

High Strength Structural Bolting for Friction Grip Connections

Introducing

H.S.F.G. Structural Bolts, Nuts,
Harden Washers & Direct
Tension Indicators (DTI)



References

H.S.F.G. Bolts

ASTM A325 & A490

BS 4395 Pt. 1 & 2

BS 4604 Pt. 1 & 2

AS 1252

DIN 6914

JIS B1186

Direct Tension Indicators

ASTM F959 & F959M

Transmission Tower Bolts

ASTM A394

BS 3692* & 4190

DIN 931* & 7990



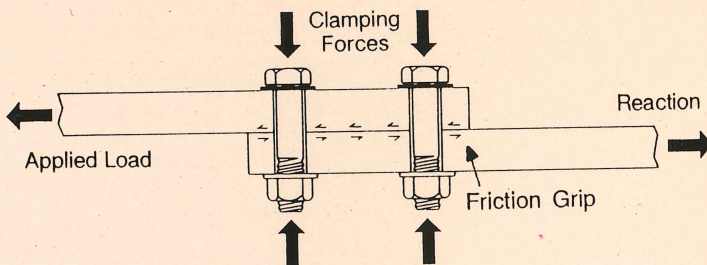
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Theory of Structural Bolting

The principle of friction-grip (slip-critical) connection is to transmit applied loads by frictional resistance of the connection interface, instead of bearing on bolt shanks. In achieving the superior strength characteristic of these bolted structural joints, the idea of structural bolting is to develop the desirable joint friction by inducing high clamping force in the connection interface. This is achieved by properly tightening every structural bolts of the connection to specified tension.



ASTM A325

High Strength Structural Bolts with
A194-2H Nuts & F436 Harden Washers
(compatible to BS 4395 Pt. 1,
AS 1252 Gen. Gr., ISO 7412 Gr. 8.8)
also available in Hot Dip Galvanized
Coating to BS729.

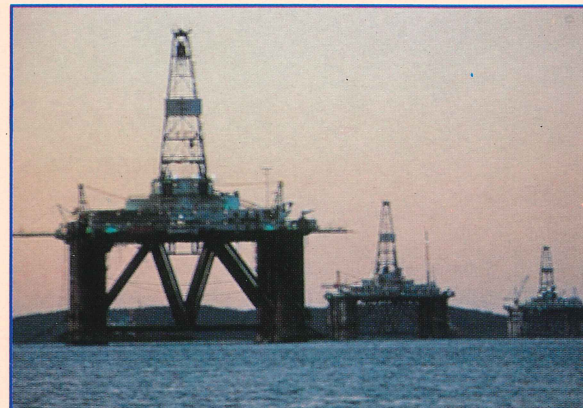
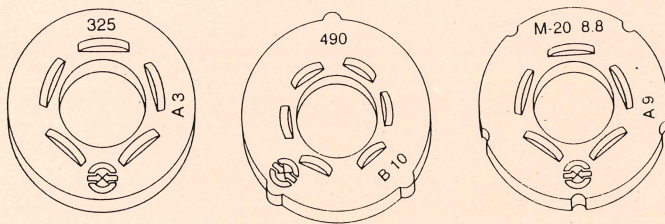


JIS B1186 F10T

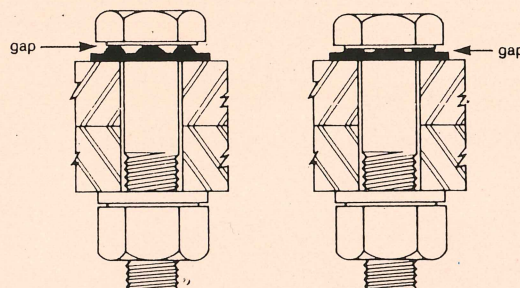
High Strength Bolts, Hex Nuts & Washers
(compatible to ASTM A490, BS 4395 Part 2,
DIN 6914 Gr. 10.9 & ISO 7412 Gr.10.9)
also available in Torque Control Type.

Direct Tension Indicator (DTI)

also known as Load Indicating (LI) Washer



This specially harden compressible type washer is an essential integrated component of High Strength Friction Grip Structural Bolting. It precisely indicates if a bolt has been tighten to specified tension requirement. During bolt installation, the direct clamping force or tension induced by the bolt will flatten protrusions found on one face of the DTI which is usually placed under the bolt head. Correct tension of the bolt is achieved when gaps within the protrusions reduced to specified spacing.



ASTM F959/F959M

Direct Tension Indicators

for ASTM A325, A490 & A193 Gr. B7,
ISO Property Class 8.8 & 10.9 Bolts.
**also available in Zinc Galvanized
with/without Baked Epoxy.**

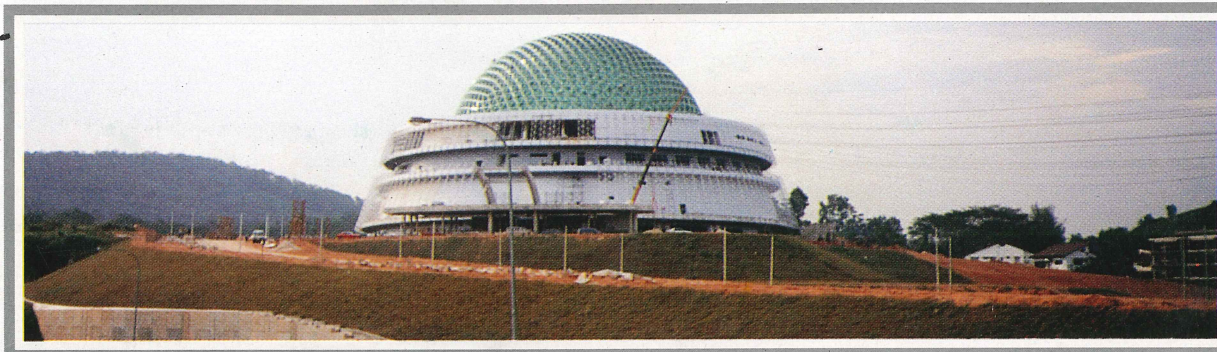
Table 1: Pretensioning Loads of F959 / F959M DTI on Structural Bolts

	ASTM A 325	ASTM A 490		ISO class 8.8	ISO class 10.9
	kips	kips		kN	kN
Bolt Dia.	min - max	min - max	Bolt Dia.	min - max	min - max
1/2"	12 - 14	15 - 18	M12		
5/8"	19 - 23	24 - 18	M16	91 - 109	114 - 131
3/4"	28 - 34	35 - 42	M20	142 - 170	179 - 206
7/8"	39 - 47	49 - 59	M22	176 - 211	221 - 254
1"	51 - 61	64 - 77	M24	205 - 246	257 - 296
1 1/8"	56 - 67	80 - 96	M27	267 - 320	334 - 348
1 1/4"	71 - 85	102 - 122	M30	326 - 391	408 - 469
1 3/8"	85 - 102	121 - 145	M33		408 - 469
1 1/2"	103 - 124	148 - 178	M36	475 - 570	595 - 684

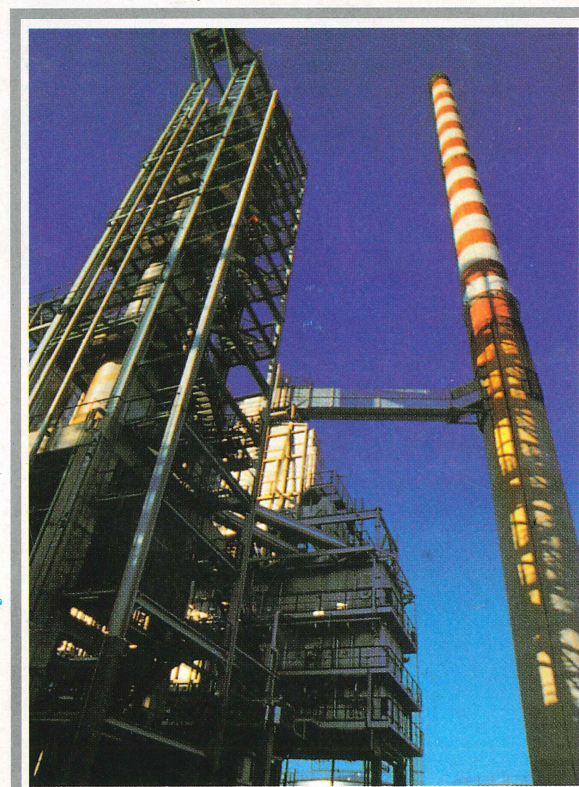
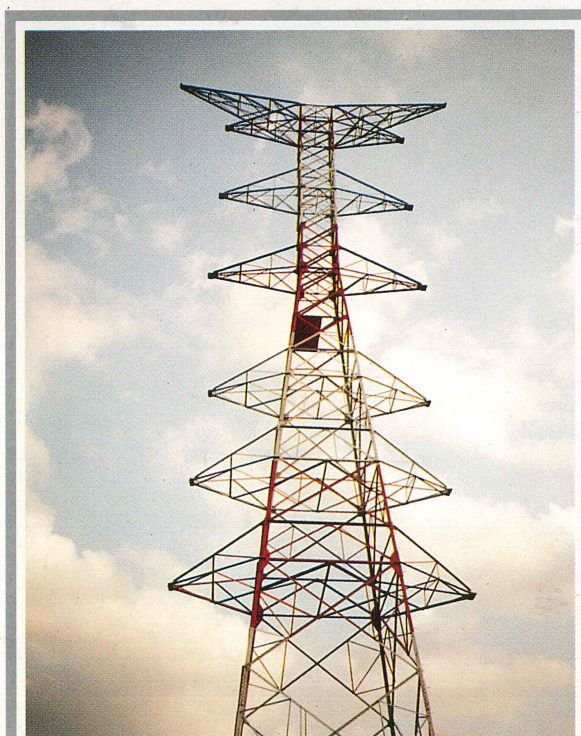
Note: 1kip = approx. 4.448 kN

Note: The ASTM is the only standard in the world that specifies the fundamental requirements of Direct Tension Indicators for use with structural bolts.

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