* For Grade E the minimum total aluminum content shall be 0.015 %, or the vanadium nitrogen ratio shall be 4:1
* For Grade C manganese content may be increased to 1.60 % maximum provided the carbon content does not exceed 0.01 %.
* Columbium may be present in the amount of 0.01 to 0.05 %.
* The size and grade is not described in this specification.

### Yield point, min. ksi (MPa):

| Grade A | Grade C and D | Grade E |
| Over 2.5 in. to 4 in. [65 to 100 mm], incl | 42 [290] | 46 [315] | 60 [415] |
| Over 4 in. to 6 in. [100 to 150 mm], incl | * | * | 55 [380] |
| Tensile strength, ksi [MPa]: |
| Over 2.5 in. to 4 in. [65 to 100 mm], incl | 80 to 100 [550 to 690] |
| Over 4 in. to 6 in. [100 to 150 mm], incl | 75 to 95 [515 to 655] |

* See specialChemistry under the Tension Tests of Specification A1.
* The size and grade is not described in this specification.
* For plates wider than 24 in. [610 mm], the elongation requirement is in section of Specification A 6/A 6M.

### 8. Keywords

8.1 bolted construction; high-strength; low-alloy; low am-

SUPPLEMENTARY REQU MF:

Sjaadadiziele supptemertzry cegu?eaietits for Jzsc at 6ie optJoo of the purchaser aze listca io Specification A 6/A 6M. Those that are considered suitable for tree with lbs specification ate listed b/ title:

S5. Charpy V-Notch Impact Test.
514. IlcodTost.

523. Copper-Beatz[ Stee] (for i£4proved atQ ghe?c corrosion resistance).
APPENDIX
(Nonmandatory Information)

X1. CHARPY V-NOTCH IMPACT TEST

X1.1 The values shown in Table X1.1 are included only as information as to the guarantees which are generally available; is a matter for agreement between the purchaser and the manufacturer.

<table>
<thead>
<tr>
<th>Test Temperature, °F [°C]</th>
<th>Longitudinal Specimens, ft</th>
<th>Transverse Specimens, ft-lbf [J]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-75 [+50]</td>
<td>20 [27]</td>
<td>15 [20]</td>
</tr>
<tr>
<td>-60 [+50]</td>
<td>25 [34]</td>
<td>20 [27]</td>
</tr>
<tr>
<td>-40 [+40]</td>
<td>25 [34]</td>
<td>25 [34]</td>
</tr>
<tr>
<td>-30 [+35]</td>
<td>30 [41]</td>
<td>30 [41]</td>
</tr>
<tr>
<td>0 [+20]</td>
<td>40 [54]</td>
<td>40 [54]</td>
</tr>
<tr>
<td>32 [+21]</td>
<td>45 [61]</td>
<td>40 [54]</td>
</tr>
<tr>
<td>72 [+55]</td>
<td>60 [68]</td>
<td>30 [41]</td>
</tr>
</tbody>
</table>

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