



## Coefficient of Friction

800-871-5022

More information can be found at  
[www.Drill-HQ.com](http://www.Drill-HQ.com).

Extreme care is needed in using friction coefficients. Please use additional independent references. For any specific application the ideal method of determining the coefficient of friction is by trials. A short table is included above the main table to illustrate how the coefficient of friction is affected by surface films. When a metal surface is perfectly clean in a vacuum, the friction is much higher than the normal accepted value and seizure can easily occur.

<b>Effect of Oxide film, Sulfide film on Coefficient of Static Friction</b>			
MATERIAL	Clean & Dry	Thick Oxide Film	Sulfide Film
Steel-Steel	0.78	0.27	0.39
Copper- Copper	1.21	0.76	0.74

<b>Coefficient of Friction</b>					
Mat. 1	Mat 2.	Dry		Greasy	
		Static	Sliding	Static	Sliding
Aluminum	Alluminum	1.05-1.35	1.4	0.3	
Aluminum	Mild Steel	0.61	0.47		
Brake Material	Cast Iron	0.4			



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Mat. 1	Mat 2.	Coefficient of Friction			
		Dry		Greasy	
		Static	Sliding	Static	Sliding
Brake Material	Cast Iron (Wet)	0.2			
Brass	Cast Iron		0.3		
Brick	Wood	0.6			
Bronze	Cast Iron		0.22		
Bronze	Steel			0.16	
Cadmium	Cadmium	0.5		0.05	
Cadmium	Mild Steel		0.46		
Cast Iron	Cast Iron	1.1	0.15		0.07
Cast Iron	Oak		0.49		0.075
Chromium	Chromium	0.41		0.34	
Copper	Cast Iron	1.05	0.29		
Copper	Copper	1.0		0.08	
Copper	Mild Steel	0.53	0.36		0.18
Copper-Lead Alloy	Steel	0.22			
Diamond	Diamond	0.1		0.05-0.1	
Diamond	Metal	0.1-0.15		0.1	
Glass	Glass	0.9-1.0	0.4	0.1-0.6	0.09-0.12
Glass	Metal	0.5-0.7		0.2-0.3	
Glass	Nickel	0.78	0.56		
Graphite	Graphite	0.1		0.1	
Graphite	Steel	0.1		0.1	
Graphite (In vacuum)	Graphite (In vacuum)	0.5-0.8			



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		Static	Sliding	Static	Sliding
Hard Carbon	Hard Carbon	0.16		0.12-0.14	
Hard Carbon	Steel	0.14		0.11-0.14	
Iron	Iron	1.0		0.15-0.2	
Lead	Cast Iron		0.43		
Leather	Wood	0.3-0.4			
Leather	Metal (Clean)	0.6		0.2	
Leather	Metal (Wet)	0.4			
Leather	Oak (Parallel grain)	0.61	0.52		
Magnesium	Magnesium	0.6		0.08	
Nickel	Nickel	0.7-1.1	0.53	0.28	0.12
Nickel	Mild Steel		0.64		0.178
Nylon	Nylon	0.15-0.25			
Oak	Oak (Parallel grain)	0.62	0.48		
Oak	Oak (cross grain)	0.54	0.32		0.072
Platinum	Platinum	1.2		0.25	
Plexiglas	Plexiglas	0.8		0.8	
Plexiglas	Steel	0.4 - 0.5		0.4 - 0.5	



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Mat. 1	Mat 2.	Coefficient of Friction			
		Dry		Greasy	
		Static	Sliding	Static	Sliding
Polystyrene	Polystyrene	0.5		0.5	
Polystyrene	Steel	0.3-0.35		0.3-0.35	
Polythene	Steel	0.2		0.2	
Rubber	Asphalt (Dry)		0.5-0.8		
Rubber	Asphalt (Wet)		0.25-0.0.75		
Rubber	Concrete (Dry)		0.6-0.85		
Rubber	Concrete (Wet)		0.45-0.75		
Sapphire	Sapphire	0.2		0.2	
Silver	Silver	1.4		0.55	
Sintered Bronze	Steel			0.13	
Solids	Rubber	1.0-4.0			
Steel	Aluminium Bros	0.45			
Steel	Brass	0.35		0.19	
Steel (Mild)	Brass	0.51	0.44		
Steel (Mild)	Cast Iron		0.23	0.183	0.133
Steel	Cast Iron	0.4		0.21	
Steel	Copper Lead Alloy	0.22		0.16	0.145



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		Static	Sliding	Static	Sliding
Steel (Hard)	Graphite	0.21		0.09	
Steel	Graphite	0.1		0.1	
Steel (Mild)	Lead	0.95	0.95	0.5	0.3
Steel (Mild)	Phos Bros		0.34		0.173
Steel	Phos Bros	0.35			
Steel (Hard)	Polythened	0.2		0.2	
Steel (Hard)	Polystyrene	0.3-0.35		0.3-0.35	
Steel (Mild)	Steel (Mild)	0.74	0.57		0.09-0.19
Steel (Hard)	Steel (Hard)	0.78	0.42	0.05-0.11	0.029-.12
Steel	Zinc (Plated on steel)	0.5	0.45		
Teflon	Steel	0.04		0.04	0.04
Teflon	Teflon	0.04		0.04	0.04
Tin	Cast Iron		.32		
Tungsten Carbide	Tungsten Carbide	0.2-0.25		0.12	
Tungsten Carbide	Steel	0.4-0.6		0.08-0.2	
Tungsten Carbide	Copper	0.35			
Tungsten Carbide	Iron	0.8			



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		Static	Sliding	Static	Sliding
Wood	Wood (clean)	0.25-0.5			
Wood	Wood (Wet)	0.2			
Wood	Metals(Clean)	0.2-0.6			
Wood	Metals(Wet)	0.2			
Wood	Brick	0.6			
Wood	Concrete	0.62			
Zinc	Zinc	0.6		0.04	
Zinc	Cast Iron	0.85	0.21		