

Direct Tension Indicator (DTI)

Direct Tension Indicator Washer

BS EN 14399-9 Direct Tension Indicator Washer Dimensions

For Use with Bolts of designation	Internal diameter d_1		External diameter d_2		Material thickness h_1		Height over protrusions h_2		Height of protrusions h_3		Protrusion tangential diameter d_3		Protrusion internal diameter d_4	
	min.	max.	min	min	min	max	min	max	min	max	min	max	min	min
M12	12.75	12.85	26.0	32.5	2.50	5.50	0.80	20	13.85					
M16	16.75	16.85	35.0	36.8	3.00	6.00	0.80	25	17.85					
M20	20.95	21.05	41.0	46.0	3.50	6.50	0.80	29	22.05					
M22	23.05	23.15	46.5	50.6	4.00	7.00	0.80	33	24.15					
M24	25.15	25.25	50.0	55.2	4.00	7.00	0.80	38	26.25					
M27	28.30	28.40	54.0	62.1	4.00	7.00	0.80	43	29.40					
M30	31.45	31.55	59.0	69.0	4.00	7.00	0.80	46.5	32.55					
M36	37.75	37.85	78.0	83.0	4.00	7.50	0.80	56	38.85					

BS EN 14399-9 DTI Compression Loads at Specified Gap

For use with bolts of designation	Compression load			
	Designated H8		Designated H10	
	Min.	Max.	Min.	Max.
M12	47	56	59	71
M16	88	106	110	132
M20	137	164	172	206
M22	170	204	212	254
M24	198	238	247	296
M27	257	308	321	385
M30	314	377	393	472
M36	458	550	572	688

These minimum values are equal to 0.7 fub. As in accordance with EN 1993-1-1

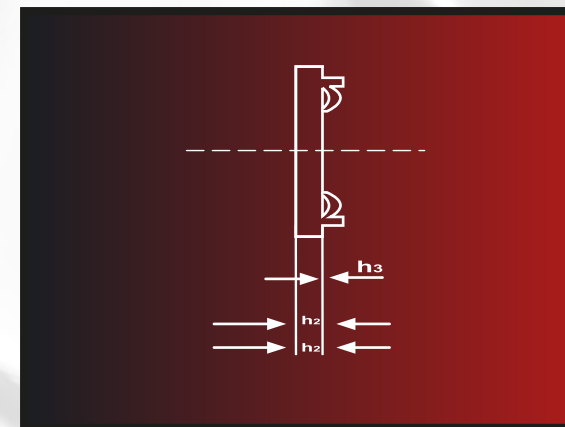
BS EN 14399-9 DTI Washer feeler gauge requirements

Direct tension indicator positions	Designation H8 and H10 Thickness of feeler gauge
Under bolt head, when nut is rotated	0.40
Under nut, when bolt is rotated	
Under nut, when nut is rotated	0.25
Under bolt head, when bolt is rotated	

The DTI is a specially Hardened washer used totally independently of the bolts torque resistance.

DTI are one of four methods allowed to ensure that structural bolting is correctly installed.

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Product Characteristic	Standard	
Material	Steel	
General requirements	EN 14399-1	
Heat treatment	Hardened and tempered or controlled rolled and tempered	
Maximum Hardness	380 HV	
Surface Finish	Normal	As processed ^c
	Sherardized ^b	EN 13811
	Others	To be agreed ^d
Associated bolts and nuts	EN 14399-3, EN 14399-4, EN 14399-7 or EN 14399-8	
Associated washers	EN 14399-5 or EN 14399-6	
Acceptability	For acceptance procedure see EN ISO 3269 ^e	
<p>The direct indicators shall not be electroplated or subjected to any process that could result in hydrogen embrittlement. Sherardizing is considered to provide corrosion protection equivalent to hot dip galvanizing. "As Processed" means the normal finish resulting from manufacture with oil coating . Other coating may be negotiated between the purchaser and the manufacturer providing they do not impair the mechanical properties of functional characteristics . coating of cadmium or cadmium alloys are not permitted. For acceptance criteria use 0,65 AQL, Ac No 0; see EN ISO 3269:2000, Tables 5 and 6</p>		

Marking



BS 4395 Higher Grade Part 2

Metric Series General Grade Part 1

