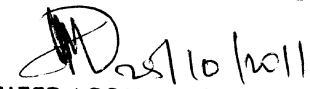



**TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED
STANDARDISED GUARANTEED TECHNICAL PARTICULARS FOR
BOLTS & NUTS, FLAT WASHERS AND SPRING WASHERS**

Sl. No	Description	Technical Parameters / Values.
1	Specifications & Standards	:
	i) Bolts	: IS 12427 - 2001
	ii) Nuts	: IS 1363 (part-3)/1992, 14394:1996
	iii) Spring Washers	: IS 3063-1994, Type B
	iv) Flat washers	: IS 2016-1967
2	Tolerances	: IS 1367 (part-2) & standard tolerances
3	Raw material	:
	i) For bolts, nuts, spring washers & flat washers	: IS:2062, GrA/SAE1018, SAE 1020 for bolts;SAE1010 nuts
	ii) Grade	: Grade A/MS & spring steel
	iii) Type of steel used	: Rod & wire rod
4	Chemical Composition	:
	i) For Bolts and nuts	:
	Carbon (Max.)	: 0.23
	Phosphorus (Max.)	: 0.05
	Sulphur (Max.)	: 0.05
5	Mechanical Properties	:
a)	For Bolts	:
	i) Tensile Strength (N/Sq.mm - min)	: 500 N/mm ² (min)
	ii) Yield Strength (N/Sq.mm - Min.)	: 300 N/mm ² (min)
	iii) Stress under proof load (N/Sq.mm - Min.)	: 280 N/mm ² (min)
	iv) Hardness HRB (Min. / Max.)	: 79 HRB to 99.5 HRB
	v) Elongation after free - ture (% Min.)	: 20%
	vi) Strength under wedge load	: 500 N/mm ² (min)
	vii) Head soundness test	: No fracture
	viii) Shear strength	: 310 MP4
b)	For Hex. Nuts	:
	i) Proof stress (N/Sq.mm – Min)	: For M16-490 N/mm ²
	ii) Test Hardness	: Vickers 130 to 302 HRB 71 min
	iii) Surface Integrity test	: As per 1367-part X
c)	For Spring washers & flat washers	: Spring washers Flat washers
	i) Hardness test	: HRC 43 to 50 as per 2016
	ii) Permanent set test	: To be carried out as per IS 3063
	iii) Permanent load test	: AS per IS 3063
	iv) Twist test	: AS per IS 3063

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6	Galvanising (Hot Dip – Mass & Equivalent) of bolts, nuts and flat washers	:	
a)	Thickness of coating <u>Minimum average coating</u>	:	
	i) Mass (gm./sq.m - Min.)	:	375 gm/mm ²
	ii) Thickness (mm - Min.)	:	54 microns (min)
b)	Electro galvanizing of spring washers	:	
	i) Mass (gm./sq.m - Min.)	:	As per IS - 1573 of 1986
	ii) Thickness (mm - Min.)	:	25 microns min to 35 microns
7	Sampling Procedure	:	
	For Bolts & Nuts, spring washers and flat washers	:	As per IS 1367 part 17
8	Dimensional Particulars for G.I.Bolts, Nuts, spring washers and Flat washers	:	Min Max
	i) Shank diameter (ds) mm	:	15.3 mm 16.7 mm
	ii) Width across Flats (s)	:	23.16 mm 24 mm
	iii) Width across corners (e) 'mm'	:	26.17 mm
	iv) Thickness of Bolt head (k) 'mm'	:	9.25 mm 10.75 mm
	v) Length of thread (b)	:	23 mm
	vi) Thread size of Nut (m) in mm P11, dw, e, m, m1, S, etc	:	M16x2.0 pitch as per IS 1363 part 3
	vii) Spring washers d1, d2, b, s etc.	:	As per IS 3063
	viii) Flat washers: d, D, S etc	:	As per IS 2016
9	Whether the materials covered have been fully tested	:	The type tests should have been conducted not earlier than 5 years in the Standard third party laboratory. The Manufacturer shall produce the type test reports at the time of acceptance tests.
10	Quality of material & standard to which conform		BIS
The Manufacturer shall produce the valid BIS certification at the time of acceptance tests.			
	<p align="center">Standardised Guaranteed Technical Particulars for Bolts & Nuts, Flat Washers and Spring Washers</p> <p align="center">STD/GTP-DWG/Approval No. <u>10</u> / Revision No. <u>0</u></p> <p align="center">Prepared & Approved during October - 2011</p>		

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(Signature)
25/10/2011

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