Rotary Inertia Conversion Table

Don't confuse mass-inertia with weight-inertia: mass inertia = $\frac{\text{wt. inertia}}{g}$

To convert from A to B, multiply by entry in Table.

A \ B	kg-m²	kg-cm²	g-cm²	kg-m-sec²	kg-cm-sec²	g-cm-sec²	oz-in²	oz-in-s²	lb-in⁻²	lb-in-s²	lb-ft²	lb-ft-s² (slug-ft⁻²)
kg-m²	1	10^{4}	10^{7}	0.10192	10.1972	$1.01972\text{-}10^{4}$	$5.46745\text{-}10^{4}$	$1.41612\text{-}10^{2}$	$3.41716\text{-}10^{3}$	8.850732	23.73025	0.73756
kg-cm²	10^{-4}	1	10^{3}	$1.01972\text{-}10^{-5}$	$1.01972\text{-}10^{-3}$	1.01972	5.46745	$1.41612\text{-}10^{-2}$	0.341716	$8.85073\text{-}10^{-4}$	$2.37303\text{-}10^{-3}$	$7.37561\text{-}10^{-5}$
g-cm²	10^{-7}	10^{-3}	1	$1.01972\text{-}10^{-8}$	$1.01972\text{-}10^{-6}$	$1.01972\text{-}10^{-3}$	$5.46745\text{-}10^{-3}$	$1.41612\text{-}10^{-5}$	$3.41716\text{-}10^{-4}$	$8.85073\text{-}10^{-7}$	$2.37303\text{-}10^{-6}$	$7.37561\text{-}10^{-8}$
kg-m-s²	9.80665	$9.80665\text{-}10^{4}$	$9.80665\text{-}10^{7}$	1	10^{2}	10^{5}	$5.36174\text{-}10^{5}$	$1.388674\text{-}10^{3}$	$3.35109\text{-}10^{4}$	86.79606	$2.32714\text{-}10^{2}$	7.23300
kg-cm-s²	$9.80665\text{-}10^{-2}$	$9.80665\text{-}10^{2}$	$9.80665\text{-}10^{5}$	10^{-2}	1	10^{3}	$5.36174\text{-}10^{3}$	13.88741	$3.35109\text{-}10^{2}$	0.86796	2.327143	$7.23300\text{-}10^{-2}$
g-cm-s²	$9.80665\text{-}10^{-5}$	0.980665	$9.80665\text{-}10^{2}$	10^{-5}	10^{-3}	1	5.36174	$1.38874\text{-}10^{-2}$	0.335109	$8.67961\text{-}10^{-4}$	$2.32714\text{-}10^{-3}$	$7.23300\text{-}10^{-5}$
oz-in²	$1.82901\text{-}10^{-5}$	0.182901	$1.82901\text{-}10^{2}$	$1.86506\text{-}10^{-6}$	$1.86506\text{-}10^{-4}$	0.186506	1	$2.59008\text{-}10^{-3}$	$6.250\text{-}10^{-2}$	$1.61880\text{-}10^{-4}$	$4.34028\text{-}10^{-4}$	$1.34900\text{-}10^{-5}$
oz-in-s²	$7.06154\text{-}10^{-3}$	70.6154	$7.06154\text{-}10^{4}$	$7.20077\text{-}10^{-4}$	$7.20077\text{-}10^{-2}$	72.00766	$3.86089\text{-}10^{2}$	1	24.13045	$6.250\text{-}10^{-2}$	0.167573	$5.20833\text{-}10^{-3}$
lb-in²	$2.92641\text{-}10^{-4}$	2.92641	$2.92641\text{-}10^{3}$	$2.98411\text{-}10^{-5}$	$2.98411\text{-}10^{-3}$	2.98411	16	$4.14414\text{-}10^{-2}$	1	$2.59008\text{-}10^{-3}$	$6.94444\text{-}10^{-3}$	$2.15840\text{-}10^{-4}$
lb-in-s²	0.112985	$1.12985\text{-}10^{3}$	$1.12985\text{-}10^{6}$	$1.15213\text{-}10^{-2}$	1.152126	$1.15213\text{-}10^{3}$	$6.17740\text{-}10^{3}$	16	$3.86088\text{-}10^{2}$	1	2.681175	$8.3333\text{-}10^{-2}$
lb-ft²	$4.21403\text{-}10^{-2}$	$4.21403\text{-}10^{2}$	$4.21403\text{-}10^{5}$	$4.29711\text{-}10^{-3}$	0.429711	$4.297114\text{-}10^{2}$	$2.304\text{-}10^{3}$	5.96755	144	0.372971	1	$3.10809\text{-}10^{-2}$
lb-ft-s² (slug ft²)	1.35583	$1.35582\text{-}10^{4}$	$1.35582\text{-}10^{7}$	0.138255	13.82551	$1.38255\text{-}10^{4}$	$7.41289\text{-}10^{4}$	192	$4.63306\text{-}10^{3}$	12	32.1740	1

Torque Conversion Table

To convert from A to B, multiply by entry in Table.

A \ B	N-m	N-cm	dyn-cm	kg-m	kg-cm	g-cm	oz-in	ft-lbs	in-lbs
N-m	1	10^{2}	10^{7}	0.1019716	10.19716	$1.019716\text{-}10^{4}$	141.6119	0.737562	8.85074
N-cm	10^{-2}	1	10^{5}	$1.019716\text{-}10^{-3}$	0.1019716^{-3}	$1.019712\text{-}10^{2}$	1.41612	$7.37562\text{-}10^{-3}$	$8.85074\text{-}10^{-2}$
dyn-cm	10^{-7}	10^{-5}	1	$1.019716\text{-}10^{-8}$	$1.01972\text{-}10^{-6}$	$1.01972\text{-}10^{-3}$	$1.41612\text{-}10^{-5}$	$7.37562\text{-}10^{-8}$	$8.85074\text{-}10^{-7}$
kg-m	9.80665	$9.80665\text{-}10^{2}$	$9.80665\text{-}10^{7}$	1	10^{2}	10^{5}	$1.38874\text{-}10^{3}$	7.23301	86.79624
kg-cm	$9.80665\text{-}10^{-2}$	9.80665	$9.80665\text{-}10^{5}$	10^{-2}	1	10^{3}	13.8874	$7.23301\text{-}10^{-2}$	0.86792
g-cm	$9.80665\text{-}10^{-5}$	$9.80665\text{-}10^{-3}$	$9.80665\text{-}10^{2}$	10^{-5}	10^{-3}	1	$1.38874\text{-}10^{-2}$	$7.23301\text{-}10^{-5}$	$8.679624\text{-}10^{-4}$
oz-in	$7.06155\text{-}10^{-3}$	0.706155	$7.06155\text{-}10^{4}$	$7.20077\text{-}10^{-4}$	$7.20077\text{-}10^{-2}$	72,0077	1	$5.20833\text{-}10^{-3}$	$6.250\text{-}10^{-2}$
ft-lbs	1.35582	$1.35582\text{-}10^{2}$	$1.35582\text{-}10^{7}$	0.1382548	13.82548	$1.382548\text{-}10^{4}$	192	1	12
in-lbs	0.112085	11.2985	$1.12985\text{-}10^{6}$	$1.15212\text{-}10^{-2}$	1.15212	$1.15212\text{-}10^{3}$	16	$8.33333\text{-}10^{-2}$	1

Densities of Common Materials

Material	oz/in³	gm/cm³
Aluminum (cast or hard-drawn)	1.54	2.66
Brass (cast or rolled 60% CU; 40% Zn)	4.80	8.30
Bronze (cast, 90% CU; 10% Sn)	4.72	8.17
Copper (cast or hand-drawn)	5.15	8.91
Plastic	0.64	1.11
Steel (hot or cold rolled, 0.2 or 0.8% carbon)	4.48	7.75
Hard Wood	0.46	0.80
Soft Wood	0.28	0.48

Calculate Horsepower

$$\text{Horsepower} = \frac{\text{Torque x Speed}}{16{,}800}$$

Torque = oz-in

Speed = revolutions per second

* The horsepower calculation uses the torque available at the specified speed

1 Horsepower = 746 watts

Most tables give densities in lb/ft³. To convert to oz/in³ *divide* this value by 108. To convert lb/ft³ to gm/cm³ *divide* by 62.5. The conversion from oz/in³ to gm/cm³ is performed by multiplying oz/in³ by 1.73.

Reference: *Elements of Strength of Materials*, S. Timoshinko and D.H. Young, pp. 342-343.