Power screw

?   **Input section**

1.0   **Kinematics, dimensions and performance parameters of the screw**

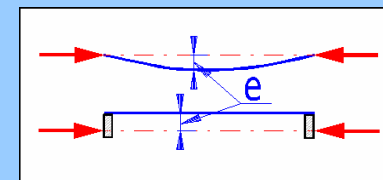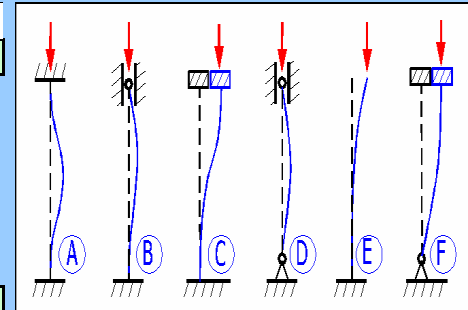| No.	Parameter	Symbol	Value	Unit	
1.1	Calculation units		SI Units (N, mm, kW…)		▼
1.2	Screw material		Hardened steel - (Rm = 580; Rp(0.2) = 320 [MPa])		▼
1.3	Nut material		Bronze - (Rm = 200; Rp(0.2) = 110 [MPa])		▼
1.4	Load force	Q	10000.0	[N]	
1.5	Feed speed	v	50.000	[mm/s]	
1.6	Coefficient of friction in threads	f	0.0800	0.06 - 0.09	
1.7	Proposed pitch thread diameter d2	d2prop	16.00	[mm]	
1.8	Thread type		Metric trapezoidal screw threads 30° (ISO 2904: 1977)		▼
1.9	Thread size		Tr 26 x 3 (d2=24.5 mm)		▼
1.10	Outer (nominal) diameter of the screw thread	d, D	26.000	[mm]	☑
1.11	Inner diameter of the nut thread	d1	23.000	[mm]	
1.12	Pitch diameter	d2	24.500	[mm]	
1.13	Inner diameter of the screw thread	d3	22.500	[mm]	
1.14	Outer diameter of the nut thread	d4	26.500	[mm]	
1.15	Thread pitch	P	3.000	[mm]	
1.16	Number od thread start	ns	1	[~]	
1.17	Thread pitch	L	3.000	[mm]	
1.18	Pitch angle	γ	2.2321	[°]	
1.19	Thread angle 1	α1	15.000	[°]	
1.20	Thread angle 2	α2	15.000	[°]	
1.21	**Friction torque (axial force capture)**		1. Not used		▼
1.22	Coefficient of friction of the pin (bearing)	fj	0.1000	[~]	
1.23	Mean pin diameter (inner bearings)	dj	32.000	[mm]	
1.24	Pin friction force	Mkj	0.000	[Nm]	
1.25	Lifting force	Mkup	14.969	[Nm]	
1.26	Lowering force	Mkdw	5.354	[Nm]	
1.27	Overall efficiency	η	0.319	[~]	
1.28	Drive power	Pmin	1.568	[kW]	
1.29	Revolutions	n [/min]	1000.00	200	
1.30	Perimeter speed of the screw	v'	1.36	[m/s]	
1.31	**Displacement/Movement of the nut (screw) depending on the revolutions**				
1.32	Nut (screw) displacement	dx	250.0000	[mm]	◉
1.33	Turn the screw (nut)	nr	83.3333	[n]	○
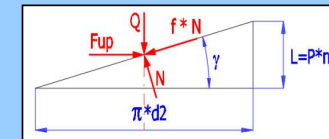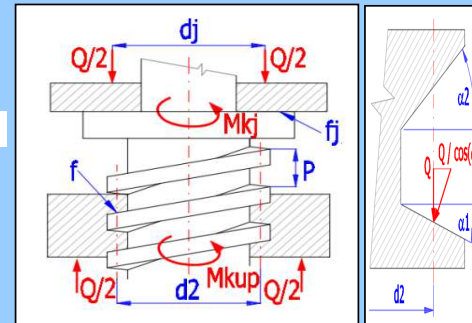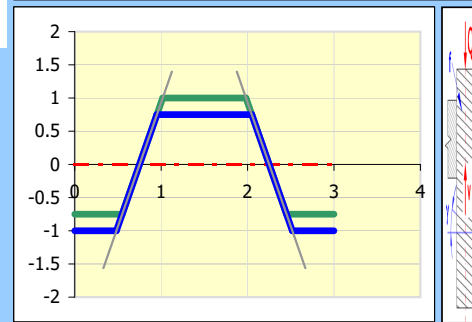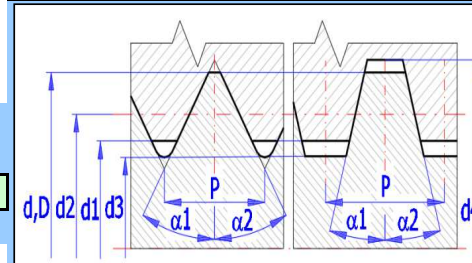
2.0 Screw strength checks

2.1	Screw length	Ls	1000.00		[mm]
2.2	**Material parameters**			☑	
2.3	Density	ro	7850.00	7850	[kg/m^3]
2.4	Modulus of elasticity in tension	E	206000	206000	[MPa]
2.5	Yield strength	Rp(0.2)	320.00	320.00	[MPa]
2.6	Permissible mean thread pressure	pD	18.75	15 - 22.5	[MPa]
2.7	Limiting slenderness ratio (short/intermediate)	SRcs	17.9	17.9	[~]
2.8	Limiting slenderness ratio (intermediate/long)	SRc	112.7	112.7	[~]
2.9	**Screw check - tension, compression, torsion**				
2.10	Torsional stress	τ	6.69	< 192	[MPa]
2.11	Tensile/Compressive stress in the direction of the sc	σ	25.15	< 320	[MPa]
2.12	Equivalent stress	σred	27.69	< 320	[MPa]
2.13	Safety coefficient	SF	**11.56**	> 2.00	[~]
2.14	**Buckling check – screw (Secant method)**				
2.15	Type of screw mounting		B. Clamped - Hinged ▼		
2.16	Effective length coeficient	elc	0.80	0.80	
2.17	Effective length	Leff	800.00		[mm]
2.18	Ball screw shaft root area	A	397.6078		[mm^2]
2.19	Quadr. moment of inertia	Ix	12580.55994		[mm^4]
2.20	Radius of gyration	rx	5.625		[mm]
2.21	Max. distance of fibre	y	11.250		[mm]
2.22	Weight of the screw	m	3.701		[kg]
2.23	Slenderness ratio	SR [~]	142.2	> SRc	
2.24	Eccentricity ratio	μ [~]	0.100	0.1 ▼	
2.25	Eccentricity	e [mm]	0.281	0.15	
2.26	Stress in the extreme fibre of the screw core	σ	28.71		[MPa]
2.27	Critical stress	σc	95.17		[MPa]
2.28	Critical force	Qcr	37840.1		[N]
2.29	Safety coefficient	SF	**3.78**	> 3.50	
2.30	Critical speed	ncr	3596		[/min]
2.31	Maximum deflection (dead weight load)	ymax	0.06919		[mm]
2.32	**Thrust check**				
2.33	Nut height	h	24.000	> 24	[mm]
2.34	Number of threads in the nut	nz	8	8	
2.35	Max. number of active threads in the nut	nzmax	8	=< 8	[~]
2.36	Thread pressure	p	10.83	< 18.75	[MPa]
2.37	Safety coefficient	SF	**1.73**	> 1.25	[~]
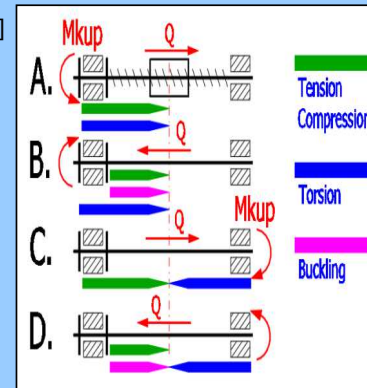
3.0 Graphical output, CAD systems

3.1	2D drawing output to:		DXF File	▼	
3.2	2D drawing scale		Automatic	▼	
3.3	Number of screw/nut threads shown in the drawing	nts	333	333	☑
3.4	Number of threads (nut) on the drawing / model	ntn	8	8	[~]
3.5	Outside diameter of the nut	DN	52.000	52	[mm]