



Smoky Hill, LLC

Heavy Contractors

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February 26, 2015

Kansas Dept. of Transportation
1652 N. U.S. 81
P.O. Box 68
Bellville, KS. 66935-0068
Attn: Jean Istas

RE: Bolts for Tie Down straps at safety barrier wall

Jean,

Please reference the attached detail on plan sheet 89 regarding the 3/4" x 1-3/4" ASTM 449 bolts for the tie down strap. We have checked with numerous vendors across the country and bolts meeting this ASTM number are not available. We have found however that bolts meeting ASTM 325 are readily available and are virtually identical in chemistry and strength. I have attached specifications for ASTM 449 and ASTM 325 for review. We are proposing the use of ASTM 325 bolts to anchor the tie down straps as they are readily available.

Thanks

Michael Chart
Smoky Hill, LLC.



(800) 547-6758

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ASTM A325

Scope

The ASTM A325 specification covers high strength heavy hex structural bolts from 1/2" diameter through 1-1/2" diameter. These bolts are intended for use in structural connections and therefore have shorter thread lengths than standard hex bolts. Refer to the Structural Bolts page of our site for thread lengths and other related dimensions.

This specification is applicable to heavy hex structural bolts only. For bolts of other configurations and thread lengths with similar mechanical properties, see Specification A449.

Bolts for general applications, including anchor bolts, are covered by Specification A 449. Also refer to Specification A 449 for quenched and tempered steel bolts and studs with diameters greater than 1-1/2" but with similar mechanical properties.

A325 Types

TYPE 1	Medium carbon, carbon boron, or medium carbon alloy steel.
TYPE 2	Withdrawn November 1991.
TYPE 3	Weathering steel.
T	Fully threaded A325. <i>(Restricted to 4 times the diameter in length)</i>
M	Metric A325.

A325 Connection Types

SC	Slip critical connection.
N	Bearing type connection with threads included in the shear plane.
X	Bearing-type connection with threads excluded from the shear plane.

→ A325 Mechanical Properties

Size	Tensile, ksi	Yield, ksi	Elong. %, min	RA %, min
1/2 - 1	120 min	92 min	14	35
1-1/8 - 1-1/2	105 min	81 min	14	35

→ A325 Chemical Properties

Type 1 Bolts

Element	Carbon Steel	Carbon Boron Steel	Alloy Steel	Alloy Boron Steel
Carbon	0.30 - 0.52%	0.30 - 0.52%	0.30 - 0.52%	0.30 - 0.52%
Manganese, min	0.60%	0.60%	0.60%	0.60%
Phosphorus, max	0.040%	0.040%	0.035%	0.035%
Sulfur, max	0.050%	0.050%	0.040%	0.040%
Silicon	0.15-0.30%	0.10 - 0.30%	0.15 - 0.35%	0.15 - 0.35%
Boron		0.0005 - 0.003%		0.0005 - 0.003%
Alloying Elements			*	*

* Steel, as defined by the American Iron and Steel Institute, shall be considered to be alloy when the maximum range given for the content of alloying elements exceeds one of more of the following limits: Manganese, 1.65%, silicon, 0.60%, copper, 0.60%, or in which a definite range or a minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels: aluminum, chromium up to 3.99%, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium or any other alloying elements added to obtain a desired alloying effect.

A325 Recommended Hardware

Nuts			Washers	
Type 1		Type 3	Type 1	Type 3
Plain	Galvanized	Plain		
A563C, C3, D, DH, DH3	A563DH	A563C3, DH3	F436-1	F436-3

Note: Nuts conforming to A194 Grade 2H are a suitable substitute for use with A325 heavy hex structural bolts. The ASTM A563 Nut Compatibility Chart has a complete list of specifications.



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ASTM A449

Scope

ASTM A449 covers headed bolts, rods, and anchor bolts in diameters ranging from 1/4" through 3" inclusive. It is a medium strength bolt manufactured from a medium carbon or alloy steel that develops its mechanical values through a heat treating process. It is intended for general engineering applications.

ASTM A449 is virtually identical in chemistry and strength to ASTM A325 and SAE J429 grade 5. However, A449 is more flexible in the sense that it covers a larger diameter range and is not restricted by a specific configuration.

A449 Types

TYPE 1	Plain carbon steel, carbon boron steel, alloy steel, or alloy boron steel.
TYPE 2	Withdrawn 2003
TYPE 3	Weathering steel.

→ A449 Mechanical Properties

Size	Tensile, ksi	Yield, ksi	Elong. %, min	RA %, min
1/4 - 1	120 min	92 min	14	35
1-1/8 - 1-1/2	105 min	81 min	14	35
1-5/8 - 3	90 min	58 min	14	35

→ A449 Chemical Properties

Element	Type 1 Bolts			
	Carbon Steel	Carbon Boron Steel	Alloy Steel	Alloy Boron Steel
Carbon	0.30 - 0.52%	0.30 - 0.52%	0.30 - 0.52%	0.30 - 0.52%
Manganese, min	0.60%	0.60%	0.60%	0.60%
Phosphorus, max	0.040%	0.040%	0.035%	0.035%
Sulfur, max	0.050%	0.050%	0.040%	0.040%
Silicon	0.15-0.30%	0.10 - 0.30%	0.15 - 0.35%	0.15 - 0.35%
Boron		0.0005 - 0.003%		0.0005 - 0.003%
Alloying Elements			*	*

* Steel as defined by the American Iron and Steel Institute shall be considered to be alloy when the