

MARYLAND METRICS

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TECHNICAL INFORMATION and DATA

Tightening of fasteners

For good functioning of the fasteners, the preload (clamping force) obtained by tightening is of significance. As a principle, fasteners are to be tightened until their lower yield stress value is reached. However, since tightening causes friction and adds additional stress on the fastener, the effective preload is lower than the yield strength. Suitable tightening torques and the resulting preload are shown in the following charts. Friction, however, has a strong influence on these figures. For normal applications (plain, slightly lubricated), start with friction coefficient $m_{total} = 0,12$ for your calculations. In other cases, refer to the following table to find the friction coefficient range. Values for high-strength structural bolting are found on page A 53, for stainless steel fasteners see page T 29.

Coefficients of friction in the bearing area (bolt or nut) and in the thread m_{total}

		Nut		
		zinc plated	plain	MoS ₂ lubricated
Bolt I formed or cut I bearing surface according to ISO 4014, 4017, 4762 DIN 931, 933, 912	plain or phosphated, slightly lubricated		0,12–(0,18)	0,06–(0,12)
	zinc plated, dacrometized	0,12–(0,20)	0,12–(0,18)	0,06–(0,12)
	black or phosphated with PLUS*)		0,14–(0,20)	
	zinc plated with PLUS*)		0,14–(0,20)	
	hot-dip galvanized		0,16–(0,25)	0,08–(0,12)

*) PLUS coating = the thread is coated with an adhesive as locking feature. Addition: m-values only apply to PLUS-coatings and onmiFIT adhesives. For all other adhesives, especially anaerobic adhesives, use $m_{total} = 0,20–(0,30)$ (please consult the manufacturer).