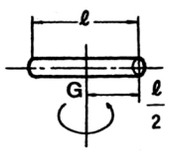
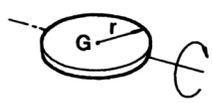
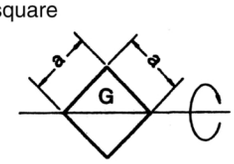
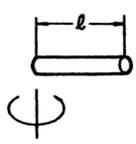
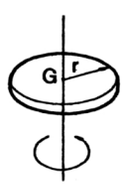
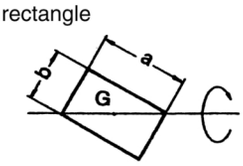
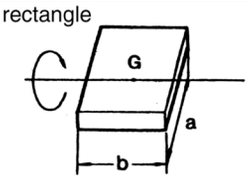
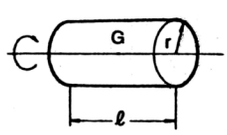
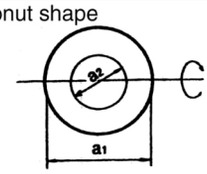
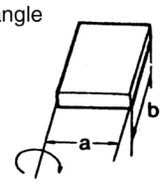
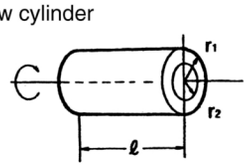
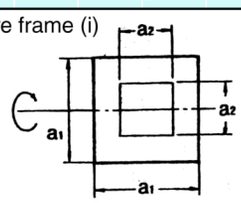
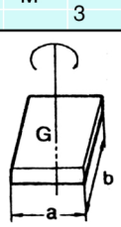
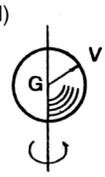
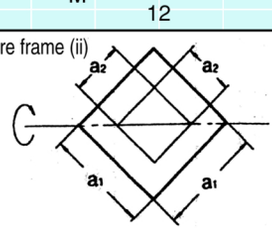
Calculation Reference for Selecting Soft Absorbers 1

Quick Reference for Moment of Inertia

Unit: kg·m2

Shape	Slim rod 	Thin disc 	Thin square 
Rotating shaft	It is perpendicular to the rod and passes through the centre of gravity	It is parallel to the plain and passes through the centre of gravity	The axis passes through the centre of gravity and the opposing corner
Moment of inertia	$M \cdot \frac{\ell^2}{12}$	$M \cdot \frac{r^2}{4}$	$M \cdot \frac{a^2}{12}$
Shape	Slim rod 	Thin disc 	Thin rectangle 
Rotating shaft	It is perpendicular to the rod at one of the ends	It is perpendicular to the plain and passes through the centre of gravity	It is an axis that is parallel to the plain and passes through the centre of gravity
Moment of inertia	$M \cdot \frac{\ell^2}{3}$	$M \cdot \frac{r^2}{2}$	$M \cdot \frac{b^2a^2}{6(b^2+a^2)}$
Shape	Thin rectangle 	Cylinder 	Thin donut shape 
Rotating shaft	It is parallel to side b and passes through the centre of gravity	It is a central axis that passes through the centre of gravity	It is an axis that is parallel to the plain and passes through the central axis
Moment of inertia	$M \cdot \frac{a^2}{12}$	$M \cdot \frac{r^2}{2}$	$M \cdot \frac{(a_1^2+a_2^2)}{16}$
Shape	Thin rectangle 	Hollow cylinder 	Square frame (i) 
Rotating shaft	It is parallel to side b and is on one side	It is a central axis that passes through the mutual center	It is an axis that is parallel to the plain and passes through the central axis
Moment of inertia	$M \cdot \frac{a^2}{3}$	$M \cdot \frac{r_1^2+r_2^2}{2}$	$M \cdot \frac{(a_1^2+a_2^2)}{12}$
Shape	Rectangle 	Sphere (filled) 	Square frame (ii) 
Rotating shaft	It is perpendicular to the plain and passes through the centre of gravity	It is an axis that passes through the centre of gravity	It is parallel to the plain and passes through the opposing corner
Moment of inertia	$M \cdot \frac{a^2+b^2}{12}$	$M \cdot \frac{2r^2}{5}$	$M \cdot \frac{(a_1^2+a_2^2)}{12}$

Calculation Reference for Selecting Soft Absorbers 2

Quick Reference for Thrust due to Air Cylinder and Thrusting Energy

DInternal diameter of the cylinder (mm)	Pushing side Thrusting energy due to cylinder F (N)	Pressure P (MPa)	Thrusting energy E2 (J) = F·St						
			Soft absorber's absorption stroke St						
			8 (mm)	10 (mm)	12 (mm)	15 (mm)	16 (mm)	25 (mm)	25.4 (mm)
ϕ12	33.9	0.3	0.271	0.339	0.407	0.509	0.542	0.848	0.861
	56.5	0.5	0.452	0.565	0.678	0.848	0.904	1.41	1.44
	79.2	0.7	0.634	0.792	0.950	1.19	1.27	1.98	2.01
ϕ16	60.3	0.3	0.482	0.603	0.724	0.905	0.965	1.51	1.53
	101	0.5	0.808	1.01	1.21	1.52	1.62	2.53	2.57
	141	0.7	1.13	1.41	1.69	2.12	2.26	3.53	3.58
ϕ20	94.2	0.3	0.754	0.942	1.13	1.41	1.51	2.36	2.39
	157	0.5	1.26	1.57	1.88	2.36	2.51	3.93	3.99
	220	0.7	1.76	2.20	2.64	3.30	3.52	5.50	5.59
ϕ25	147	0.3	1.18	1.47	1.76	2.21	2.35	3.68	3.73
	245	0.5	1.96	2.45	2.94	3.68	3.92	6.13	6.22
	344	0.7	2.75	3.44	4.13	5.16	5.50	8.60	8.74
ϕ32	241	0.3	1.93	2.41	2.88	3.60	3.84	6.00	6.10
	402	0.5	3.21	4.01	4.81	6.02	6.42	10.0	10.2
	563	0.7	4.49	5.61	6.73	8.42	8.98	14.0	14.2
ϕ40	377	0.3	3.02	3.78	4.54	5.67	6.05	9.45	9.60
	628	0.5	5.04	6.30	7.56	9.45	10.1	15.8	16.0
	880	0.7	7.06	8.82	10.6	13.2	14.1	22.1	22.4
ϕ50	589	0.3	4.70	5.88	7.06	8.82	9.41	14.7	14.9
	982	0.5	7.84	9.80	11.8	14.7	15.7	24.7	24.9
	1374	0.7	11.0	13.7	16.4	20.6	21.9	34.3	34.8
ϕ63	935	0.3	7.51	9.39	11.3	14.1	15.0	23.5	23.9
	1560	0.5	12.6	15.7	18.8	23.6	25.1	39.3	39.9
	2180	0.7	17.5	21.9	26.3	32.9	35.0	54.8	55.6
ϕ80	1510	0.3	12.1	15.1	18.1	22.7	24.2	37.8	38.4
	2510	0.5	20.1	25.1	30.1	37.7	40.2	62.8	63.8
	3520	0.7	28.1	35.1	42.1	52.7	56.2	88.0	89.2