

ASTM F3125

TECHNICAL SPECIFICATIONS

SCOPE

This specification covers the chemical, physical and mechanical requirements for structural bolts manufactured from steel and alloy steel, in two strength grades, two styles and two types. This specification is a consolidation of and eventual replacement for six ASTM standards: A325, A325M, A490, A490M, F1852 and F2280. The main difference between this standard and the older, existing standards is that A325s from 1-1/8" to 1-1/2" now have the same mechanical requirements as A325s 1" and under. Previously the larger bolts had slightly lower requirements.

F3125 BOLT TYPES

| GRADE | MIN STRENGTH, TENSILE | TYPE | STYLE |
|-------|-----------------------|--------|----------------|
| A325 | 120ksi min | 1 or 3 | Heavy Hex Head |
| A325M | 830MPa min | 1 or 3 | Heavy Hex Head |
| F1852 | 120ksi min | 1 or 3 | Twist-off/TC |
| A490 | 150-173ksi | 1 or 3 | Heavy Hex Head |
| A490M | 1040MPa | 1 or 3 | Heavy Hex Head |
| F2280 | 150ksi | 1 or 3 | Twist-off/TC |

TYPE 1 – 120KSI – CARBON, CARBON BORON, ALLOY, OR ALLOY BORON STEEL TYPE 1 – 150KSI – ALLOY OR ALLOY BORON STEEL TYPE 3 – WEATHERING STEEL

F3125 CHEMICAL REQUIREMENTS

| HEAT ANALYSIS | 120KSI TYPE 1, | 150KSI TYPE 1, % | 150KSI TYPE 3, % |
|---------------|----------------|------------------|------------------|
| Carbon | % 0.30-0.52 | 0.30-0.48 | 0.30-0.53 |
| Manganese | 0.60 min | 0.60 min | 0.60 min |
| Phosphorus | 0.035 max | 0.035 max | 0.035 |
| Sulfur | 0.040 max | 0.040 max | 0.040 |
| Silicon | 0.15-0.30 | - | |
| Boron | .003 max | 0.003 max | |
| Copper | - | | 0.20-0.60 |
| Nickel | - | | 0.20* min |
| Chromium | - | | 0.45 min |
| Molybdenum | - | | 0.10* min |

ADDITIONAL FOOTNOTES AND A325 TYPE 3 CHEMISTRIES NOT INCLUDED HERE FOR BREVITY
 150KSI TYPE 3- EITHER NICKEL OR MOLYBDENUM MUST BE PRESENT

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F3125 MECHANICAL PROPERTIES

| GRADE | TENSILE, KSI | YIELD, KSI MIN | ELONGATION, % MIN | RA, % MIN |
|---------------------|--------------|----------------|-------------------|-----------|
| 120ksi (A325/F1852) | 120 min | 92 | 14 | 35 |
| 150ksi (A490/F2280) | 150-173 | 130 | 14 | 40 |

F3125 MARKING REQUIREMENTS & MATCHING COMPONENTS

| | 120KSI, TYPE 1 | 120KSI, TYPE 3 | 150 KSI, TYPE 1 | 150KSI, TYPE 3 |
|-------------|----------------|----------------|-----------------|----------------|
| Marking | A325 | A325 | A490 | A490 |
| Nut, Plain | A563 DH | A563 DH | A563 DH | A563 DH |
| Nut, Coated | A563 DH | A563 DH | A563 DH | A563 DH |
| Washer | F436-1 | F436-3 | F436-1 | F436-3 |

A194 2H NUTS ARE AN ACCEPTABLE SUBSTITUTE FOR A563 DH NUTS
 SUITABLE PLAIN FINISH NUT ALTERNATIVES CAN BE FOUND IN THE FULL F3125 TEXT
 SUPPLEMENTARY REQUIREMENTS S1 AND S2 HAVE SPECIAL MARKING REQUIREMENTS.

F3125 PERMITTED COATINGS

| BOLT | F2329 HOT DIP GALVANIZING | B695 MECHANICAL GALVANIZING | F1136 ZINC/ALUMINUM (DACROMET) | F2833 ZINC/ALUMINUM |
|-------|---------------------------|-----------------------------|--------------------------------|---------------------|
| A325 | Approved | Class 55 | Grade 3 | Grade 1 |
| F1852 | Not Approved | Class 55 | Not Approved | Not Approved |
| A490 | Not Approved | Not Approved | Grade 3 | Grade 1 |
| F2280 | Not Approved | Not Approved | Not Approved | Not Approved |

*OTHER COATINGS MAY BE USED ON 120KSI/A325 FASTENERS UPON AGREEMENT BETWEEN PURCHASER AND USER. COATINGS ON 150KSI/A490 FASTENERS MUST BE QUALIFIED BY ASTM COMMITTEE F16

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F3125 NUT OVERTAP ALLOWANCES

| SIZE | F2329 AND B695, IN | F1136 AND F2833, IN |
|---------|--------------------|---------------------|
| 1/2-13 | 0.018 | 0.009 |
| 5/8-11 | 0.020 | 0.010 |
| 3/4-10 | 0.020 | 0.010 |
| 7/8-9 | 0.022 | 0.011 |
| 1-8 | 0.024 | 0.012 |
| 1-1/8-7 | 0.024 | 0.012 |
| 1-1/4-7 | 0.024 | 0.012 |
| 1-3/8-6 | 0.027 | 0.014 |
| 1-1/2-6 | 0.027 | 0.014 |

HOT DIP GALVANIZED NUTS ARE TAPPED AFTER COATING. OTHER COATINGS ARE APPLIED AFTER NUT TAPPING
 NUTS OVERTAPPED FOR USE WITH 150KSI/A490 BOLTS SHALL BE PROOF LOAD TESTED TO 175KSI MINIMUM AFTER OVERTAPPING

F3125 SUPPLEMENTAL REQUIREMENTS

| | |
|-----------|--|
| S1 | A325/120ksi bolts up to 4x the diameter threaded full length. Mark A325T |
| S2 | Alternate head geometry or thread length. Mark A325S or A490S |
| S3 | Lubricants |
| S4 | Rotational Capacity Testing |