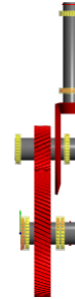
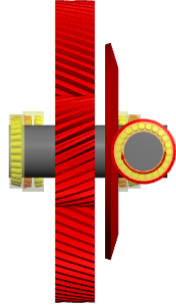


Shaft Calculation



MESYS Shaft and Rolling bearing calculation

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Input data

Settings

Housing material	Steel	
Housing youngs modulus	E_Housing	207000 MPa
Housing poisson number	v_Housing	0.3
Housing thermal elongation coefficient	α_Housing	11.500 10 ⁻⁶ /K
Housing temperature	ϑ_Housing	20.000 °C
Weight of the shaft is considered		
Angle for weight	βw	-90.0000 °
Shear deformations in the shaft are considered		
Shear deformations	According Hutchinson	
Lubrication		
Lubricant	ISO VG 220 mineral oil	
Kinematic viscosity at 40°C	v40	220.000 mm ² /s
Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Pressure viscosity coefficient	α	0.0000 1/MPa
Oil density	ρOil	890.000 kg/m ³
Oil temperature	ϑOil	70.000 °C
Lubricant cleanness	Oil lubrication with on-line filter ISO4406 -/17/14	
Oil does not contain effective EP additives		

Load spectrum

Number	Frequency [%]
1	100.0000

Calculation is done with single load spectrum element
 Load spectrum element for results

1

Group 1 ('Input')

MESYS Shaft and Rolling bearing calculation

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Position	x	459.870 mm
Position	y	2087.6 mm
Position	z	0.0000 mm

Shaft 1 ('InputShaft')

Speed	n	1500.0 rpm
Temperature	T	20.000 °C
Position	x	0.0000 mm
Material		Steel
Youngs modulus	E	207000 MPa
Poisson number	v	0.3
Density	ρ	7850.0 kg/m ³
Thermal elongation coefficient	α	11.500 10 ⁻⁶ /K

Nonlinear rolling bearing stiffness is considered

Outer geometry

Length [mm]	Diameter 1 [mm]
1000	150

Loading

Name	Position [mm]	Width [mm]	Element	Fx [kN]	Fy [kN]	Fz [kN]	Mx [Nm]	My [Nm]	Mz [Nm]
Coupling 20	40	1	0	0	0	0	5000	0	0

Bevel gear 'BG1' at position 960

Width	b	100 mm
Number of teeth	z	12
Normal module	mn	15.000 mm
Normal pressure angle	α_nD	20.000 °
Normal pressure angle	α_nC	20.000 °
Helix angle	β_m	35.000 °
Helix direction		Spiral left hand
Profile shift coefficient	x	0
Pitch angle	δ	16.699 °

Boundary conditions

Rolling bearing 'B1' at position 100

Bearing is connected to 'InputShaft' with inner ring and to 'Housing' with outer ring
 Type of rolling bearing Taper roller bearing

MESYS Shaft and Rolling bearing calculation

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Manufacturer		Generic
Bearing name		T 2ED 150
Bearing inner diameter	d	150.000 mm
Bearing outer diameter	D	225.000 mm
Bearing width	B	53.000 mm
Nominal contact angle	α	12.592 °
Dynamic load capacity	Cr	395.757 kN
Static load capacity	C0r	638.539 kN
Center of contact cone		left

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication

Shaft is supported radially and axially

Rolling bearing 'B2' at position 800

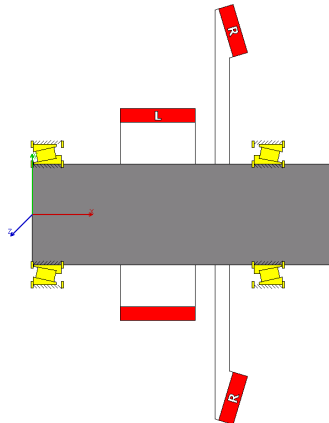
Bearing is connected to 'InputShaft' with inner ring and to 'Housing' with outer ring

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 150
Bearing inner diameter	d	150.000 mm
Bearing outer diameter	D	225.000 mm
Bearing width	B	53.000 mm
Nominal contact angle	α	12.592 °
Dynamic load capacity	Cr	395.757 kN
Static load capacity	C0r	638.539 kN
Center of contact cone		right

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication

Shaft is supported radially and axially

Group 2 ('Intermediate')



Position	x	-50.0000 mm
Position	y	761.331 mm
Position	z	0.0000 mm

Shaft 2 ('Intermediate shaft')

Speed	n	-450.0000 rpm
Temperature	T	20.000 °C
Position	x	0.0000 mm
Material		Steel

Youngs modulus	E	207000 MPa
Poisson number	v	0.3
Density	ρ	7850.0 kg/m ³
Thermal elongation coefficient	α	11.500 10 ⁻⁶ /K
Nonlinear rolling bearing stiffness is considered		

Outer geometry

Length [mm]	Diameter 1 [mm]
600	200

Loading

Cylindrical gear 'CG1' at position 250

Width	b	150 mm
Number of teeth	z	30
Normal module	mn	12.000 mm
Normal pressure angle	α_n	20.000 °
Helix angle	β	25.000 °
Helix direction		Helix left hand
Profile shift coefficient	x	0

Bevel gear 'BG2' at position 400

Width	b	100 mm
Number of teeth	z	40
Normal module	mn	15.000 mm
Normal pressure angle	α_nD	20.000 °
Normal pressure angle	α_nC	20.000 °
Helix angle	β_m	35.000 °
Helix direction		Spiral right hand
Profile shift coefficient	x	0
Pitch angle	δ	73.301 °

Boundary conditions

Rolling bearing 'B3' at position 30

Bearing is connected to 'Intermediate shaft' with inner ring and to 'Housing' with outer ring

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 200
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	280.000 mm
Bearing width	B	56.000 mm
Nominal contact angle	α	12.742 °
Dynamic load capacity	Cr	498.826 kN
Static load capacity	COr	893.991 kN
Center of contact cone		right

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication

Shaft is supported radially and axially

Rolling bearing 'B4' at position 470

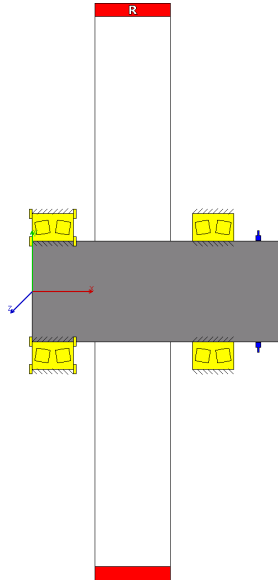
Bearing is connected to 'Intermediate shaft' with inner ring and to 'Housing' with outer ring

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 200
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	280.000 mm
Bearing width	B	56.000 mm

Nominal contact angle	α	12.742 °
Dynamic load capacity	Cr	498.826 kN
Static load capacity	C0r	893.991 kN
Center of contact cone		left

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication
 Shaft is supported radially and axially

Group 3 ('Output')



Position	x	0.0000 mm
Position	y	0.0000 mm
Position	z	0.0000 mm

Shaft 3 ('Intermediate shaft 2')

Speed	n	158.824 rpm
Temperature	T	20.000 °C
Position	x	0.0000 mm
Material		Steel
Youngs modulus	E	207000 MPa
Poisson number	ν	0.3
Density	ρ	7850.0 kg/m ³
Thermal elongation coefficient	α	11.500 10 ⁻⁶ /K

Nonlinear rolling bearing stiffness is considered

Outer geometry

Length [mm]	Diameter 1 [mm]
500	200

Loading

Cylindrical gear 'CG2' at position 200

Width	b	150 mm
Number of teeth	z	85
Normal module	mn	12.000 mm
Normal pressure angle	α_n	20.000 °
Helix angle	β	25.000 °
Helix direction		Helix right hand
Profile shift coefficient	x	0

Boundary conditions

Rolling bearing 'B5' at position 41

Bearing is connected to 'Intermediate shaft 2' with inner ring and to 'Housing' with outer ring

Type of rolling bearing		Spherical roller bearing
Manufacturer		Generic
Bearing name		23040
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	310.000 mm
Bearing width	B	82.000 mm
Nominal contact angle	α	9.1341 °
Dynamic load capacity	Cr	792.411 kN
Static load capacity	C0r	1382.5 kN

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication

Shaft is supported radially and axially

Rolling bearing 'B6' at position 360

Bearing is connected to 'Intermediate shaft 2' with inner ring and to 'Housing' with outer ring

Type of rolling bearing		Spherical roller bearing
Manufacturer		Generic
Bearing name		23040
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	310.000 mm
Bearing width	B	82.000 mm
Nominal contact angle	α	9.1341 °
Dynamic load capacity	Cr	792.411 kN
Static load capacity	C0r	1382.5 kN

Bearing data is set from shaft calculation: Geometry, Material, Temperature, Lubrication

Shaft is supported radially

Reaction coupling 'Reaction coupling' at position 450

Width	l	10.000 mm
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Cylindrical gear connections

Name	z1	z2	mn [mm]	α_n [°]	β [°]	u	a [mm]	jt [mm]	cg [N/mm/μm]
CG1-CG2	30	85	12	20	25	2.83	761.331	0.1	20

Bevel gear connections

Name	z1	z2	mmn [mm]	β_{2m} [°]	u	Σ [°]	a [mm]	jt [mm]	cg [N/mm/μm]
BG1-BG2	12	40	15	35	3.33	90	0	0.1	20

Results

Results for load spectrum element 1

Maximal equivalent stress	maxSigV	56.409 MPa
Maximal bearing stress	pmax	2588.6 MPa
Minimal static safety for bearings	minSF	2.3877
Minimal bearing reference life	minL10rh	5960.9 h
Minimal bearing modified reference life	minLnmrh	3045.7 h
Minimal bearing basic life	minL10h	1646.2 h
Minimal bearing modified life	minLnmh	6998.1 h

Maximum shaft deflections

Shaft	maxUx [mm]	maxUy [mm]	maxUz [mm]	maxUr [mm]	maxSigV [MPa]
InputShaft	0.1001	0.0319	0.0946	0.0999	30.7
Intermediate shaft	0.0863	0.0224	0.0412	0.0469	24.6
Intermediate shaft 2	0.5932	0.1374	0.1128	0.1777	56.4

maxUx : Maximal displacement in x
 maxUy : Maximal displacement in y
 maxUz : Maximal displacement in z
 maxUr : Maximal displacement in radial direction
 maxSigV : Maximal equivalent stress

Mass properties

Shaft	Mass [kg]	Mass center [mm]	Jxx [kg mm ²]	Jyy [kg mm ²]	Jzz [kg mm ²]
InputShaft	138.721	500.0	390153	1.17552e+007	1.17552e+007
Intermediate shaft	147.969	300.0	739845	4.80899e+006	4.80899e+006
Intermediate shaft 2	123.308	250.0	616538	2.87718e+006	2.87718e+006

Group		Mass [kg]	Mass center [mm]	Jxx [kg mm ²]	Jyy [kg mm ²]	Jzz [kg mm ²]
Input	rotating	138.721	500.0	390153	1.17552e+007	1.17552e+007
Intermediate	rotating	147.969	300.0	739845	4.80899e+006	4.80899e+006
Output	rotating	123.308	250.0	616538	2.87718e+006	2.87718e+006

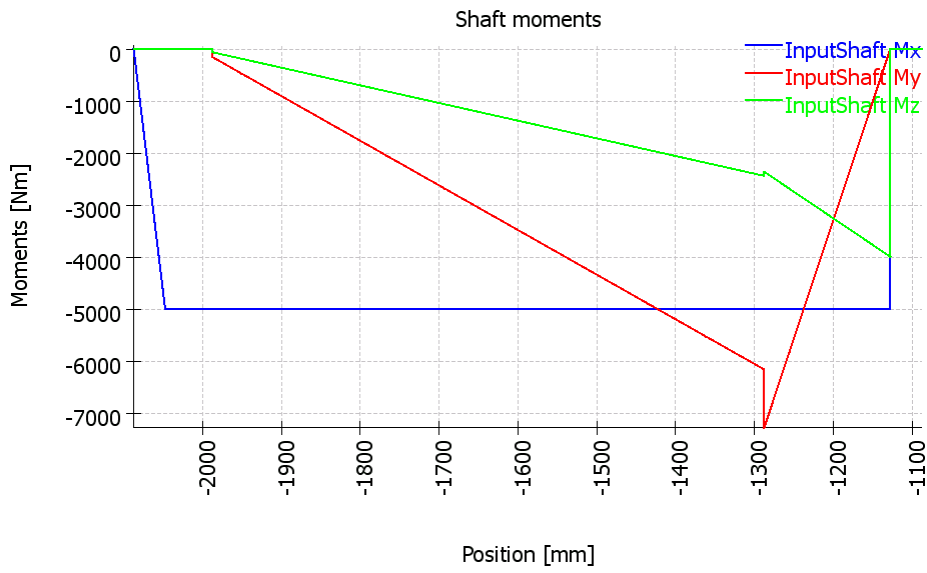
Graphics for load spectrum element 1

Result Graphics for Group 'Input'

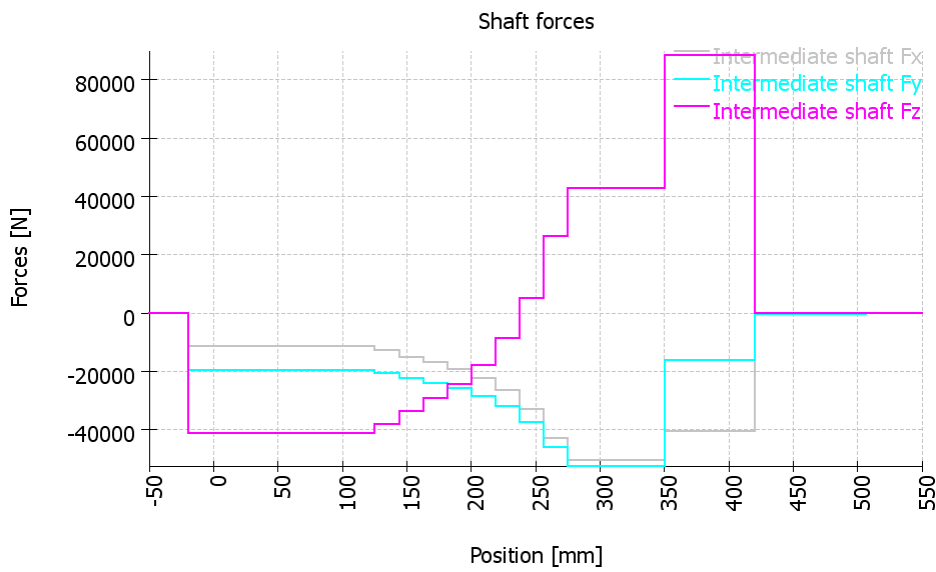
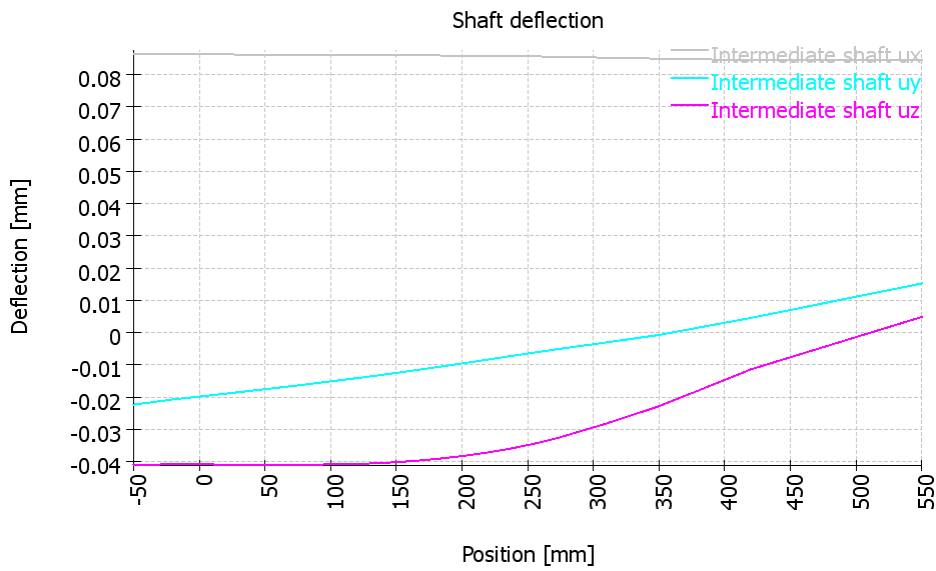


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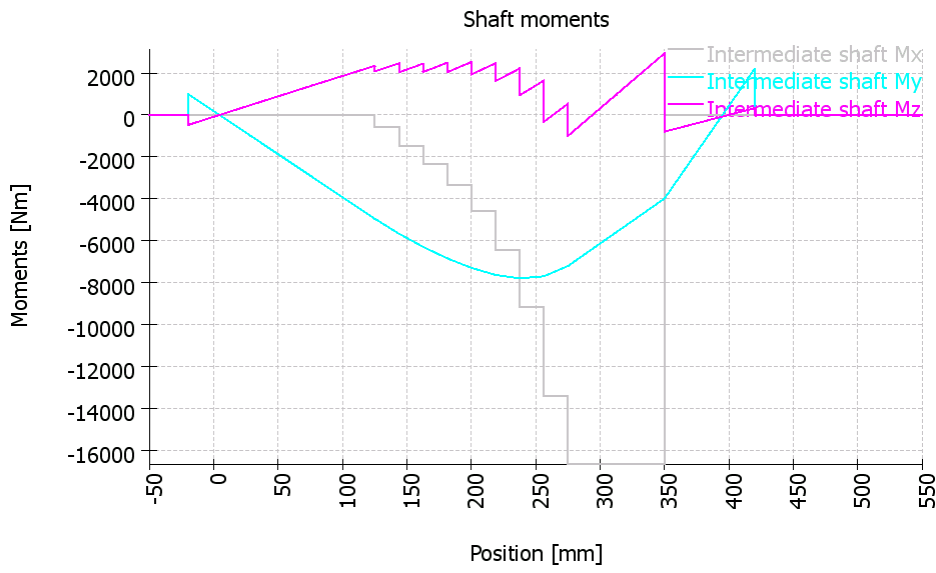


Result Graphics for Group 'Intermediate'

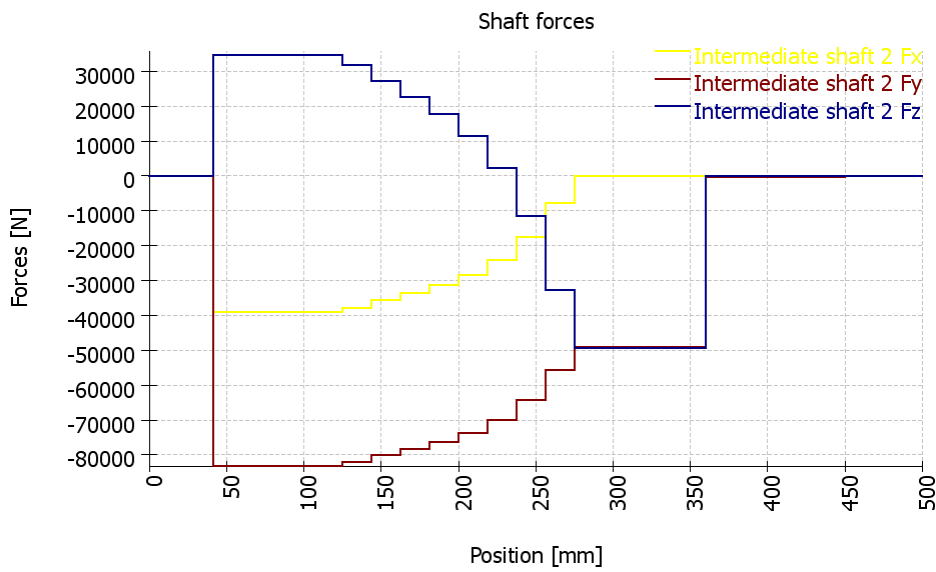
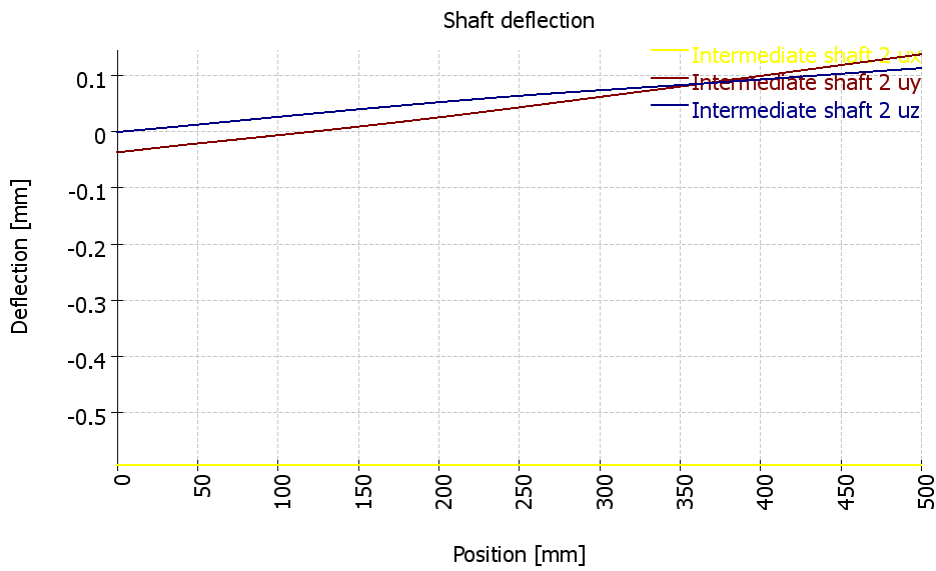


MESYS Shaft and Rolling bearing calculation

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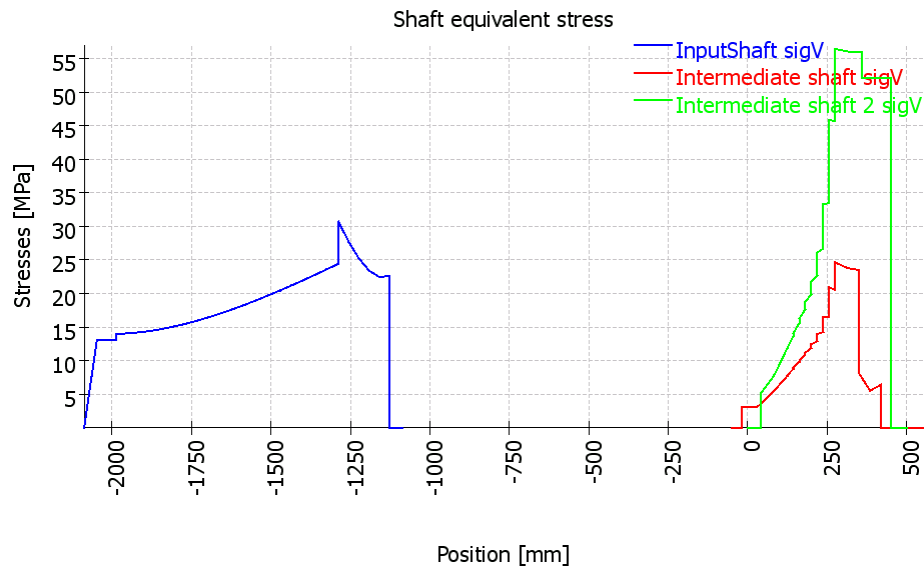
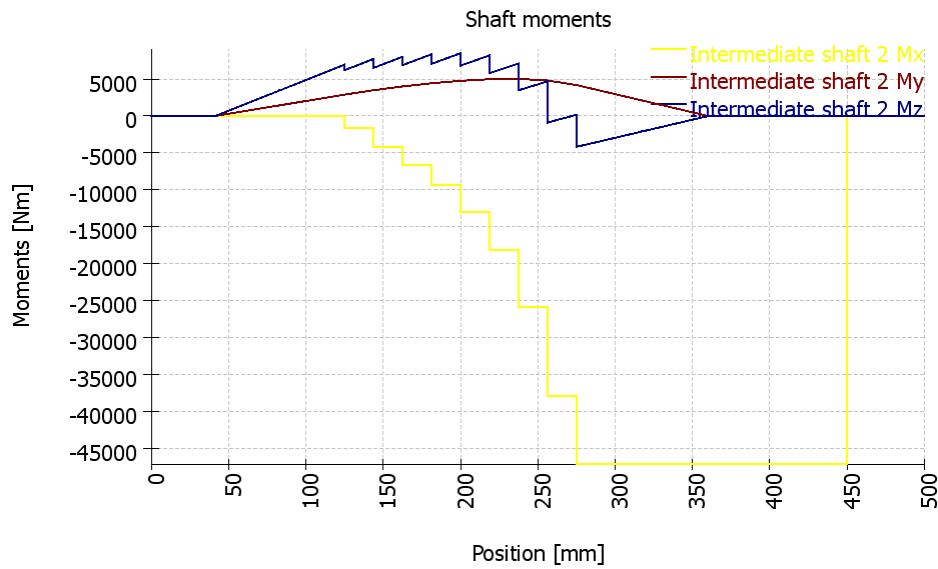


Result Graphics for Group 'Output'



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Bearing Forces

Name	x [mm]	Fx [kN]	Fy [kN]	Fz [kN]	Mx [Nm]	My [Nm]	Mz [Nm]
InputShaft	459.87						
B1	100	2.19	3.39	-8.58	0.000	-154.135	-60.947
B2	800	-37.16	6.82	54.09	0.000	-1122.887	79.479
Intermediate shaft	-50						
B3	30	-11.38	-19.71	-41.00	0.000	994.376	-475.648
B4	470	40.30	15.62	-88.43	0.000	-2208.065	-346.201
Intermediate shaft 2	0						
B5	41	-39.13	-83.45	34.63	0.000	-15.486	-37.324
B6	360	0.00	48.54	49.29	0.000	0.000	0.000
Reaction coupling	450	0.0000	0.0000	0.0000	47222.222	0.000	0.000

Fx : Axial force
 Fy : Radial force Y
 Fz : Radial force Z
 Mx : Torque
 My : Moment Y
 Mz : Moment Z

Bearing Displacements

Name	x [mm]	ux [mm]	uy [mm]	uz [mm]	rx [mrad]	ry [mrad]	rz [mrad]
InputShaft	0						
B1	100	-0.0988	0.0132	-0.0330	21.03	0.09	0.04
B2	800	-0.0985	0.0036	0.0040	20.15	-0.34	-0.13
Intermediate shaft	0						
B3	30	0.0863	-0.0207	-0.0408	-5.12	-0.01	0.05
B4	470	0.0845	0.0045	-0.0114	-5.29	-0.12	0.08
Intermediate shaft 2	0						
B5	41	-0.5921	-0.0237	0.0098	0.84	-0.26	0.32
B6	360	-0.5932	0.0835	0.0844	0.34	-0.20	0.38
Reaction coupling	450	-0.5932	0.1181	0.1027	0.00	-0.20	0.38

ux : Displacement X
 uy : Displacement Y
 uz : Displacement Z
 rx : Rotation around X
 ry : Rotation around Y
 rz : Rotation around Z

Bearing Results

Bearing	X [mm]	L10h [h]	Lnmh [h]	L10rh [h]	Lnmrh [h]	pmax [MPa]	SF
B1	100	3071098	153554914	2672590	133629508	811.26	24.31
B2	800	1646	9704	5961	29851	1450.04	7.61
B3	30	108520	5425986	161056	1970752	1197.84	11.15
B4	470	6229	33177	19437	81017	1407.71	8.07
B5	41	7121	6998	6612	3046	2588.63	2.39
B6	360	355557	1916778	241697	417176	1381.04	8.39

L10h : Basic life (ISO 281)
 Lnmh : Modified life (ISO 281)
 L10rh : Basic reference rating life (ISO/TS 16281)
 Lnmrh : Modified reference rating life (ISO/TS 16281)
 pmax : Maximal pressure
 SF : Static safety factor

Connections

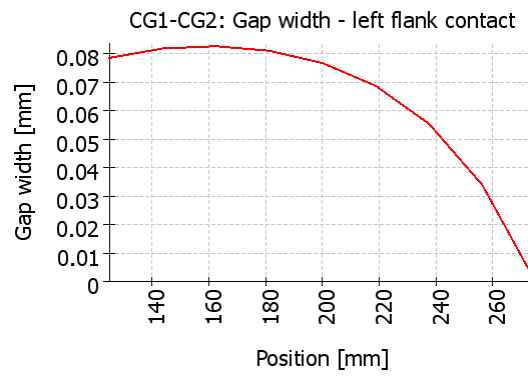
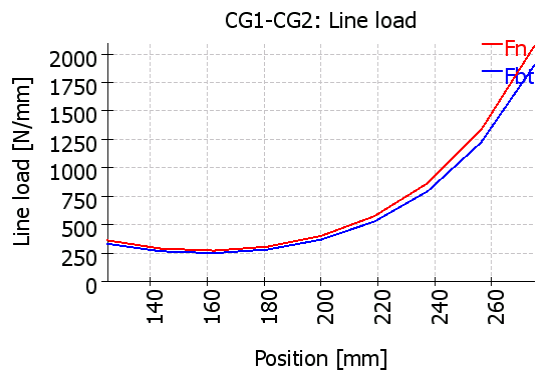
Name	Element	n1 [rpm]	n2 [rpm]	T1 [Nm]	T2 [Nm]	P [kW]	SF1	SF2	SH1	SH2
CG1-CG2	1	-450.00	158.82	-16666.67	-47222.22	785.40				
Name	Element	n1 [rpm]	n2 [rpm]	T1 [Nm]	T2 [Nm]	P [kW]	SF1	SF2	SH1	SH2
BG1-BG2	1	1500.00	-450.00	5000.00	16666.67	785.40				

n : Rotation speed
 T : Torque
 P : Power
 SF : Safety factor root
 SH : Safety factor flank

Name	Element	Fx1 [kN]	Fy1 [kN]	Fz1 [kN]	Mx1 [Nm]	My1 [Nm]	Mz1 [Nm]	Fx2 [kN]	Fy2 [kN]	Fz2 [kN]	Mx2 [Nm]	My2 [Nm]	Mz2 [Nm]
CG1-CG2	1	39.131	33.701	-83.917	16666.67	0.00	7771.79	-39.131	-33.701	83.917	47222.22	0.00	22020.08
BG1-BG2	1	-36.332	10.211	45.508	-5000.00	0.00	-3991.77	-10.211	-36.332	-45.508	-16666.67	0.00	3739.73

MESYS Shaft and Rolling bearing calculation

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Details for bearing: B1

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 150
Bearing inner diameter	d	150.000 mm
Bearing outer diameter	D	225.000 mm
Bearing width	B	53.000 mm
Bearing width inner ring	Bi	52.000 mm
Bearing width outer ring	Be	44.000 mm
Number of rolling elements	Z	23
Roller diameter	Dw	20.625 mm
Pitch diameter	Dpw	185.797 mm
Length of Roller	Lwe	35.000 mm
Nominal contact angle	α	12.592 °
Center of contact cone		left
Distance to centre of pressure	a	45.219 mm
Distance bearing center to row center	δRC	-2.0325 mm
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal axial clearance	Pa	0.0000 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	1500.0 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	-98.7866 μm
Displacement Y	uy	13.201 μm
Displacement Z	uz	-33.0198 μm
Rotation around Y	ry	0.0872 mrad
Rotation around Z	rz	0.0418 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOMax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s

Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³
Oil temperature	θOil	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	v(θ)	51.794 mm ² /s
Operating oil density	ρ(θ)	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	23
Roller diameter	Dw	20.625 mm
Pitch diameter	Dpw	185.797 mm
Length of Roller	Lwe	35.000 mm
Nominal contact angle	α	12.592 °
Nominal axial clearance	Pa	0.0000 mm
Change of clearance	ΔPd	0.0000 mm
Effective axial clearance	Paeff	0.0000 mm
Distance between rolling elements	δRE	4.6743 mm
Shoulder diameter inner ring	dSi	184.274 mm

Forces and displacement

Axial force	Fx	2.1901 kN
Radial force Y	Fy	3.3950 kN
Radial force Z	Fz	-8.5776 kN
Displacement X	ux	-98.7866 μm
Displacement Y	uy	13.201 μm
Displacement Z	uz	-33.0198 μm
Moment Y	My	-154.1345 Nm
Moment Z	Mz	-60.9470 Nm
Rotation around Y	ry	0.0872 mrad
Rotation around Z	rz	0.0418 mrad
Maximal pressure inner race	pmax_i	811.257 MPa
Maximal pressure outer race	pmax_e	728.702 MPa
Maximal pressure	pmax	811.257 MPa
Static safety factor	SF	24.311

Life

Dynamic load capacity	Cr	395.757 kN
Static load capacity	C0r	638.539 kN
Fatigue load limit	Cur	63.538 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	6.07623
Contamination factor	eC	0.713837
Life modification factor	aISO	50
Reference load	Pref	9617.8 N
Basic reference rating life	L10r	240533
Basic reference rating life	L10rh	2.67259e+006 h
Modified reference rating life	Lnmr	1.20267e+007
Modified reference rating life	Lnmrh	1.3363e+008 h

Life according ISO 281

Dynamic radial load factor	X	1
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MESYS Shaft and Rolling bearing calculation

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Dynamic axial load factor	Y	0
Dynamic equivalent load	P	9225.0 N
Basic life	L10	276399
Basic life	L10h	3.0711e+006 h
Modified life	Ln _m	1.38199e+007
Modified life	Ln _m h	1.53555e+008 h

Thermal permissible speed

Factor for load independent losses	f _{0r}	3
Factor for load dependent losses	f _{1r}	0.0004
Surface for heat transfer	A _r	62439.2 mm ²
Thermal transmission coefficient	k _q	296.718 W/m ² ·K
Load for reference speed	P _{1r}	31927.0 N
Viscosity at reference conditions	ν _r	12.000 mm ² /s
Load independent friction moment	M _{0r}	1.6933 Nm
Load dependent friction moment	M _{1r}	2.3728 Nm
Thermal reference speed	n _{tr}	2175.5 rpm
Factor for load independent losses	f ₀	3
Factor for load dependent losses	f ₁	0.0004
Load for permissible speed	P ₁	9225.0 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M ₀	4.0532 Nm
Load dependent friction moment	M ₁	0.6856 Nm
Thermal permissible speed	n _t	1866.7 rpm
Friction moments and temperature increase for current speed (n=1500)		
Load independent friction moment for current speed	M _{0_n}	3.5033 Nm
Load dependent friction moment for current speed	M _{1_n}	0.6856 Nm
Total friction moment for current speed	M _{_n}	4.1889 Nm
Temperature difference for current speed	Δθ _{_n}	35.516 °C

Subsurface stresses

Maximal shear stress for inner race	τ _{max_i}	243.737 MPa
Depth for maximal shear stress inner race	h(τ _{max_i})	0.1031 mm
Shear yield stress for core inner race	τ _{Yield_i}	510.000 MPa
Shear fatigue limit for core inner race	τ _{a_i}	306.000 MPa
Shear stress at core inner race	τ _{_i}	162.338 MPa
Maximal shear stress for outer race	τ _{max_e}	218.817 MPa
Depth for maximal shear stress outer race	h(τ _{max_e})	0.1151 mm
Shear yield stress for core outer race	τ _{Yield_e}	510.000 MPa
Shear fatigue limit for core outer race	τ _{a_e}	306.000 MPa
Shear stress at core outer race	τ _{_e}	145.740 MPa
Required hardness depth inner race	h _{dmin_i}	0.0000 mm
Required hardness depth outer race	h _{dmin_e}	0.0000 mm

Damage Frequencies

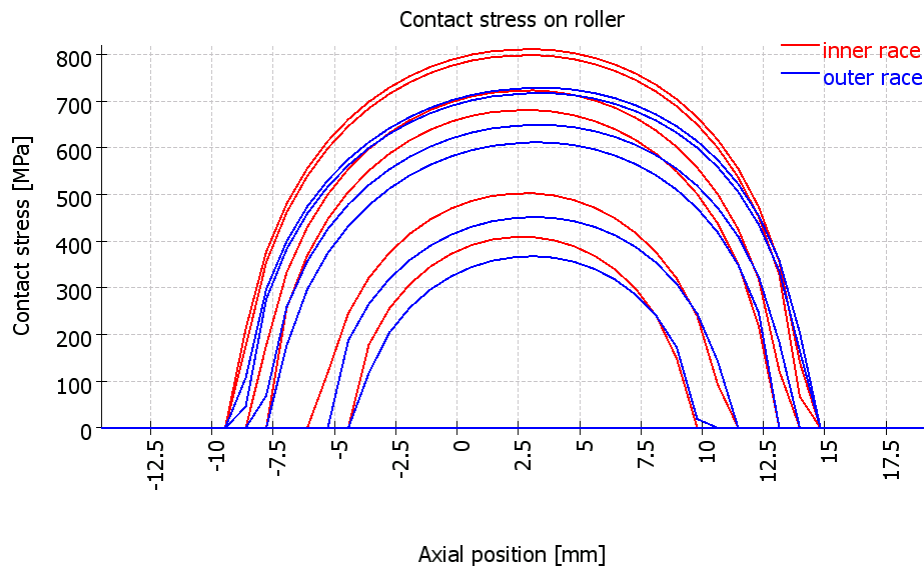
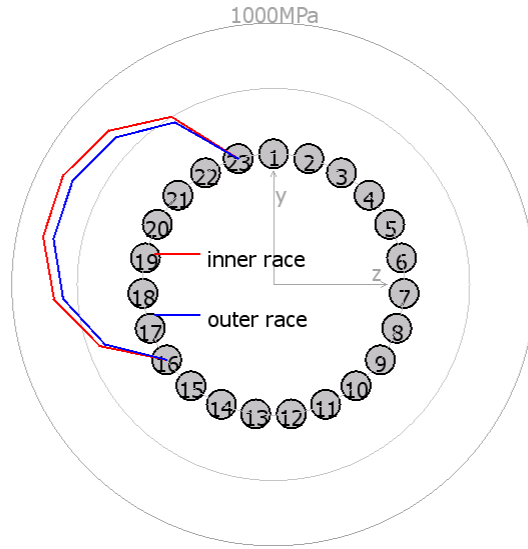
Speed of inner ring	n _i	25.00 1/s	(1500rpm)
Speed of outer ring	n _e	0.00 1/s	(0rpm)
Rotation speed of cage	f _c	11.15 1/s	(669rpm)
Damage frequency for inner race	f _{ip}	318.65 1/s	(19119rpm)
Damage frequency for outer race	f _{ep}	-256.35 1/s	(-15381rpm)
Damage frequency for rolling element	f _{rp}	-222.56 1/s	(-13354rpm)

Bearing stiffness matrix

MESYS Shaft and Rolling bearing calculation

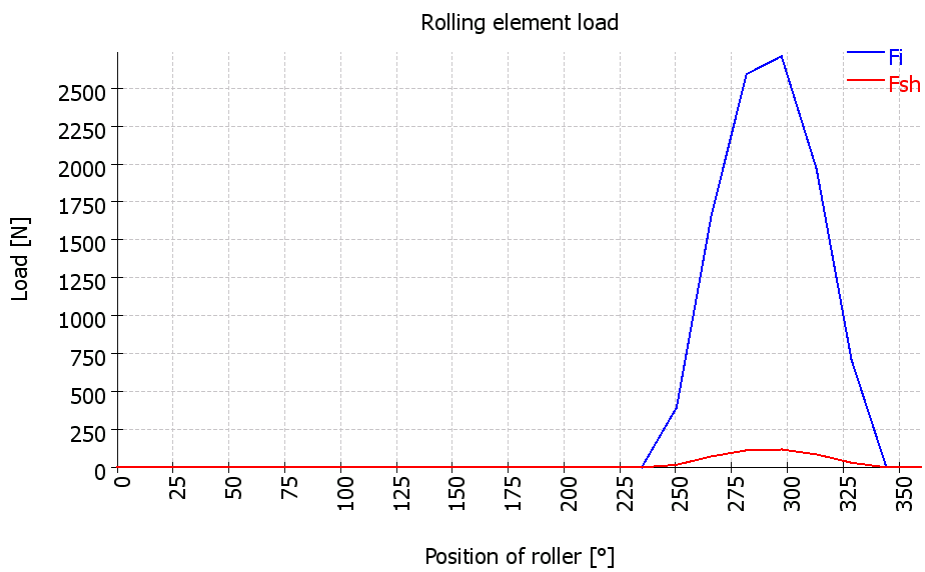
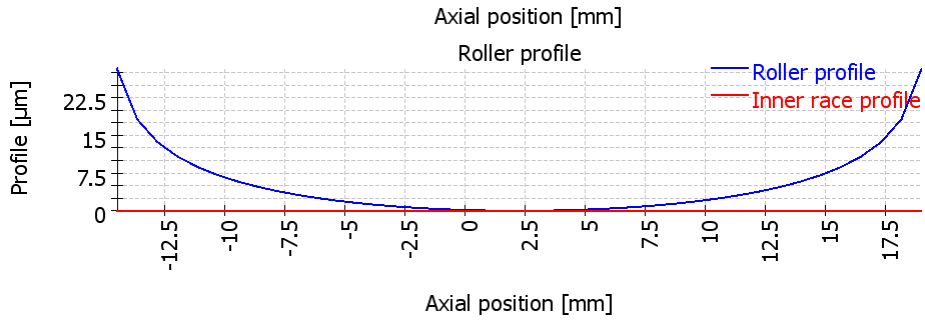
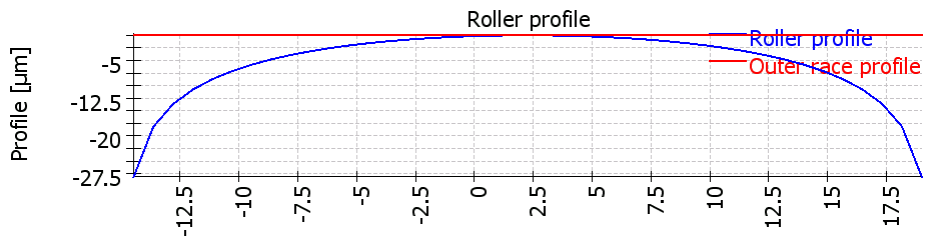
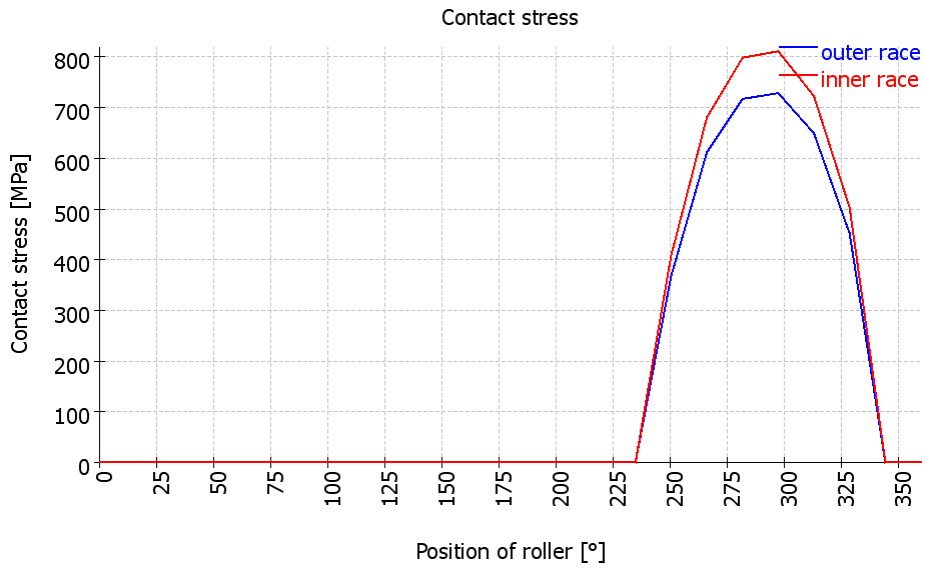
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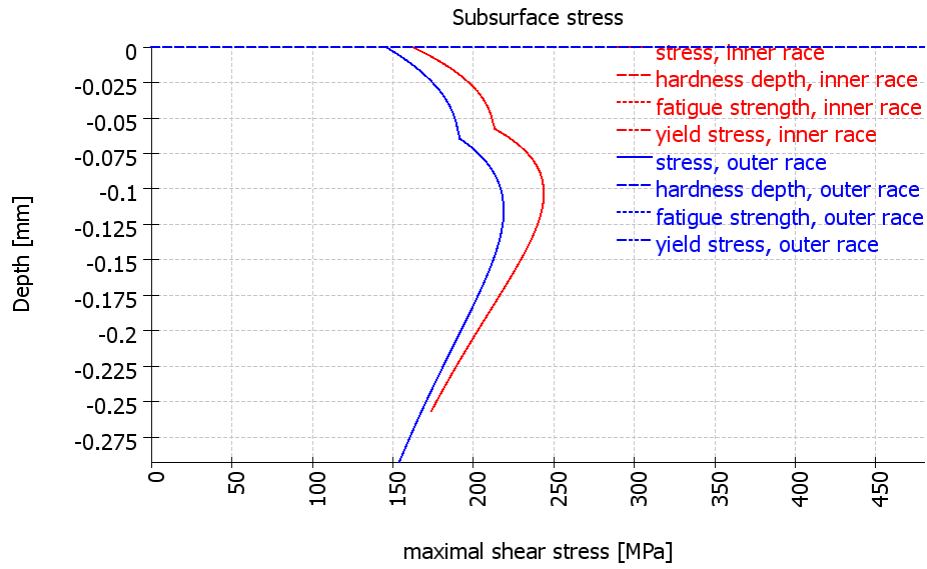
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	85.908	125.880	-328.288	-5939.712	-2273.674
Fy [N]	125.682	423.578	-396.111	-7167.567	-7651.258
Fz [N]	-328.376	-396.389	1297.895	23508.338	7171.351
My [Nm]	-5.929	-7.158	23.440	473.527	146.345
Mz [Nm]	-2.266	-7.635	7.149	146.213	151.974



MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini





Result table for bearing 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	0	-0	-0	-0	0	0
2	15.6522	0	-0	-0	-0	0	0
3	31.3043	0	-0	-0	-0	0	0
4	46.9565	0	-0	-0	-0	0	0
5	62.6087	0	-0	-0	-0	0	0
6	78.2609	0	-0	-0	-0	0	0
7	93.913	0	-0	-0	-0	0	0
8	109.565	0	-0	-0	-0	0	0
9	125.217	0	-0	-0	-0	0	0
10	140.87	0	-0	-0	-0	0	0
11	156.522	0	-0	-0	-0	0	0
12	172.174	0	-0	-0	-0	0	0
13	187.826	0	-0	-0	-0	0	0
14	203.478	0	-0	-0	-0	0	0
15	219.13	0	-0	-0	-0	0	0
16	234.783	0	-0	-0	-0	0	0
17	250.435	395.312	-86.187	129.197	363.527	6.95484	17.251
18	266.087	1667.48	-363.559	111.055	1623.57	29.2766	72.767
19	281.739	2592.98	-565.356	-514.864	2477.66	45.4775	113.154
20	297.391	2710.47	-590.977	-1216.99	2348.69	47.506	118.282
21	313.043	1968.72	-429.246	-1311.42	1404.19	34.4887	85.9124
22	328.696	709.884	-154.776	-591.946	359.97	12.4355	30.9785
23	344.348	0	-0	-0	-0	0	0

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	profile_i [μm]	profile_e [μm]	aISO
1	-14.476	0.854	28.15	0.00	0.00	0.00
2	-13.639	0.854	18.18	0.00	0.00	0.00
3	-12.802	0.854	13.68	0.00	0.00	0.00
4	-11.965	0.854	10.80	0.00	0.00	0.00
5	-11.128	0.854	8.72	0.00	0.00	0.00
6	-10.291	0.854	7.11	0.00	0.00	0.00
7	-9.454	0.854	5.83	0.00	0.00	0.00
8	-8.617	0.854	4.77	0.00	0.00	50.00
9	-7.780	0.854	3.89	0.00	0.00	50.00
10	-6.944	0.854	3.15	0.00	0.00	50.00
11	-6.107	0.854	2.52	0.00	0.00	50.00
12	-5.270	0.854	1.99	0.00	0.00	50.00
13	-4.433	0.854	1.53	0.00	0.00	50.00
14	-3.596	0.854	1.15	0.00	0.00	50.00
15	-2.759	0.854	0.83	0.00	0.00	50.00
16	-1.922	0.854	0.57	0.00	0.00	50.00
17	-1.085	0.854	0.36	0.00	0.00	50.00
18	-0.248	0.854	0.20	0.00	0.00	50.00
19	0.589	0.854	0.09	0.00	0.00	50.00
20	1.426	0.854	0.02	0.00	0.00	50.00
21	2.263	0.854	0.00	0.00	0.00	50.00
22	3.100	0.854	0.02	0.00	0.00	50.00
23	3.937	0.854	0.09	0.00	0.00	50.00
24	4.774	0.854	0.20	0.00	0.00	50.00
25	5.611	0.854	0.36	0.00	0.00	50.00
26	6.448	0.854	0.57	0.00	0.00	50.00
27	7.285	0.854	0.83	0.00	0.00	50.00
28	8.122	0.854	1.15	0.00	0.00	50.00
29	8.959	0.854	1.53	0.00	0.00	50.00
30	9.796	0.854	1.99	0.00	0.00	50.00
31	10.633	0.854	2.52	0.00	0.00	50.00
32	11.470	0.854	3.15	0.00	0.00	50.00
33	12.307	0.854	3.89	0.00	0.00	50.00
34	13.144	0.854	4.77	0.00	0.00	50.00
35	13.981	0.854	5.83	0.00	0.00	50.00
36	14.818	0.854	7.11	0.00	0.00	0.00
37	15.655	0.854	8.72	0.00	0.00	0.00
38	16.492	0.854	10.80	0.00	0.00	0.00
39	17.329	0.854	13.68	0.00	0.00	0.00
40	18.166	0.854	18.18	0.00	0.00	0.00
41	19.003	0.854	28.15	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pi in MPa on inner race for rollers 16 to 23 row 1

Section	16	17	18	19	20	21	22	23
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	174.23	212.02	0.00	0.00	0.00
9	0.00	0.00	0.00	354.58	377.30	176.41	0.00	0.00
10	0.00	0.00	257.37	461.78	480.41	333.38	0.00	0.00
11	0.00	0.00	369.67	539.18	555.76	429.79	0.00	0.00
12	0.00	0.00	447.09	598.78	614.12	500.01	118.32	0.00
13	0.00	0.00	505.43	646.12	660.63	554.20	245.57	0.00
14	0.00	178.12	551.02	684.29	698.23	597.14	321.17	0.00
15	0.00	255.77	587.19	715.21	728.73	631.53	375.18	0.00
16	0.00	307.90	615.92	740.15	753.37	659.04	415.71	0.00
17	0.00	345.38	638.48	759.97	772.98	680.79	446.47	0.00
18	0.00	372.49	655.72	775.28	788.15	697.53	469.48	0.00
19	0.00	391.37	668.20	786.48	799.27	709.75	485.95	0.00
20	0.00	403.20	676.27	793.83	806.58	717.76	496.60	0.00
21	0.00	408.17	679.38	796.59	809.34	720.97	501.28	0.00
22	0.00	408.37	680.70	798.43	811.26	722.71	502.43	0.00
23	0.00	401.90	677.12	795.74	808.68	719.70	497.78	0.00
24	0.00	388.83	669.28	789.30	802.41	712.64	487.63	0.00
25	0.00	368.35	656.90	778.93	792.26	701.28	471.50	0.00
26	0.00	338.99	639.55	764.31	777.92	685.25	448.58	0.00
27	0.00	298.06	616.55	744.93	758.90	663.95	417.49	0.00
28	0.00	239.99	586.89	720.10	734.54	636.52	375.94	0.00
29	0.00	148.42	549.05	688.79	703.84	601.67	319.70	0.00
30	0.00	0.00	500.61	649.51	665.37	557.44	239.14	0.00
31	0.00	0.00	437.41	599.92	616.92	500.61	92.61	0.00
32	0.00	0.00	351.02	536.21	554.89	425.30	0.00	0.00
33	0.00	0.00	217.08	451.19	472.69	318.21	0.00	0.00
34	0.00	0.00	0.00	327.84	355.44	121.73	0.00	0.00
35	0.00	0.00	0.00	66.99	139.70	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 16 to 23 row 1

Section	16	17	18	19	20	21	22	23
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	45.12	107.11	0.00	0.00	0.00
9	0.00	0.00	0.00	275.20	296.77	68.94	0.00	0.00
10	0.00	0.00	176.64	383.19	400.09	259.29	0.00	0.00
11	0.00	0.00	296.68	458.92	473.75	356.69	0.00	0.00
12	0.00	0.00	374.40	516.70	530.33	425.67	0.00	0.00
13	0.00	0.00	431.98	562.49	575.36	478.44	187.21	0.00
14	0.00	117.26	476.78	599.48	611.83	520.19	265.27	0.00
15	0.00	203.70	512.39	629.62	641.61	553.75	319.28	0.00
16	0.00	257.79	540.87	654.14	665.88	580.79	359.53	0.00
17	0.00	296.22	563.54	673.91	685.48	602.45	390.20	0.00
18	0.00	324.25	581.24	689.51	700.98	619.44	413.45	0.00
19	0.00	344.32	594.54	701.35	712.76	632.29	430.57	0.00
20	0.00	357.75	603.80	709.67	721.07	641.29	442.29	0.00
21	0.00	364.86	608.56	713.85	725.27	645.94	448.57	0.00
22	0.00	367.63	611.69	717.18	728.70	649.25	451.65	0.00
23	0.00	364.46	610.44	716.46	728.11	648.31	449.53	0.00
24	0.00	355.52	605.41	712.40	724.22	643.77	442.56	0.00
25	0.00	340.21	596.38	704.87	716.90	635.43	430.38	0.00
26	0.00	317.47	583.01	693.58	705.89	623.00	412.33	0.00
27	0.00	285.36	564.75	678.15	690.80	605.97	387.35	0.00
28	0.00	240.13	540.79	657.97	671.05	583.65	353.68	0.00
29	0.00	172.65	509.90	632.21	645.85	554.99	308.23	0.00
30	0.00	18.81	470.20	599.63	613.99	518.39	244.50	0.00
31	0.00	0.00	418.52	558.36	573.69	471.33	142.48	0.00
32	0.00	0.00	348.86	505.35	522.09	409.34	0.00	0.00
33	0.00	0.00	246.46	435.13	454.13	323.14	0.00	0.00
34	0.00	0.00	0.00	335.80	359.21	183.19	0.00	0.00
35	0.00	0.00	0.00	164.06	203.53	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Details for bearing: B2

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 150
Bearing inner diameter	d	150.000 mm
Bearing outer diameter	D	225.000 mm
Bearing width	B	53.000 mm
Bearing width inner ring	Bi	52.000 mm
Bearing width outer ring	Be	44.000 mm
Number of rolling elements	Z	23
Roller diameter	Dw	20.625 mm
Pitch diameter	Dpw	185.797 mm
Length of Roller	Lwe	35.000 mm
Nominal contact angle	α	12.592 °
Center of contact cone		right
Distance to centre of pressure	a	45.219 mm
Distance bearing center to row center	δRC	-2.0325 mm
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal axial clearance	Pa	0.0000 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	1500.0 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	-98.4847 μm
Displacement Y	uy	3.6389 μm
Displacement Z	uz	3.9672 μm
Rotation around Y	ry	-0.3423 mrad
Rotation around Z	rz	-0.1282 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOMax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s

Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³
Oil temperature	θOil	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	v(θ)	51.794 mm ² /s
Operating oil density	ρ(θ)	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	23
Roller diameter	Dw	20.625 mm
Pitch diameter	Dpw	185.797 mm
Length of Roller	Lwe	35.000 mm
Nominal contact angle	α	12.592 °
Nominal axial clearance	Pa	0.0000 mm
Change of clearance	ΔPd	0.0000 mm
Effective axial clearance	Paeff	0.0000 mm
Distance between rolling elements	δRE	4.6743 mm
Shoulder diameter inner ring	dSi	184.274 mm

Forces and displacement

Axial force	Fx	-37.1611 kN
Radial force Y	Fy	6.8164 kN
Radial force Z	Fz	54.086 kN
Displacement X	ux	-98.4847 μm
Displacement Y	uy	3.6389 μm
Displacement Z	uz	3.9672 μm
Moment Y	My	-1122.8867 Nm
Moment Z	Mz	79.479 Nm
Rotation around Y	ry	-0.3423 mrad
Rotation around Z	rz	-0.1282 mrad
Maximal pressure inner race	pmax_i	1450.0 MPa
Maximal pressure outer race	pmax_e	1296.6 MPa
Maximal pressure	pmax	1450.0 MPa
Static safety factor	SF	7.6096

Life

Dynamic load capacity	Cr	395.757 kN
Static load capacity	C0r	638.539 kN
Fatigue load limit	Cur	63.538 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	6.07623
Contamination factor	eC	0.713837
Life modification factor	aISO	5.00781
Reference load	Pref	60056.9 N
Basic reference rating life	L10r	536.479
Basic reference rating life	L10rh	5960.9 h
Modified reference rating life	Lnmr	2686.58
Modified reference rating life	Lnmrh	29850.9 h

Life according ISO 281

Dynamic radial load factor	X	0.4
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MESYS Shaft and Rolling bearing calculation

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Dynamic axial load factor	Y	1.79072
Dynamic equivalent load	P	88350.6 N
Basic life	L10	148.16
Basic life	L10h	1646.2 h
Modified life	Ln _m	873.401
Modified life	Ln _m h	9704.5 h

Thermal permissible speed

Factor for load independent losses	f _{0r}	3
Factor for load dependent losses	f _{1r}	0.0004
Surface for heat transfer	A _r	62439.2 mm ²
Thermal transmission coefficient	k _q	296.718 W/m ² ·K
Load for reference speed	P _{1r}	31927.0 N
Viscosity at reference conditions	ν _r	12.000 mm ² /s
Load independent friction moment	M _{0r}	1.6933 Nm
Load dependent friction moment	M _{1r}	2.3728 Nm
Thermal reference speed	n _{tr}	2175.5 rpm
Factor for load independent losses	f ₀	3
Factor for load dependent losses	f ₁	0.0004
Load for permissible speed	P ₁	133090 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M ₀	2.1739 Nm
Load dependent friction moment	M ₁	9.8911 Nm
Thermal permissible speed	n _t	733.192 rpm
Friction moments and temperature increase for current speed (n=1500)		
Load independent friction moment for current speed	M _{0_n}	3.5033 Nm
Load dependent friction moment for current speed	M _{1_n}	9.8911 Nm
Total friction moment for current speed	M _{_n}	13.394 Nm
Temperature difference for current speed	Δθ _{_n}	113.564 °C

Subsurface stresses

Maximal shear stress for inner race	τ _{max_i}	435.655 MPa
Depth for maximal shear stress inner race	h(τ _{max_i})	0.1842 mm
Shear yield stress for core inner race	τ _{Yield_i}	510.000 MPa
Shear fatigue limit for core inner race	τ _{a_i}	306.000 MPa
Shear stress at core inner race	τ _{_i}	306.000 MPa
Maximal shear stress for outer race	τ _{max_e}	389.342 MPa
Depth for maximal shear stress outer race	h(τ _{max_e})	0.2049 mm
Shear yield stress for core outer race	τ _{Yield_e}	510.000 MPa
Shear fatigue limit for core outer race	τ _{a_e}	306.000 MPa
Shear stress at core outer race	τ _{_e}	306.000 MPa
Required hardness depth inner race	h _{dmin_i}	0.4694 mm
Required hardness depth outer race	h _{dmin_e}	0.4390 mm

Damage Frequencies

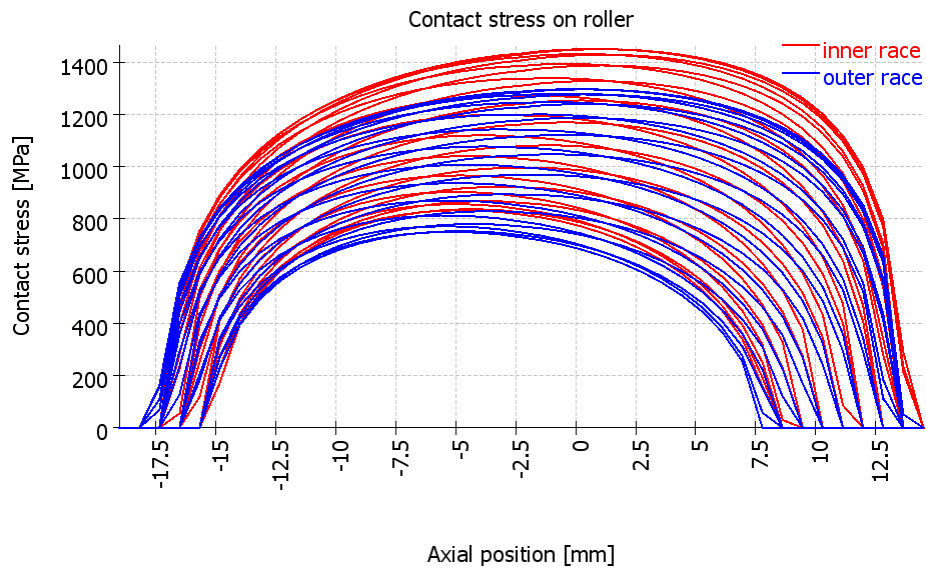
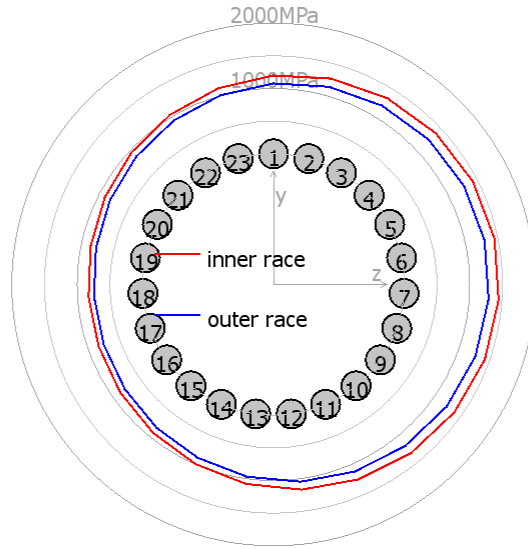
Speed of inner ring	n _i	25.00 1/s	(1500rpm)
Speed of outer ring	n _e	0.00 1/s	(0rpm)
Rotation speed of cage	f _c	11.15 1/s	(669rpm)
Damage frequency for inner race	f _{ip}	318.65 1/s	(19119rpm)
Damage frequency for outer race	f _{ep}	-256.35 1/s	(-15381rpm)
Damage frequency for rolling element	f _{rp}	-222.56 1/s	(-13354rpm)

Bearing stiffness matrix

MESYS Shaft and Rolling bearing calculation

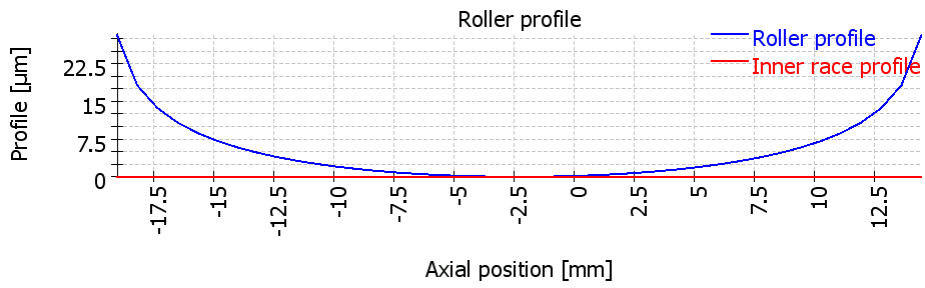
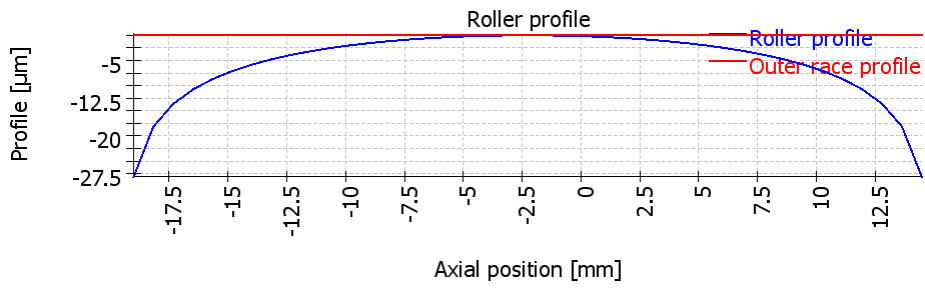
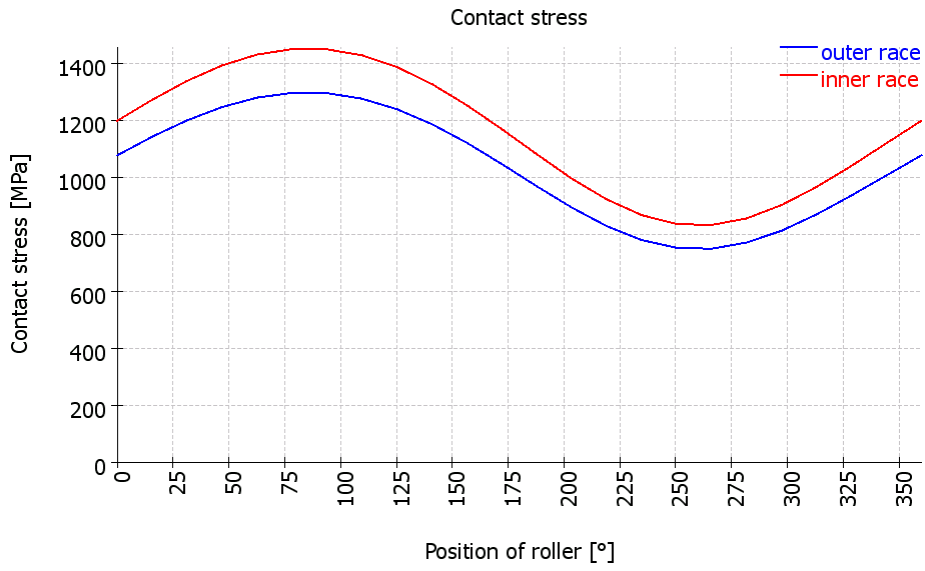
Change this text in mesys.ini

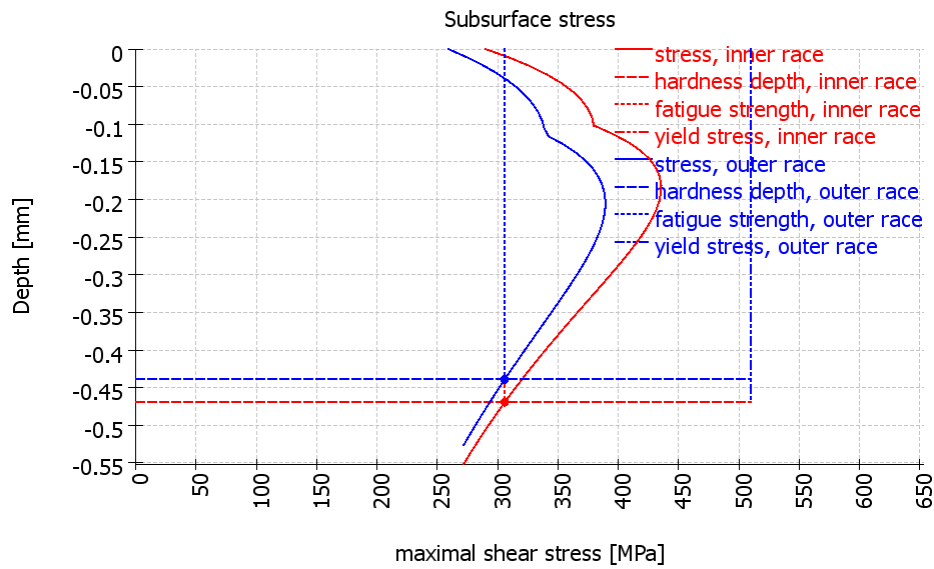
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	519.680	-27.831	-224.959	5248.440	-56.326
Fy [N]	-27.920	5274.086	-11.278	81.401	96598.994
Fz [N]	-224.015	-11.572	5145.309	-93548.732	-95.333
My [Nm]	5.315	0.092	-94.354	2065.753	1.128
Mz [Nm]	-0.054	97.450	-0.082	0.704	2144.817



MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini





Result table for bearing 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	7768.83	1693.95	-7581.9	-0	136.192	339.022
2	15.6522	9114.67	1986.96	-8565.59	-2399.97	163.786	397.753
3	31.3043	10363.3	2258.64	-8641.71	-5255.14	190.263	452.24
4	46.9565	11410.6	2486.36	-7601.19	-8138.89	213.369	497.944
5	62.6087	12135.7	2643.86	-5449.11	-10516.3	230.153	529.588
6	78.2609	12479.8	2718.43	-2478.12	-11925.4	239.276	544.603
7	93.913	12408.3	2702.62	826.445	-12082.2	239.702	541.485
8	109.565	11923.3	2596.9	3897.03	-10965.2	231.225	520.32
9	125.217	11070.8	2411.29	6231.05	-8827.39	214.782	483.117
10	140.87	9928.52	2162.69	7516.73	-6115.31	191.953	433.269
11	156.522	8598.64	1873.28	7697.34	-3343.42	164.64	375.234
12	172.174	7222.51	1573.77	6983.31	-959.833	136.285	315.181
13	187.826	5901.75	1286.26	5706.23	784.304	109.091	257.545
14	203.478	4756.37	1036.86	4257.68	1849.37	85.6191	207.562
15	219.13	3856.38	840.857	2919.46	2375.16	67.3433	168.288
16	234.783	3236.62	705.866	1821.57	2580.57	54.8147	141.242
17	250.435	2904.77	633.599	949.327	2671.15	47.8971	126.761
18	266.087	2849.39	621.592	189.766	2774.28	46.1001	124.344
19	281.739	3060.77	667.744	-607.731	2924.56	49.1478	133.568
20	297.391	3538.16	771.895	-1588.57	3065.81	57.0071	154.401
21	313.043	4279.08	933.479	-2850.35	3051.98	69.8723	186.734
22	328.696	5260.2	1147.38	-4386.2	2667.31	87.7303	229.549
23	344.348	6450.54	1406.79	-6061.82	1698.44	110.235	281.494

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	profile_i [μm]	profile_e [μm]	aISO
1	-19.003	0.854	28.15	0.00	0.00	0.00
2	-18.166	0.854	18.18	0.00	0.00	0.00
3	-17.329	0.854	13.68	0.00	0.00	50.00
4	-16.492	0.854	10.80	0.00	0.00	50.00
5	-15.655	0.854	8.72	0.00	0.00	50.00
6	-14.818	0.854	7.11	0.00	0.00	50.00
7	-13.981	0.854	5.83	0.00	0.00	27.46
8	-13.144	0.854	4.77	0.00	0.00	17.20
9	-12.307	0.854	3.89	0.00	0.00	12.49
10	-11.470	0.854	3.15	0.00	0.00	9.90
11	-10.633	0.854	2.52	0.00	0.00	8.30
12	-9.796	0.854	1.99	0.00	0.00	7.23
13	-8.959	0.854	1.53	0.00	0.00	6.48
14	-8.122	0.854	1.15	0.00	0.00	5.93
15	-7.285	0.854	0.83	0.00	0.00	5.51
16	-6.449	0.854	0.57	0.00	0.00	5.19
17	-5.612	0.854	0.36	0.00	0.00	4.95
18	-4.775	0.854	0.20	0.00	0.00	4.76
19	-3.938	0.854	0.09	0.00	0.00	4.62
20	-3.101	0.854	0.02	0.00	0.00	4.52
21	-2.264	0.854	0.00	0.00	0.00	4.47
22	-1.427	0.854	0.02	0.00	0.00	4.39
23	-0.590	0.854	0.09	0.00	0.00	4.36
24	0.247	0.854	0.20	0.00	0.00	4.36
25	1.084	0.854	0.36	0.00	0.00	4.39
26	1.921	0.854	0.57	0.00	0.00	4.45
27	2.758	0.854	0.83	0.00	0.00	4.55
28	3.595	0.854	1.15	0.00	0.00	4.69
29	4.432	0.854	1.53	0.00	0.00	4.88
30	5.269	0.854	1.99	0.00	0.00	5.13
31	6.106	0.854	2.52	0.00	0.00	5.48
32	6.943	0.854	3.15	0.00	0.00	5.96
33	7.780	0.854	3.89	0.00	0.00	6.65
34	8.617	0.854	4.77	0.00	0.00	7.69
35	9.454	0.854	5.83	0.00	0.00	9.38
36	10.291	0.854	7.11	0.00	0.00	12.49
37	11.128	0.854	8.72	0.00	0.00	19.62
38	11.965	0.854	10.80	0.00	0.00	45.14
39	12.802	0.854	13.68	0.00	0.00	50.00
40	13.639	0.854	18.18	0.00	0.00	50.00
41	14.476	0.854	28.15	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pi in MPa on inner race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	360.57	448.45	505.53	535.29	539.08	518.30	471.51	395.44	280.47	55.12	0.00	0.00	0.00	0.00	0.00
5	612.71	676.64	722.12	748.09	754.12	740.99	708.53	656.94	586.75	498.89	388.21	251.56	0.00	0.00	0.00
6	757.01	814.69	857.24	882.94	890.94	881.66	855.15	812.04	753.67	682.39	597.88	506.43	409.95	312.04	227.10
7	856.73	912.13	954.02	980.43	990.26	983.70	960.83	922.40	869.89	805.83	730.91	651.65	571.32	495.20	435.19
8	931.14	985.90	1028.08	1055.61	1067.19	1062.83	1042.60	1007.26	958.30	898.22	828.15	754.35	680.28	611.07	556.71
9	989.06	1044.01	1087.00	1115.87	1129.16	1126.71	1108.57	1075.49	1028.90	971.26	903.92	832.91	761.70	695.27	642.63
10	1035.30	1090.94	1135.06	1165.40	1180.37	1179.64	1163.26	1131.92	1087.03	1030.94	965.19	895.58	825.61	760.17	707.66
11	1072.77	1129.44	1174.88	1206.78	1223.41	1224.29	1209.44	1179.53	1135.88	1080.79	1015.92	946.90	877.23	811.80	758.61
12	1103.36	1161.30	1208.22	1241.74	1260.01	1262.42	1248.94	1220.22	1177.51	1123.04	1058.58	989.62	919.67	853.64	799.26
13	1128.36	1187.74	1236.26	1271.46	1291.37	1295.23	1283.01	1255.31	1213.33	1159.20	1094.83	1025.53	954.89	887.85	831.96
14	1148.67	1209.66	1259.87	1296.78	1318.33	1323.60	1312.56	1285.75	1244.32	1190.33	1125.78	1055.89	984.26	915.89	858.25
15	1164.96	1227.67	1279.65	1318.33	1341.51	1348.17	1338.23	1312.21	1271.20	1217.19	1152.27	1081.55	1008.70	938.77	879.17
16	1177.70	1242.25	1296.08	1336.56	1361.37	1369.39	1360.50	1335.20	1294.50	1240.34	1174.88	1103.17	1028.89	957.21	895.47
17	1187.23	1253.73	1309.49	1351.80	1378.27	1387.62	1379.74	1355.08	1314.61	1260.18	1194.06	1121.19	1045.33	971.72	907.69
18	1193.83	1262.37	1320.12	1364.31	1392.43	1403.12	1396.21	1372.14	1331.81	1277.02	1210.12	1135.97	1058.37	982.66	916.19
19	1197.63	1268.33	1328.14	1374.25	1404.05	1416.05	1410.09	1386.56	1346.32	1291.08	1223.29	1147.72	1068.25	990.30	921.23
20	1198.72	1271.67	1333.62	1381.70	1413.19	1426.51	1421.47	1398.44	1358.22	1302.46	1233.69	1156.60	1075.11	994.76	922.94
21	1195.83	1271.05	1335.14	1385.18	1418.35	1432.97	1428.84	1406.30	1366.09	1309.81	1240.03	1161.39	1077.85	995.04	920.38
22	1194.33	1272.21	1338.74	1390.96	1425.96	1441.94	1438.69	1416.53	1376.15	1319.07	1247.96	1167.39	1081.37	995.63	917.69
23	1188.81	1269.40	1338.40	1392.82	1429.65	1446.99	1444.62	1422.83	1382.27	1324.38	1251.92	1169.38	1080.81	992.05	910.68
24	1180.53	1263.99	1335.58	1392.28	1430.98	1449.69	1448.19	1426.75	1385.95	1327.19	1253.27	1168.61	1077.31	985.31	900.24
25	1169.38	1255.90	1330.22	1389.29	1429.93	1450.04	1449.41	1428.29	1387.20	1327.47	1251.97	1165.03	1070.80	975.28	886.18
26	1155.18	1244.98	1322.19	1383.75	1426.38	1447.93	1448.17	1427.34	1385.90	1325.11	1247.89	1158.50	1061.07	961.71	868.20
27	1137.62	1230.98	1311.28	1375.46	1420.19	1443.21	1444.33	1423.75	1381.89	1319.93	1240.83	1148.76	1047.85	944.27	845.82
28	1116.33	1213.57	1297.20	1364.16	1411.08	1435.64	1437.65	1417.29	1374.94	1311.67	1230.51	1135.49	1030.74	922.43	818.40
29	1090.73	1192.29	1279.54	1349.50	1398.75	1424.90	1427.81	1407.64	1364.70	1299.97	1216.52	1118.24	1009.18	895.52	785.03
30	1060.11	1166.51	1257.76	1330.98	1382.72	1410.56	1414.39	1394.37	1350.73	1284.36	1198.33	1096.37	982.42	862.55	744.39
31	1023.40	1135.37	1231.12	1307.93	1362.38	1392.02	1396.80	1376.88	1332.40	1264.15	1175.18	1069.01	949.37	822.12	694.51
32	979.12	1097.66	1198.57	1279.42	1336.87	1368.47	1374.24	1354.35	1308.87	1238.42	1146.02	1034.92	908.50	772.14	632.28
33	925.06	1051.62	1158.63	1244.14	1304.98	1338.74	1345.57	1325.63	1278.90	1205.83	1109.35	992.28	857.46	709.30	552.27
34	857.72	994.55	1109.07	1200.14	1264.92	1301.15	1309.11	1289.01	1240.71	1164.43	1062.90	938.33	792.55	627.92	443.48
35	771.11	922.08	1046.35	1144.38	1213.95	1253.08	1262.31	1241.89	1191.54	1111.13	1003.05	868.50	707.27	516.64	273.79
36	653.55	826.40	964.45	1071.80	1147.55	1190.30	1201.00	1180.00	1126.81	1040.78	923.61	774.55	588.58	344.68	0.00
37	475.78	691.21	851.75	973.01	1057.51	1105.18	1117.73	1095.70	1038.25	943.82	812.50	638.84	400.94	0.00	0.00
38	0.00	470.02	680.60	827.42	926.53	981.93	997.12	973.06	908.26	799.00	640.44	407.69	0.00	0.00	0.00
39	0.00	0.00	340.14	571.30	706.03	778.02	798.23	769.17	687.09	539.16	279.08	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	234.39	290.32	215.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pi in MPa on inner race for rollers 16 to 23 row 1

Section	16	17	18	19	20	21	22	23
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	225.53
5	0.00	0.00	0.00	0.00	118.30	299.57	426.88	530.49
6	171.07	171.31	229.02	315.03	412.98	509.43	601.72	685.83
7	399.01	394.58	423.77	479.25	552.85	632.53	713.35	789.93
8	523.05	515.84	537.01	582.28	646.00	718.02	793.28	866.22
9	608.96	599.36	615.88	655.49	713.69	781.41	853.65	924.77
10	673.06	661.24	674.39	710.23	764.90	830.00	900.56	970.90
11	722.61	708.66	719.08	752.15	804.38	867.85	937.57	1007.79
12	761.59	745.54	753.61	784.49	834.98	897.47	966.90	1037.46
13	792.43	774.29	780.23	809.33	858.54	920.49	990.05	1061.28
14	816.69	796.45	800.43	828.00	876.28	938.05	1008.04	1080.21
15	835.46	813.10	815.21	841.46	889.07	950.93	1021.62	1094.94
16	849.49	824.97	825.27	850.35	897.51	959.69	1031.29	1105.97
17	859.32	832.59	831.11	855.15	902.03	964.74	1037.46	1113.66
18	865.31	836.30	833.07	856.15	902.93	966.34	1040.37	1118.27
19	867.71	836.34	831.34	853.55	900.37	964.68	1040.19	1119.95
20	866.63	832.80	826.01	847.42	894.43	959.81	1037.01	1118.79
21	861.18	824.80	816.20	836.85	884.13	950.71	1029.69	1113.59
22	855.20	816.01	805.49	825.50	873.40	941.61	1022.86	1109.34
23	844.74	802.57	790.06	809.47	858.09	928.10	1011.79	1100.99
24	830.56	785.17	770.55	789.40	838.97	911.08	997.48	1089.66
25	812.41	763.48	746.58	764.96	815.73	890.27	979.76	1075.22
26	789.87	737.00	717.60	735.57	787.87	865.30	958.31	1057.43
27	762.36	704.99	682.78	700.43	754.70	835.60	932.68	1035.92
28	729.01	666.38	640.90	658.36	715.23	800.38	902.26	1010.22
29	688.61	619.57	590.13	607.60	667.98	758.51	866.20	979.64
30	639.31	562.07	527.52	545.33	610.70	708.33	823.26	943.25
31	578.18	489.61	447.75	466.54	539.67	647.28	771.66	899.73
32	500.11	393.67	339.15	360.64	447.88	571.10	708.63	847.14
33	394.50	250.52	157.59	191.93	318.40	471.58	629.56	782.42
34	228.49	0.00	0.00	0.00	29.71	328.26	525.66	700.51
35	0.00	0.00	0.00	0.00	0.00	0.00	375.49	591.74
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	432.78
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.20
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	68.23	154.34	163.75	108.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	398.37	472.42	521.78	549.33	555.91	540.72	503.86	444.41	358.91	234.22	0.00	0.00	0.00	0.00	0.00
5	597.56	655.54	696.90	721.58	729.33	719.37	692.13	648.18	588.04	511.67	422.15	314.46	181.54	0.00	0.00
6	717.08	770.14	809.24	833.62	842.70	835.71	813.04	775.44	724.01	659.87	587.33	506.47	422.77	343.31	273.34
7	800.59	851.75	890.34	915.22	925.67	920.88	901.15	867.26	820.43	762.14	696.66	624.95	552.76	486.88	432.05
8	863.04	913.63	952.50	978.26	990.06	987.10	969.57	938.19	894.25	839.35	777.60	710.28	642.98	581.95	531.46
9	911.57	962.29	1001.87	1028.71	1041.88	1040.53	1024.77	995.26	953.30	900.55	840.94	775.96	710.98	651.93	602.88
10	950.14	1001.43	1041.98	1070.03	1084.56	1084.70	1070.44	1042.40	1001.86	950.54	892.19	828.42	764.49	706.05	657.17
11	981.18	1033.33	1075.04	1104.38	1120.27	1121.80	1108.87	1082.04	1042.57	992.21	934.55	871.32	807.66	749.08	699.68
12	1006.28	1059.50	1102.51	1133.21	1150.46	1153.32	1141.59	1115.77	1077.12	1027.39	970.05	906.90	843.01	783.80	733.44
13	1026.52	1080.99	1125.40	1157.52	1176.12	1180.27	1169.65	1144.71	1106.69	1057.35	1000.04	936.66	872.20	812.01	760.40
14	1042.68	1098.53	1144.43	1178.01	1197.98	1203.38	1193.80	1169.63	1132.09	1082.97	1025.49	961.62	896.33	834.91	781.81
15	1055.32	1112.67	1160.13	1195.22	1216.56	1223.18	1214.59	1191.11	1153.94	1104.90	1047.08	982.53	916.19	853.33	798.57
16	1064.84	1123.79	1172.90	1209.52	1232.26	1240.08	1232.43	1209.57	1172.68	1123.59	1065.30	999.92	932.35	867.89	811.29
17	1071.55	1132.20	1183.01	1221.21	1245.35	1254.37	1247.62	1225.32	1188.64	1139.41	1080.52	1014.17	945.23	879.00	820.43
18	1075.64	1138.09	1190.67	1230.50	1256.05	1266.26	1260.39	1238.60	1202.06	1152.60	1093.01	1025.57	955.12	886.98	826.29
19	1077.25	1141.60	1196.03	1237.52	1264.50	1275.90	1270.89	1249.57	1213.11	1163.34	1102.96	1034.31	962.23	892.04	829.08
20	1076.45	1142.79	1199.13	1242.32	1270.76	1283.34	1279.17	1258.30	1221.86	1171.72	1110.47	1040.50	966.66	894.27	828.90
21	1072.06	1140.43	1198.69	1243.59	1273.47	1287.24	1283.89	1263.45	1227.03	1176.50	1114.36	1043.05	967.40	892.77	824.89
22	1068.92	1139.66	1200.12	1246.94	1278.40	1293.39	1290.86	1270.75	1234.18	1183.03	1119.71	1046.71	968.86	891.55	820.75
23	1062.16	1135.32	1198.02	1246.76	1279.81	1296.04	1294.31	1274.53	1237.81	1186.03	1121.49	1046.76	966.65	886.56	812.71
24	1052.89	1128.63	1193.68	1244.43	1279.10	1296.59	1295.66	1276.19	1239.26	1186.78	1120.94	1044.34	961.79	878.72	801.54
25	1041.01	1119.52	1187.04	1239.88	1276.25	1295.01	1294.89	1275.70	1238.51	1185.25	1117.99	1039.38	954.20	867.88	787.07
26	1026.33	1107.81	1177.98	1233.02	1271.14	1291.22	1291.91	1272.97	1235.47	1181.33	1112.53	1031.73	943.68	853.81	768.98
27	1008.57	1093.29	1166.29	1223.66	1263.62	1285.06	1286.56	1267.84	1229.97	1174.86	1104.37	1021.18	929.97	836.16	746.83
28	987.35	1075.64	1151.69	1211.56	1253.45	1276.31	1278.64	1260.12	1221.79	1165.59	1093.23	1007.39	912.69	814.46	719.98
29	962.15	1054.42	1133.82	1196.37	1240.33	1264.67	1267.84	1249.48	1210.62	1153.19	1078.75	989.95	891.30	788.04	687.55
30	932.26	1029.03	1112.15	1177.63	1223.82	1249.73	1253.76	1235.52	1196.03	1137.19	1060.40	968.25	865.09	755.96	648.24
31	896.68	998.66	1085.98	1154.72	1203.34	1230.94	1235.87	1217.70	1177.45	1116.97	1037.49	941.47	833.03	716.85	600.09
32	853.98	962.16	1054.34	1126.77	1178.08	1207.52	1213.39	1195.24	1154.05	1091.66	1009.02	908.44	793.64	668.65	539.93
33	801.98	917.82	1015.80	1092.52	1146.91	1178.39	1185.27	1167.06	1124.71	1060.00	973.57	867.42	744.65	608.08	462.06
34	737.24	863.07	968.25	1050.13	1108.14	1141.96	1149.93	1131.55	1087.73	1020.14	928.99	815.76	682.41	529.25	353.98
35	653.72	793.61	908.29	996.71	1059.15	1095.77	1104.97	1086.26	1040.49	969.15	871.82	749.00	600.42	419.83	169.48
36	539.13	701.65	830.07	927.39	995.63	1035.77	1046.43	1027.13	978.64	902.12	796.05	658.98	484.96	240.48	0.00
37	359.37	570.28	722.04	833.01	909.64	954.65	967.16	946.82	894.18	809.72	689.74	527.47	293.90	0.00	0.00
38	0.00	345.47	555.52	692.91	784.08	836.97	852.22	829.80	769.79	670.80	522.59	291.38	0.00	0.00	0.00
39	0.00	0.00	185.41	437.93	568.55	639.60	660.37	632.57	554.02	412.74	112.95	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	51.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 16 to 23 row 1

Section	16	17	18	19	20	21	22	23
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	126.27	293.00
5	0.00	0.00	0.00	0.00	204.07	331.95	436.10	523.69
6	229.44	227.25	266.86	334.42	413.32	497.27	578.10	651.85
7	398.57	393.42	417.27	465.30	527.71	599.00	671.03	739.03
8	499.84	492.45	510.25	550.36	605.32	670.39	737.98	803.14
9	571.25	561.82	575.86	611.31	661.93	723.40	788.52	852.28
10	624.77	613.42	624.63	656.88	704.66	763.89	827.63	890.83
11	666.10	652.86	661.75	691.59	737.39	795.20	858.25	921.42
12	698.44	683.34	690.19	718.11	762.48	819.42	882.24	945.78
13	723.78	706.82	711.81	738.13	781.45	837.91	900.87	965.05
14	743.44	724.60	727.85	752.80	795.36	851.64	914.99	980.06
15	758.32	737.56	739.16	762.91	804.93	861.26	925.24	991.39
16	769.06	746.34	746.32	769.01	810.66	867.25	932.06	999.46
17	776.09	751.36	749.76	771.47	812.92	869.96	935.77	1004.57
18	779.72	752.92	749.73	770.56	811.94	869.60	936.59	1006.95
19	780.16	751.19	746.40	766.42	807.87	866.31	934.65	1006.73
20	777.48	746.26	739.84	759.10	800.75	860.15	930.01	1003.95
21	770.88	737.31	729.23	747.77	789.70	850.17	921.66	997.55
22	763.78	727.59	717.76	735.69	778.20	840.14	913.71	991.99
23	752.60	713.64	701.98	719.32	762.53	826.11	901.91	982.71
24	738.03	696.05	682.43	699.23	743.34	808.84	887.16	970.73
25	719.79	674.49	658.74	675.06	720.32	788.08	869.26	955.89
26	697.50	648.46	630.34	646.25	692.99	763.45	847.91	937.98
27	670.56	617.21	596.41	612.00	660.64	734.37	822.68	916.63
28	638.14	579.67	555.72	571.10	622.28	700.09	792.96	891.39
29	599.02	534.23	506.38	521.74	576.42	659.46	757.93	861.60
30	551.33	478.28	445.23	460.92	520.71	610.83	716.36	826.36
31	492.05	407.15	366.27	383.02	451.12	551.53	666.48	784.40
32	415.66	310.74	254.60	274.69	359.54	476.98	605.48	733.77
33	309.65	152.52	0.00	58.06	222.58	377.75	528.48	671.47
34	120.31	0.00	0.00	0.00	0.00	225.52	425.71	592.27
35	0.00	0.00	0.00	0.00	0.00	0.00	269.40	485.81
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	324.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Details for bearing: B3

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 200
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	280.000 mm
Bearing width	B	56.000 mm
Bearing width inner ring	Bi	55.000 mm
Bearing width outer ring	Be	46.000 mm
Number of rolling elements	Z	28
Roller diameter	Dw	22.000 mm
Pitch diameter	Dpw	238.243 mm
Length of Roller	Lwe	37.000 mm
Nominal contact angle	α	12.742 °
Center of contact cone		right
Distance to centre of pressure	a	52.564 mm
Distance bearing center to row center	δRC	-2.3719 mm
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal axial clearance	Pa	0.0000 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	-450.0000 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	86.331 μm
Displacement Y	uy	-20.7458 μm
Displacement Z	uz	-40.7937 μm
Rotation around Y	ry	-0.0140 mrad
Rotation around Z	rz	0.0537 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOMax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s

Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³
Oil temperature	θOil	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	v(θ)	51.794 mm ² /s
Operating oil density	ρ(θ)	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	28
Roller diameter	Dw	22.000 mm
Pitch diameter	Dpw	238.243 mm
Length of Roller	Lwe	37.000 mm
Nominal contact angle	α	12.742 °
Nominal axial clearance	Pa	0.0000 mm
Change of clearance	ΔPd	0.0000 mm
Effective axial clearance	Paeff	0.0000 mm
Distance between rolling elements	δRE	4.6748 mm
Shoulder diameter inner ring	dSi	236.824 mm

Forces and displacement

Axial force	Fx	-11.3791 kN
Radial force Y	Fy	-19.7071 kN
Radial force Z	Fz	-40.9963 kN
Displacement X	ux	86.331 μm
Displacement Y	uy	-20.7458 μm
Displacement Z	uz	-40.7937 μm
Moment Y	My	994.376 Nm
Moment Z	Mz	-475.6483 Nm
Rotation around Y	ry	-0.0140 mrad
Rotation around Z	rz	0.0537 mrad
Maximal pressure inner race	pmax_i	1197.8 MPa
Maximal pressure outer race	pmax_e	1096.1 MPa
Maximal pressure	pmax	1197.8 MPa
Static safety factor	SF	11.1512

Life

Dynamic load capacity	Cr	498.826 kN
Static load capacity	C0r	893.991 kN
Fatigue load limit	Cur	82.959 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	2.82974
Contamination factor	eC	0.736598
Life modification factor	aISO	12.2364
Reference load	Pref	40406.1 N
Basic reference rating life	L10r	4348.52
Basic reference rating life	L10rh	161056 h
Modified reference rating life	Lnmr	53210.3
Modified reference rating life	Lnmrh	1.97075e+006 h

Life according ISO 281

Dynamic radial load factor	X	1
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Dynamic axial load factor	Y	0
Dynamic equivalent load	P	45487.0 N
Basic life	L10	2930.03
Basic life	L10h	108520 h
Modified life	Ln _m	146502
Modified life	Ln _m h	5.42599e+006 h

Thermal permissible speed

Factor for load independent losses	f _{0r}	3
Factor for load dependent losses	f _{1r}	0.0004
Surface for heat transfer	A _r	84446.0 mm ²
Thermal transmission coefficient	k _q	267.771 W/m ² ·K
Load for reference speed	P _{1r}	44699.6 N
Viscosity at reference conditions	ν _r	12.000 mm ² /s
Load independent friction moment	M _{0r}	2.8178 Nm
Load dependent friction moment	M _{1r}	4.2598 Nm
Thermal reference speed	n _{tr}	1525.5 rpm
Factor for load independent losses	f ₀	3
Factor for load dependent losses	f ₁	0.0004
Load for permissible speed	P ₁	45487.0 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M ₀	5.8576 Nm
Load dependent friction moment	M ₁	4.3348 Nm
Thermal permissible speed	n _t	1059.3 rpm
Friction moments and temperature increase for current speed (n=450)		
Load independent friction moment for current speed	M _{0_n}	3.3101 Nm
Load dependent friction moment for current speed	M _{1_n}	4.3348 Nm
Total friction moment for current speed	M _{_n}	7.6449 Nm
Temperature difference for current speed	Δθ _{_n}	15.932 °C

Subsurface stresses

Maximal shear stress for inner race	τ _{max_i}	359.830 MPa
Depth for maximal shear stress inner race	h(τ _{max_i})	0.1657 mm
Shear yield stress for core inner race	τ _{Yield_i}	510.000 MPa
Shear fatigue limit for core inner race	τ _{a_i}	306.000 MPa
Shear stress at core inner race	τ _{_i}	306.000 MPa
Maximal shear stress for outer race	τ _{max_e}	329.140 MPa
Depth for maximal shear stress outer race	h(τ _{max_e})	0.1817 mm
Shear yield stress for core outer race	τ _{Yield_e}	510.000 MPa
Shear fatigue limit for core outer race	τ _{a_e}	306.000 MPa
Shear stress at core outer race	τ _{_e}	306.000 MPa
Required hardness depth inner race	h _{dmin_i}	0.3079 mm
Required hardness depth outer race	h _{dmin_e}	0.2744 mm

Damage Frequencies

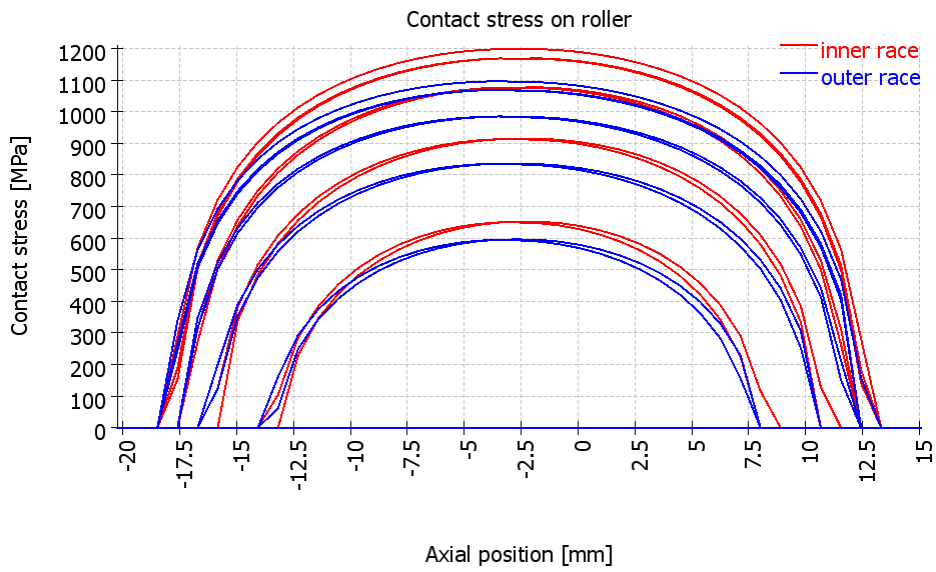
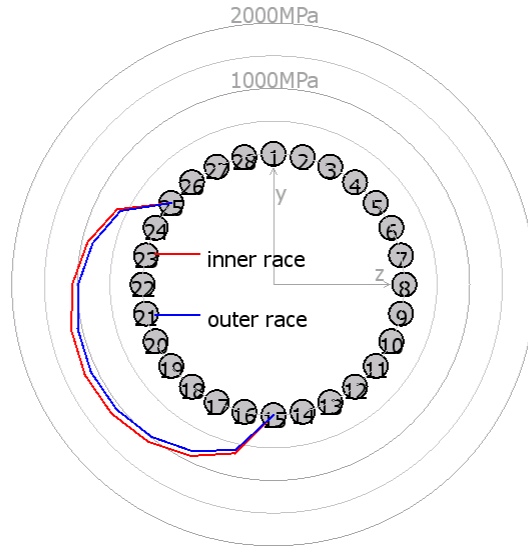
Speed of inner ring	n _i	-7.50 1/s	(-450rpm)
Speed of outer ring	n _e	0.00 1/s	(0rpm)
Rotation speed of cage	f _c	-3.41 1/s	(-205rpm)
Damage frequency for inner race	f _{ip}	-114.46 1/s	(-6867rpm)
Damage frequency for outer race	f _{ep}	95.54 1/s	(5733rpm)
Damage frequency for rolling element	f _{rp}	80.56 1/s	(4834rpm)

Bearing stiffness matrix

MESYS Shaft and Rolling bearing calculation

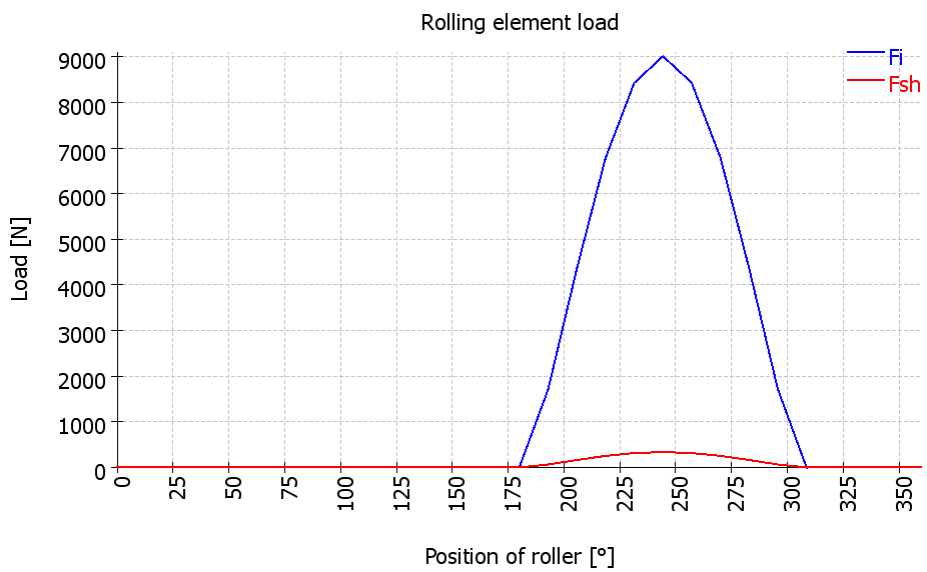
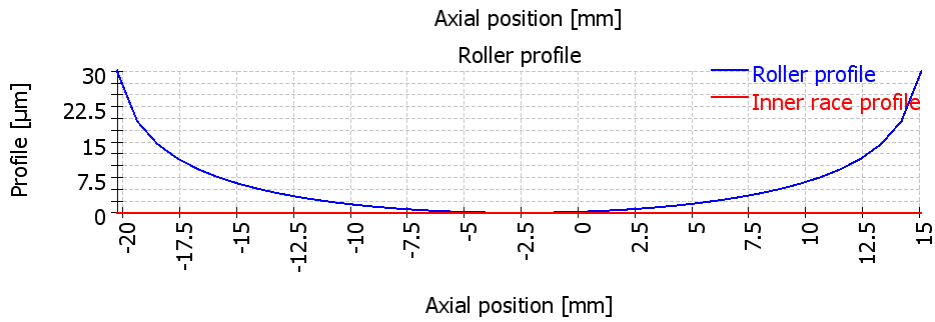
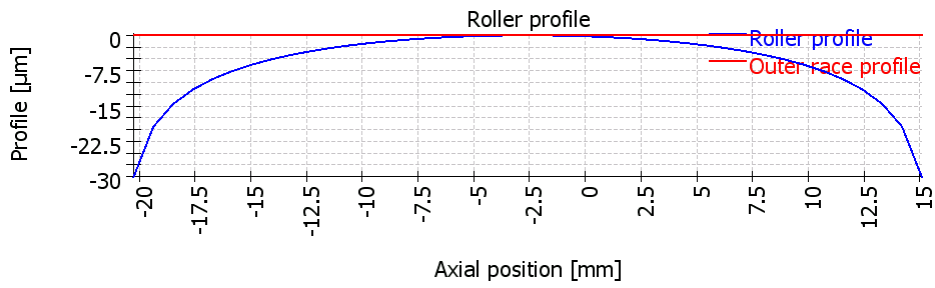
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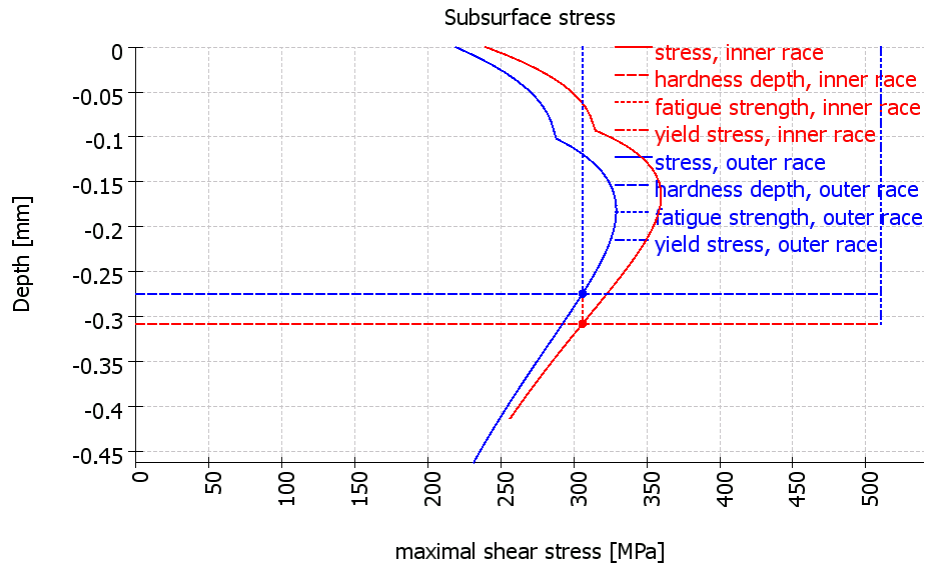
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	199.005	329.428	685.643	-16653.209	7957.250
Fy [N]	329.798	1309.884	797.474	-19333.592	31647.391
Fz [N]	685.039	797.812	2585.988	-62938.544	19342.832
My [Nm]	-16.640	-19.276	-62.851	1710.475	-530.074
Mz [Nm]	7.955	31.622	19.269	-529.889	844.607



MESYS Shaft and Rolling bearing calculation

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Result table for bearing 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	0	-0	-0	-0	0	0
2	12.8571	0	-0	-0	-0	0	0
3	25.7143	0	-0	-0	-0	0	0
4	38.5714	0	-0	-0	-0	0	0
5	51.4286	0	-0	-0	-0	0	0
6	64.2857	0	-0	-0	-0	0	0
7	77.1429	0	-0	-0	-0	0	0
8	90	0	-0	-0	-0	0	0
9	102.857	0	-0	-0	-0	0	0
10	115.714	0	-0	-0	-0	0	0
11	128.571	0	-0	-0	-0	0	0
12	141.429	0	-0	-0	-0	0	0
13	154.286	0	-0	-0	-0	0	0
14	167.143	0	-0	-0	-0	0	0
15	180	0	-0	-0	-0	0	0
16	192.857	1702.11	375.437	1618.57	369.427	39.8716	63.5716
17	205.714	4350.54	959.594	3823.17	1841.14	102.2	162.487
18	218.571	6780.07	1495.45	5170.33	4123.2	159.63	253.227
19	231.429	8427.08	1858.68	5124.8	6426.3	198.79	314.74
20	244.286	9014.55	1988.22	3814.95	7921.82	213.042	336.681
21	257.143	8434.71	1860.29	1830.68	8020.74	199.713	315.025
22	270	6796.98	1499.06	1.21784e-012	6629.61	161.284	253.858
23	282.857	4368.15	963.365	-948.071	4153.77	103.919	163.144
24	295.714	1718.63	379.025	-727.325	1510.31	41.0291	64.1885
25	308.571	0	-0	-0	-0	0	0
26	321.429	0	-0	-0	-0	0	0
27	334.286	0	-0	-0	-0	0	0
28	347.143	0	-0	-0	-0	0	0

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	profile_i [μm]	profile_e [μm]	aISO
1	-20.258	0.902	30.02	0.00	0.00	0.00
2	-19.374	0.902	19.39	0.00	0.00	0.00
3	-18.490	0.902	14.59	0.00	0.00	0.00
4	-17.607	0.902	11.52	0.00	0.00	50.00
5	-16.723	0.902	9.30	0.00	0.00	50.00
6	-15.839	0.902	7.59	0.00	0.00	50.00
7	-14.955	0.902	6.22	0.00	0.00	50.00
8	-14.071	0.902	5.09	0.00	0.00	50.00
9	-13.188	0.902	4.15	0.00	0.00	38.71
10	-12.304	0.902	3.36	0.00	0.00	27.45
11	-11.420	0.902	2.69	0.00	0.00	21.37
12	-10.536	0.902	2.12	0.00	0.00	17.69
13	-9.653	0.902	1.64	0.00	0.00	15.30
14	-8.769	0.902	1.23	0.00	0.00	13.66
15	-7.885	0.902	0.89	0.00	0.00	12.50
16	-7.001	0.902	0.61	0.00	0.00	11.68
17	-6.117	0.902	0.38	0.00	0.00	11.09
18	-5.234	0.902	0.21	0.00	0.00	10.68
19	-4.350	0.902	0.09	0.00	0.00	10.42
20	-3.466	0.902	0.02	0.00	0.00	10.30
21	-2.582	0.902	0.00	0.00	0.00	10.35
22	-1.699	0.902	0.02	0.00	0.00	10.35
23	-0.815	0.902	0.09	0.00	0.00	10.53
24	0.069	0.902	0.21	0.00	0.00	10.85
25	0.953	0.902	0.38	0.00	0.00	11.32
26	1.837	0.902	0.61	0.00	0.00	12.00
27	2.720	0.902	0.89	0.00	0.00	12.94
28	3.604	0.902	1.23	0.00	0.00	14.25
29	4.488	0.902	1.64	0.00	0.00	16.11
30	5.372	0.902	2.12	0.00	0.00	18.85
31	6.256	0.902	2.69	0.00	0.00	23.12
32	7.139	0.902	3.36	0.00	0.00	30.33
33	8.023	0.902	4.15	0.00	0.00	44.11
34	8.907	0.902	5.09	0.00	0.00	50.00
35	9.791	0.902	6.22	0.00	0.00	50.00
36	10.674	0.902	7.59	0.00	0.00	50.00
37	11.558	0.902	9.30	0.00	0.00	50.00
38	12.442	0.902	11.52	0.00	0.00	50.00
39	13.326	0.902	14.59	0.00	0.00	0.00
40	14.210	0.902	19.39	0.00	0.00	0.00
41	15.093	0.902	30.02	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 16 to 28 row 1

Section	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	188.64	287.96	153.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	313.21	517.37	568.46	503.65	270.50	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	124.26	529.28	679.45	721.13	669.28	504.25	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	383.78	658.81	788.41	825.71	780.08	639.57	339.11	0.00	0.00	0.00	0.00	0.00
8	0.00	516.25	750.70	868.93	903.68	861.85	734.81	484.58	0.00	0.00	0.00	0.00	0.00
9	104.73	607.95	820.48	931.44	964.53	925.32	806.99	582.73	0.00	0.00	0.00	0.00	0.00
10	285.91	676.91	875.48	981.39	1013.35	976.07	863.89	655.99	229.25	0.00	0.00	0.00	0.00
11	384.37	730.90	919.80	1022.03	1053.18	1017.40	909.80	713.25	345.81	0.00	0.00	0.00	0.00
12	453.78	774.11	955.96	1055.43	1085.99	1051.41	947.37	759.15	424.20	0.00	0.00	0.00	0.00
13	506.19	809.05	985.62	1082.98	1113.12	1079.54	978.30	796.43	482.63	0.00	0.00	0.00	0.00
14	546.88	837.39	1009.92	1105.67	1135.52	1102.76	1003.79	826.86	527.95	0.00	0.00	0.00	0.00
15	578.74	860.25	1029.69	1124.19	1153.85	1121.80	1024.67	851.64	563.66	0.00	0.00	0.00	0.00
16	603.53	878.41	1045.49	1139.07	1168.62	1137.16	1041.54	871.60	591.82	0.00	0.00	0.00	0.00
17	622.39	892.43	1057.76	1150.68	1180.19	1149.24	1054.84	887.34	613.75	0.00	0.00	0.00	0.00
18	636.08	902.70	1066.81	1159.28	1188.81	1158.31	1064.89	899.28	630.30	0.00	0.00	0.00	0.00
19	645.09	909.51	1072.84	1165.06	1194.67	1164.55	1071.90	907.71	642.04	0.00	0.00	0.00	0.00
20	649.71	912.99	1075.94	1168.10	1197.84	1168.04	1075.98	912.79	649.32	0.00	0.00	0.00	0.00
21	649.40	912.23	1075.01	1167.17	1197.06	1167.57	1076.01	913.61	651.63	0.00	0.00	0.00	0.00
22	647.11	911.36	1074.89	1167.54	1197.73	1168.39	1076.87	914.32	651.98	0.00	0.00	0.00	0.00
23	639.84	906.23	1070.72	1163.93	1194.44	1165.24	1073.68	910.80	647.40	0.00	0.00	0.00	0.00
24	628.09	897.74	1063.63	1157.58	1188.47	1159.35	1067.58	903.95	638.45	0.00	0.00	0.00	0.00
25	611.53	885.73	1053.48	1148.40	1179.73	1150.64	1058.45	893.64	624.84	0.00	0.00	0.00	0.00
26	589.57	869.92	1040.08	1136.21	1168.04	1138.93	1046.10	879.58	606.08	0.00	0.00	0.00	0.00
27	561.35	849.87	1023.10	1120.71	1153.15	1123.94	1030.22	861.40	581.42	0.00	0.00	0.00	0.00
28	525.55	825.00	1002.11	1101.55	1134.69	1105.30	1010.38	838.52	549.72	0.00	0.00	0.00	0.00
29	480.09	794.45	976.50	1078.19	1112.16	1082.49	986.00	810.16	509.25	0.00	0.00	0.00	0.00
30	421.42	757.04	945.42	1049.92	1084.88	1054.81	956.26	775.20	457.16	0.00	0.00	0.00	0.00
31	342.59	710.97	907.69	1015.74	1051.91	1021.28	920.01	731.99	388.28	0.00	0.00	0.00	0.00
32	224.82	653.48	861.59	974.22	1011.91	980.48	875.61	678.01	290.93	0.00	0.00	0.00	0.00
33	0.00	579.89	804.45	923.26	962.90	930.36	820.51	609.08	115.73	0.00	0.00	0.00	0.00
34	0.00	481.19	731.95	859.52	901.81	867.65	750.62	517.47	0.00	0.00	0.00	0.00	0.00
35	0.00	334.47	636.23	777.40	823.53	786.86	658.60	385.23	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	500.03	666.05	718.51	677.53	528.87	127.58	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	263.19	499.34	565.05	514.74	312.36	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	140.79	281.59	182.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 16 to 28 row 1

Section	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	266.65	338.30	243.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	347.47	518.29	563.03	506.28	314.89	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	200.19	522.94	655.40	692.86	646.23	501.69	124.15	0.00	0.00	0.00	0.00	0.00
7	0.00	390.91	632.97	749.02	782.90	741.43	616.23	354.96	0.00	0.00	0.00	0.00	0.00
8	0.00	501.59	711.89	818.52	850.26	812.05	697.93	475.00	0.00	0.00	0.00	0.00	0.00
9	161.28	579.74	772.01	872.48	902.80	866.87	760.08	558.29	63.02	0.00	0.00	0.00	0.00
10	293.48	638.88	819.37	915.50	944.84	910.62	809.08	620.99	249.92	0.00	0.00	0.00	0.00
11	374.69	685.21	857.41	950.35	978.99	946.11	848.52	670.11	343.51	0.00	0.00	0.00	0.00
12	433.18	722.19	888.28	978.80	1006.94	975.14	880.64	709.42	408.92	0.00	0.00	0.00	0.00
13	477.58	751.95	913.42	1002.08	1029.85	998.96	906.91	741.22	458.21	0.00	0.00	0.00	0.00
14	512.02	775.89	933.81	1021.03	1048.55	1018.42	928.35	767.00	496.52	0.00	0.00	0.00	0.00
15	538.81	794.96	950.16	1036.26	1063.63	1034.14	945.69	787.79	526.59	0.00	0.00	0.00	0.00
16	559.41	809.85	962.96	1048.23	1075.50	1046.57	959.46	804.29	550.11	0.00	0.00	0.00	0.00
17	574.76	821.03	972.59	1057.26	1084.50	1056.05	970.02	817.03	568.15	0.00	0.00	0.00	0.00
18	585.50	828.86	979.32	1063.57	1090.85	1062.82	977.65	826.35	581.42	0.00	0.00	0.00	0.00
19	592.05	833.54	983.32	1067.33	1094.69	1067.02	982.54	832.51	590.39	0.00	0.00	0.00	0.00
20	594.63	835.22	984.66	1068.61	1096.10	1068.74	984.77	835.64	595.35	0.00	0.00	0.00	0.00
21	592.71	833.02	982.32	1066.27	1093.90	1066.83	983.32	834.89	595.80	0.00	0.00	0.00	0.00
22	588.97	830.71	980.73	1065.11	1093.02	1066.11	982.61	834.05	594.47	0.00	0.00	0.00	0.00
23	580.65	824.49	975.42	1060.30	1088.52	1061.75	978.21	829.32	588.61	0.00	0.00	0.00	0.00
24	568.16	815.18	967.41	1052.97	1081.55	1054.87	971.11	821.52	578.70	0.00	0.00	0.00	0.00
25	551.17	802.59	956.58	1043.03	1072.02	1045.39	961.23	810.52	564.45	0.00	0.00	0.00	0.00
26	529.08	786.46	942.73	1030.28	1059.76	1033.12	948.35	796.04	545.36	0.00	0.00	0.00	0.00
27	501.02	766.36	925.55	1014.47	1044.52	1017.80	932.18	777.70	520.68	0.00	0.00	0.00	0.00
28	465.65	741.72	904.61	995.22	1025.95	999.08	912.32	754.95	489.27	0.00	0.00	0.00	0.00
29	420.81	711.71	879.33	972.05	1003.58	976.45	888.19	727.02	449.36	0.00	0.00	0.00	0.00
30	362.71	675.14	848.89	944.25	976.74	949.25	859.01	692.83	397.96	0.00	0.00	0.00	0.00
31	283.35	630.25	812.15	910.88	944.54	916.53	823.68	650.74	329.40	0.00	0.00	0.00	0.00
32	156.83	574.25	767.41	870.54	905.68	876.93	780.57	598.23	229.53	0.00	0.00	0.00	0.00
33	0.00	502.29	712.06	821.18	858.24	828.43	727.20	531.05	0.00	0.00	0.00	0.00	0.00
34	0.00	404.57	641.77	759.53	799.23	767.85	659.48	441.00	0.00	0.00	0.00	0.00	0.00
35	0.00	252.89	548.42	679.95	723.57	689.71	569.91	307.29	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	413.19	571.31	621.57	583.30	441.76	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	151.42	404.72	470.05	421.48	212.09	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	157.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Details for bearing: B4

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Taper roller bearing
Manufacturer		Generic
Bearing name		T 2ED 200
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	280.000 mm
Bearing width	B	56.000 mm
Bearing width inner ring	Bi	55.000 mm
Bearing width outer ring	Be	46.000 mm
Number of rolling elements	Z	28
Roller diameter	Dw	22.000 mm
Pitch diameter	Dpw	238.243 mm
Length of Roller	Lwe	37.000 mm
Nominal contact angle	α	12.742 °
Center of contact cone		left
Distance to centre of pressure	a	52.564 mm
Distance bearing center to row center	δRC	-2.3719 mm
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal axial clearance	Pa	0.0000 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	-450.0000 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	84.519 μm
Displacement Y	uy	4.5455 μm
Displacement Z	uz	-11.3989 μm
Rotation around Y	ry	-0.1250 mrad
Rotation around Z	rz	0.0823 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOMax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s

Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³
Oil temperature	θOil	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	v(θ)	51.794 mm ² /s
Operating oil density	ρ(θ)	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	28
Roller diameter	Dw	22.000 mm
Pitch diameter	Dpw	238.243 mm
Length of Roller	Lwe	37.000 mm
Nominal contact angle	α	12.742 °
Nominal axial clearance	Pa	0.0000 mm
Change of clearance	ΔPd	0.0000 mm
Effective axial clearance	Paeff	0.0000 mm
Distance between rolling elements	δRE	4.6748 mm
Shoulder diameter inner ring	dSi	236.824 mm

Forces and displacement

Axial force	Fx	40.299 kN
Radial force Y	Fy	15.625 kN
Radial force Z	Fz	-88.4295 kN
Displacement X	ux	84.519 μm
Displacement Y	uy	4.5455 μm
Displacement Z	uz	-11.3989 μm
Moment Y	My	-2208.0647 Nm
Moment Z	Mz	-346.2008 Nm
Rotation around Y	ry	-0.1250 mrad
Rotation around Z	rz	0.0823 mrad
Maximal pressure inner race	pmax_i	1407.7 MPa
Maximal pressure outer race	pmax_e	1284.7 MPa
Maximal pressure	pmax	1407.7 MPa
Static safety factor	SF	8.07415

Life

Dynamic load capacity	Cr	498.826 kN
Static load capacity	C0r	893.991 kN
Fatigue load limit	Cur	82.959 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	2.82974
Contamination factor	eC	0.736598
Life modification factor	aISO	4.16816
Reference load	Pref	76199.1 N
Basic reference rating life	L10r	524.803
Basic reference rating life	L10rh	19437.2 h
Modified reference rating life	Lnmr	2187.46
Modified reference rating life	Lnmrh	81017.2 h

Life according ISO 281

Dynamic radial load factor	X	0.4
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Dynamic axial load factor	Y	1.76894
Dynamic equivalent load	P	107206 N
Basic life	L10	168.175
Basic life	L10h	6228.7 h
Modified life	Ln _m	895.791
Modified life	Ln _m h	33177.5 h

Thermal permissible speed

Factor for load independent losses	f _{0r}	3
Factor for load dependent losses	f _{1r}	0.0004
Surface for heat transfer	A _r	84446.0 mm ²
Thermal transmission coefficient	k _q	267.771 W/m ² ·K
Load for reference speed	P _{1r}	44699.6 N
Viscosity at reference conditions	ν _r	12.000 mm ² /s
Load independent friction moment	M _{0r}	2.8178 Nm
Load dependent friction moment	M _{1r}	4.2598 Nm
Thermal reference speed	n _{tr}	1525.5 rpm
Factor for load independent losses	f ₀	3
Factor for load dependent losses	f ₁	0.0004
Load for permissible speed	P ₁	142573 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M ₀	4.0621 Nm
Load dependent friction moment	M ₁	13.587 Nm
Thermal permissible speed	n _t	611.737 rpm
Friction moments and temperature increase for current speed (n=450)		
Load independent friction moment for current speed	M _{0_n}	3.3101 Nm
Load dependent friction moment for current speed	M _{1_n}	13.587 Nm
Total friction moment for current speed	M _{_n}	16.897 Nm
Temperature difference for current speed	Δθ _{_n}	35.214 °C

Subsurface stresses

Maximal shear stress for inner race	τ _{max_i}	422.873 MPa
Depth for maximal shear stress inner race	h(τ _{max_i})	0.1947 mm
Shear yield stress for core inner race	τ _{Yield_i}	510.000 MPa
Shear fatigue limit for core inner race	τ _{a_i}	306.000 MPa
Shear stress at core inner race	τ _{_i}	306.000 MPa
Maximal shear stress for outer race	τ _{max_e}	385.763 MPa
Depth for maximal shear stress outer race	h(τ _{max_e})	0.2129 mm
Shear yield stress for core outer race	τ _{Yield_e}	510.000 MPa
Shear fatigue limit for core outer race	τ _{a_e}	306.000 MPa
Shear stress at core outer race	τ _{_e}	306.000 MPa
Required hardness depth inner race	h _{dmin_i}	0.4750 mm
Required hardness depth outer race	h _{dmin_e}	0.4493 mm

Damage Frequencies

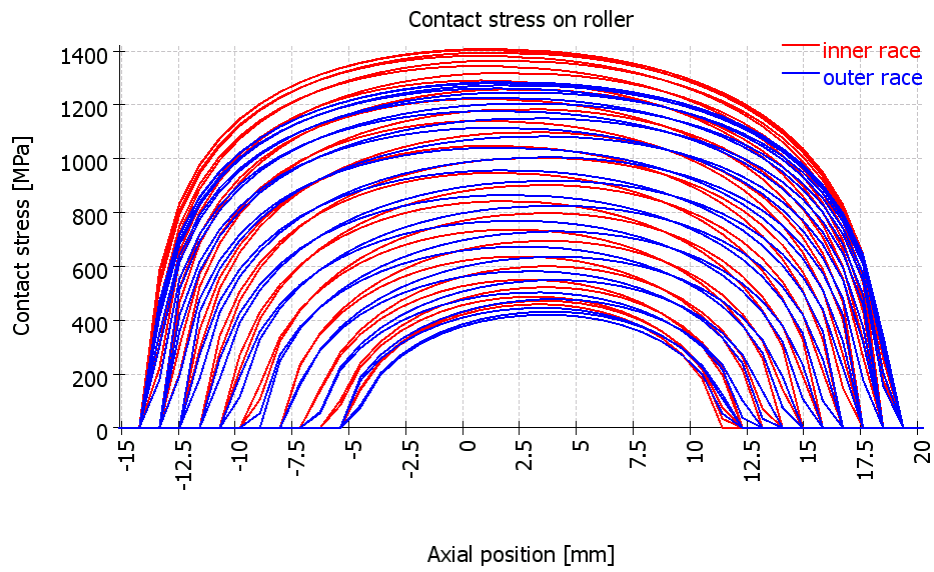
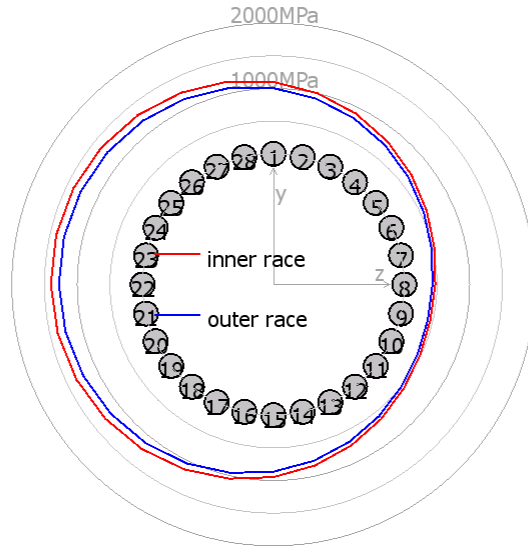
Speed of inner ring	n _i	-7.50 1/s	(-450rpm)
Speed of outer ring	n _e	0.00 1/s	(0rpm)
Rotation speed of cage	f _c	-3.41 1/s	(-205rpm)
Damage frequency for inner race	f _{ip}	-114.46 1/s	(-6867rpm)
Damage frequency for outer race	f _{ep}	95.54 1/s	(5733rpm)
Damage frequency for rolling element	f _{rp}	80.56 1/s	(4834rpm)

Bearing stiffness matrix

MESYS Shaft and Rolling bearing calculation

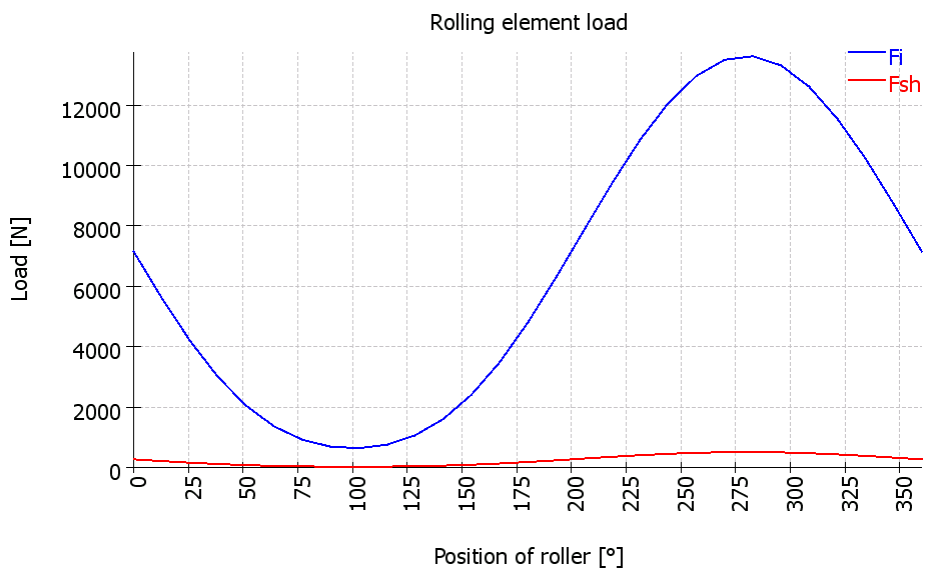
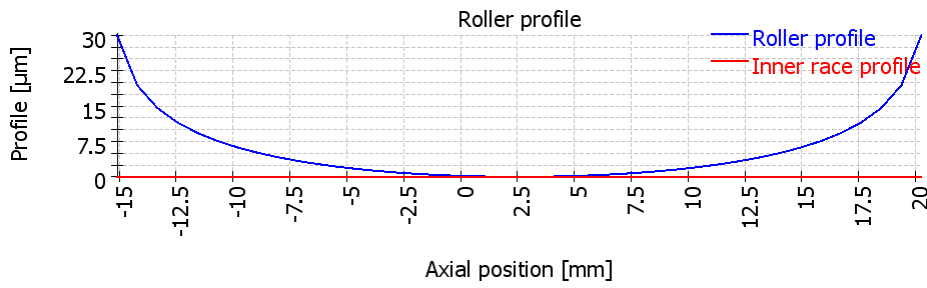
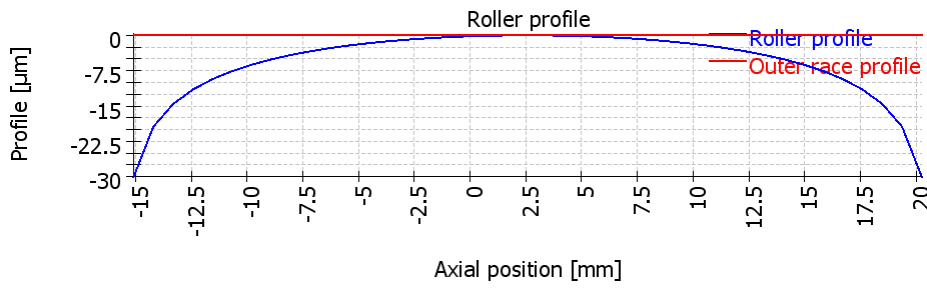
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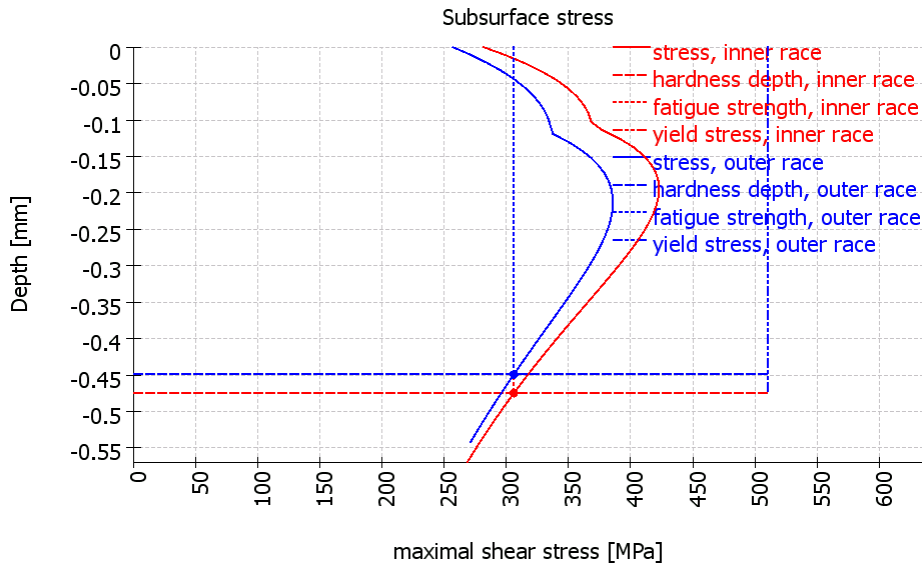
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	604.694	93.147	-510.210	-12880.981	-1801.841
Fy [N]	93.050	6116.302	74.555	1758.353	-148351.390
Fz [N]	-509.921	73.706	5713.053	138071.131	-1758.405
My [Nm]	-12.995	1.774	138.863	3758.114	-45.769
Mz [Nm]	-1.817	-149.202	-1.791	-45.764	4037.719



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Result table for bearing 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	7151.89	-1577.56	-6975.73	-0	167.364	267.113
2	12.8571	5610.59	-1237.67	-5335.18	-1217.72	130.339	209.548
3	25.7143	4198.37	-926.182	-3689.41	-1776.73	96.8278	156.803
4	38.5714	2991.89	-660.05	-2281.52	-1819.45	68.567	111.743
5	51.4286	2040.29	-450.122	-1240.75	-1555.86	46.5511	76.202
6	64.2857	1353.15	-298.528	-572.643	-1189.1	30.8022	50.5382
7	77.1429	914.573	-201.768	-198.497	-869.673	20.8321	34.1581
8	90	688.189	-151.819	-4.11012e-014	-671.234	15.7357	25.7029
9	102.857	637.642	-140.661	138.393	-606.341	14.6808	23.8151
10	115.714	755.074	-166.557	319.544	-663.541	17.5393	28.201
11	128.571	1063.92	-234.666	647.006	-811.32	24.9683	39.736
12	141.429	1604.12	-353.789	1223.27	-975.524	38.0362	59.9117
13	154.286	2407.1	-530.847	2115.32	-1018.69	57.6003	89.9018
14	167.143	3481.23	-767.673	3310.4	-755.578	83.9656	130.019
15	180	4793.83	-1057.05	4675.84	-5.72625e-013	116.295	179.043
16	192.857	6284.83	-1385.73	5976.46	1364.09	153.067	234.73
17	205.714	7863.74	-1733.78	6910.64	3327.99	191.906	293.7
18	218.571	9420.55	-2076.94	7184.06	5729.09	230.131	351.845
19	231.429	10862.7	-2394.86	6606.17	8283.87	265.184	405.709
20	244.286	12077.3	-2662.6	5111.2	10613.5	294.588	451.07
21	257.143	12977.2	-2861.04	2816.64	12340.5	315.92	484.679
22	270	13506.8	-2977.9	2.4201e-012	13174.4	327.833	504.459
23	282.857	13623.6	-3003.8	-2956.93	12955.2	329.524	508.823
24	295.714	13318.7	-2936.75	-5636.52	11704.4	320.881	497.434
25	308.571	12611.1	-2780.92	-7669.31	9617.01	302.452	471.006
26	321.429	11550.2	-2547.18	-8808.02	7024.16	275.496	431.386
27	334.286	10235.5	-2257.42	-8994.81	4331.67	242.731	382.283
28	347.143	8728.7	-1925.25	-8300.28	1894.48	205.581	326.005

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

MESYS Shaft and Rolling bearing calculation

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Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	profile_i [μm]	profile_e [μm]	aISO
1	-15.093	0.902	30.02	0.00	0.00	0.00
2	-14.209	0.902	19.39	0.00	0.00	0.00
3	-13.325	0.902	14.59	0.00	0.00	50.00
4	-12.441	0.902	11.52	0.00	0.00	50.00
5	-11.558	0.902	9.30	0.00	0.00	26.78
6	-10.674	0.902	7.59	0.00	0.00	14.34
7	-9.790	0.902	6.22	0.00	0.00	9.85
8	-8.906	0.902	5.09	0.00	0.00	7.65
9	-8.022	0.902	4.15	0.00	0.00	6.39
10	-7.139	0.902	3.36	0.00	0.00	5.57
11	-6.255	0.902	2.69	0.00	0.00	5.02
12	-5.371	0.902	2.12	0.00	0.00	4.63
13	-4.487	0.902	1.64	0.00	0.00	4.34
14	-3.604	0.902	1.23	0.00	0.00	4.12
15	-2.720	0.902	0.89	0.00	0.00	3.96
16	-1.836	0.902	0.61	0.00	0.00	3.84
17	-0.952	0.902	0.38	0.00	0.00	3.75
18	-0.068	0.902	0.21	0.00	0.00	3.69
19	0.815	0.902	0.09	0.00	0.00	3.66
20	1.699	0.902	0.02	0.00	0.00	3.66
21	2.583	0.902	0.00	0.00	0.00	3.69
22	3.467	0.902	0.02	0.00	0.00	3.70
23	4.350	0.902	0.09	0.00	0.00	3.75
24	5.234	0.902	0.21	0.00	0.00	3.83
25	6.118	0.902	0.38	0.00	0.00	3.94
26	7.002	0.902	0.61	0.00	0.00	4.08
27	7.886	0.902	0.89	0.00	0.00	4.27
28	8.769	0.902	1.23	0.00	0.00	4.52
29	9.653	0.902	1.64	0.00	0.00	4.85
30	10.537	0.902	2.12	0.00	0.00	5.30
31	11.421	0.902	2.69	0.00	0.00	5.91
32	12.304	0.902	3.36	0.00	0.00	6.80
33	13.188	0.902	4.15	0.00	0.00	8.15
34	14.072	0.902	5.09	0.00	0.00	10.41
35	14.956	0.902	6.22	0.00	0.00	14.78
36	15.839	0.902	7.59	0.00	0.00	25.46
37	16.723	0.902	9.30	0.00	0.00	50.00
38	17.607	0.902	11.52	0.00	0.00	50.00
39	18.491	0.902	14.59	0.00	0.00	50.00
40	19.375	0.902	19.39	0.00	0.00	0.00
41	20.258	0.902	30.02	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	291.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	518.55	279.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	342.04
7	652.72	473.65	216.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	271.75	507.46
8	747.76	593.90	404.86	105.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.26	430.49	614.29
9	820.09	680.95	519.29	321.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	336.91	531.98	691.98
10	877.33	748.07	602.20	436.52	230.98	0.00	0.00	0.00	0.00	0.00	0.00	237.03	439.87	605.88	751.53
11	923.69	801.64	666.29	518.12	353.08	145.15	0.00	0.00	0.00	0.00	138.30	348.57	513.32	662.62	798.47
12	961.77	845.25	717.50	580.66	435.45	280.83	102.38	0.00	0.00	84.24	268.68	424.09	569.19	707.35	836.02
13	993.27	881.15	759.17	630.33	497.33	364.32	240.71	147.25	140.52	226.33	347.86	480.31	612.94	743.06	866.23
14	1019.37	910.83	793.38	670.52	545.85	425.23	320.38	250.83	244.57	304.50	404.86	523.73	647.62	771.63	890.45
15	1040.89	935.32	821.52	703.26	584.64	472.12	377.37	316.98	310.22	359.52	448.02	557.69	675.10	794.32	909.63
16	1058.44	955.37	844.54	729.90	615.82	508.96	420.50	364.97	357.53	400.54	481.21	584.20	696.61	812.01	924.46
17	1072.45	971.49	863.11	751.37	640.76	537.99	453.72	401.05	392.85	431.55	506.59	604.52	712.99	825.31	935.40
18	1083.23	984.07	877.72	768.28	660.34	560.58	479.15	428.20	419.19	454.67	525.48	619.47	724.82	834.64	942.80
19	1091.01	993.37	888.68	781.07	675.17	577.59	498.07	448.09	438.21	471.18	538.70	629.60	732.48	840.29	946.89
20	1095.88	999.54	896.20	790.01	685.63	589.58	511.26	461.69	450.88	481.81	546.77	635.25	736.20	842.41	947.78
21	1096.73	1001.56	899.40	794.40	691.19	596.22	518.59	469.03	457.24	486.46	549.34	635.88	735.28	840.17	944.49
22	1098.50	1003.99	902.41	797.90	695.09	600.38	522.64	472.51	459.60	487.50	549.02	634.43	733.06	837.36	941.28
23	1096.25	1002.31	901.16	796.94	694.24	599.40	521.12	470.07	455.92	482.70	543.25	627.95	726.16	830.12	933.82
24	1091.15	997.56	896.59	792.31	689.30	593.82	514.46	462.01	446.47	472.37	532.43	616.96	715.24	819.26	923.05
25	1083.08	989.64	888.56	783.86	680.08	583.40	502.31	447.92	430.73	456.00	516.12	601.10	700.00	804.54	908.79
26	1071.87	978.33	876.82	771.30	666.20	567.65	484.05	426.97	407.79	432.72	493.60	579.80	680.02	785.62	890.74
27	1057.23	963.31	861.01	754.17	647.12	545.85	458.68	397.82	376.10	401.10	463.72	552.20	654.61	761.94	868.46
28	1038.74	944.13	840.60	731.84	622.01	516.86	424.56	358.21	332.94	358.70	424.65	516.97	622.80	732.77	841.33
29	1015.87	920.16	814.84	703.37	589.63	478.92	378.95	303.85	272.92	300.87	373.19	472.02	583.15	697.01	808.50
30	987.85	890.53	782.67	667.43	548.11	429.09	316.62	224.87	181.64	216.46	303.03	413.74	533.36	653.06	768.73
31	953.61	853.98	742.57	621.96	494.39	361.95	224.80	74.12	0.00	33.91	196.95	335.02	469.60	598.41	720.20
32	911.60	808.67	692.17	563.64	422.93	264.77	0.00	0.00	0.00	0.00	0.00	216.28	384.39	528.88	660.05
33	859.51	751.77	627.68	486.57	321.50	70.55	0.00	0.00	0.00	0.00	0.00	0.00	258.16	436.36	583.48
34	793.65	678.54	542.20	377.96	141.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300.27	481.09
35	707.55	580.08	420.66	193.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	328.52
36	588.24	435.64	208.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	400.36	147.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 16 to 28 row 1

Section	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	309.07	465.61	549.28	584.90	577.52	525.84	420.61	221.76	0.00	0.00
4	0.00	303.68	519.08	655.91	750.47	808.63	834.95	830.28	794.23	725.15	619.37	465.19	200.35
5	364.71	570.44	717.99	826.21	905.15	955.22	978.46	975.02	944.72	887.02	801.14	684.12	524.13
6	558.67	716.83	841.87	937.44	1008.67	1054.60	1076.33	1073.75	1046.75	995.19	919.17	817.89	686.05
7	678.88	816.56	929.55	1017.74	1084.28	1127.68	1148.55	1146.66	1121.93	1074.42	1004.59	912.53	795.30
8	764.54	890.26	995.57	1078.85	1142.19	1183.91	1204.27	1202.98	1179.98	1135.44	1069.99	984.18	876.26
9	829.41	947.15	1047.06	1126.82	1187.85	1228.39	1248.44	1247.70	1226.11	1183.88	1121.78	1040.59	939.27
10	880.20	992.18	1088.06	1165.17	1224.47	1264.15	1284.04	1283.81	1263.41	1223.09	1163.66	1086.07	989.76
11	920.73	1028.33	1121.09	1196.15	1254.10	1293.15	1312.98	1313.24	1293.88	1255.18	1197.97	1123.31	1030.97
12	953.36	1057.53	1147.81	1221.24	1278.12	1316.71	1336.55	1337.28	1318.86	1281.57	1226.25	1154.03	1064.95
13	979.67	1081.09	1169.35	1241.47	1297.50	1335.76	1355.68	1356.87	1339.29	1303.27	1249.58	1179.45	1093.10
14	1000.74	1099.91	1186.52	1257.58	1312.94	1350.98	1371.01	1372.65	1355.87	1320.97	1268.74	1200.41	1116.41
15	1017.35	1114.67	1199.92	1270.12	1324.95	1362.85	1383.03	1385.12	1369.08	1335.21	1284.28	1217.54	1135.56
16	1030.04	1125.84	1209.97	1279.47	1333.89	1371.72	1392.10	1394.64	1379.29	1346.37	1296.61	1231.28	1151.08
17	1039.23	1133.78	1216.98	1285.94	1340.05	1377.88	1398.48	1401.46	1386.78	1354.74	1306.05	1241.98	1163.34
18	1045.19	1138.72	1221.18	1289.72	1343.61	1381.50	1402.35	1405.77	1391.73	1360.53	1312.80	1249.87	1172.62
19	1048.11	1140.83	1222.70	1290.95	1344.70	1382.71	1403.84	1407.71	1394.28	1363.85	1317.02	1255.10	1179.09
20	1048.08	1140.19	1221.61	1289.67	1343.36	1381.53	1402.96	1407.28	1394.46	1364.76	1318.76	1257.76	1182.84
21	1044.00	1135.56	1216.59	1284.48	1338.13	1376.47	1398.21	1402.98	1390.75	1361.78	1316.60	1256.49	1182.63
22	1040.55	1132.06	1213.11	1281.16	1335.03	1373.72	1395.87	1401.12	1389.42	1361.04	1316.46	1256.96	1183.79
23	1032.98	1124.52	1205.64	1273.90	1327.99	1367.05	1389.61	1395.34	1384.19	1356.40	1312.42	1253.51	1181.00
24	1022.35	1114.12	1195.46	1264.03	1318.44	1357.92	1380.94	1387.16	1376.54	1349.32	1305.87	1247.47	1175.49
25	1008.52	1100.73	1182.46	1251.48	1306.30	1346.27	1369.78	1376.51	1366.42	1339.72	1296.75	1238.76	1167.20
26	991.22	1084.14	1166.44	1236.06	1291.40	1331.94	1355.99	1363.24	1353.67	1327.46	1284.90	1227.23	1155.95
27	970.08	1064.00	1147.12	1217.50	1273.48	1314.68	1339.33	1347.13	1338.06	1312.31	1270.09	1212.62	1141.47
28	944.59	1039.87	1124.08	1195.43	1252.21	1294.18	1319.48	1327.86	1319.30	1293.95	1252.00	1194.60	1123.40
29	914.02	1011.14	1096.78	1169.36	1227.12	1269.98	1296.03	1305.03	1296.96	1271.97	1230.17	1172.70	1101.24
30	877.37	976.95	1064.46	1138.60	1197.58	1241.50	1268.39	1278.05	1270.47	1245.79	1204.03	1146.29	1074.31
31	833.20	936.10	1026.09	1102.22	1162.71	1207.91	1235.78	1246.16	1239.07	1214.61	1172.74	1114.50	1041.65
32	779.36	886.84	980.15	1058.88	1121.31	1168.08	1197.10	1208.29	1201.67	1177.35	1135.16	1076.10	1001.91
33	712.44	826.50	924.44	1006.65	1071.60	1120.36	1150.78	1162.88	1156.74	1132.41	1089.63	1029.29	953.11
34	626.50	750.73	855.42	942.49	1010.89	1062.24	1094.44	1107.63	1101.94	1077.41	1033.63	971.34	892.14
35	509.54	651.60	767.06	861.43	934.80	989.75	1024.31	1038.86	1033.61	1008.57	963.11	897.76	813.82
36	327.67	511.79	647.51	754.22	835.50	895.89	933.86	950.23	945.39	919.29	870.97	800.48	708.42
37	0.00	271.19	466.80	600.28	696.64	766.59	810.22	829.39	824.87	796.54	742.78	662.44	553.70
38	0.00	0.00	0.00	327.62	471.43	565.22	621.38	646.14	641.69	607.71	540.37	432.90	262.94
39	0.00	0.00	0.00	0.00	0.00	0.00	204.10	262.64	255.61	177.53	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	182.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	429.52	182.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	257.04
7	562.72	392.26	115.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190.42	427.76
8	655.48	511.79	329.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.37	358.64	533.17
9	725.69	596.83	444.73	249.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	271.85	459.55	608.94
10	781.20	662.03	526.18	368.16	159.02	0.00	0.00	0.00	0.00	0.00	0.00	169.92	375.96	531.94	666.85
11	826.23	714.00	588.67	449.23	290.87	60.00	0.00	0.00	0.00	0.00	54.69	289.02	448.46	587.27	712.54
12	863.36	756.37	638.50	510.67	373.91	225.06	0.00	0.00	0.00	0.00	215.07	365.18	503.21	630.92	749.24
13	894.24	791.37	679.10	559.32	435.20	310.40	188.61	84.40	75.19	175.61	296.36	421.06	546.06	665.90	778.95
14	920.02	820.47	712.56	598.70	483.00	371.07	271.24	203.41	197.21	257.18	353.43	464.08	580.13	694.08	803.00
15	941.50	844.68	740.24	630.91	521.21	417.41	328.49	271.34	265.01	312.68	396.37	497.84	607.33	716.70	822.33
16	959.25	864.70	763.09	657.30	552.06	453.83	371.47	319.62	312.84	353.74	429.47	524.40	628.88	734.62	837.57
17	973.71	881.06	781.76	678.78	576.93	482.67	404.61	355.81	348.45	384.86	455.03	545.07	645.61	748.44	849.20
18	985.16	894.12	796.73	695.99	596.73	505.34	430.20	383.23	375.23	408.35	474.39	560.68	658.09	758.56	857.55
19	993.83	904.14	808.30	709.35	612.06	522.75	449.57	403.67	394.96	425.54	488.42	571.78	666.70	765.28	862.84
20	999.83	911.26	816.69	719.13	623.32	535.45	463.53	418.14	408.68	437.20	497.63	578.71	671.67	768.76	865.19
21	1002.13	914.57	821.11	724.71	630.04	543.20	472.04	426.78	416.51	443.31	501.78	581.04	672.38	768.24	863.72
22	1005.27	918.25	825.33	729.46	635.22	548.63	477.50	431.82	420.64	446.08	503.26	581.45	671.92	767.20	862.32
23	1004.75	918.18	825.67	730.13	636.05	549.36	477.87	431.45	419.26	443.54	499.80	577.31	667.21	762.15	857.06
24	1001.63	915.31	822.99	727.47	633.17	545.92	473.57	426.00	412.67	436.01	491.79	569.09	658.86	753.82	848.82
25	995.83	909.58	817.17	721.36	626.42	538.11	464.35	415.14	400.49	423.09	478.89	556.53	646.65	742.04	837.45
26	987.19	900.79	808.02	711.53	615.49	525.53	449.68	398.23	381.97	404.09	460.50	539.15	630.21	726.49	822.68
27	975.47	888.66	795.20	697.63	599.92	507.58	428.74	374.17	355.90	377.84	435.70	516.24	608.97	706.73	804.14
28	960.32	872.81	778.28	679.09	579.00	483.30	400.22	341.15	320.16	342.41	403.00	486.71	582.12	682.11	781.31
29	941.25	852.69	756.61	655.14	551.70	451.25	361.90	295.91	270.76	294.27	359.93	448.87	548.44	651.72	753.46
30	917.61	827.54	729.28	624.61	516.47	409.05	309.79	231.46	198.33	225.70	301.80	399.90	506.08	614.20	719.53
31	888.47	796.29	694.97	585.80	470.79	352.45	234.96	124.36	53.35	107.99	217.46	334.53	451.96	567.51	678.00
32	852.51	757.35	651.70	535.96	410.29	272.29	101.76	0.00	0.00	0.00	37.60	240.11	380.40	508.25	626.50
33	807.73	708.32	596.30	470.34	325.90	135.87	0.00	0.00	0.00	0.00	0.00	33.74	278.10	430.20	561.14
34	751.02	645.23	523.16	379.26	189.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.91	318.98	474.62
35	677.02	560.83	420.68	234.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.50	349.85
36	575.26	439.15	253.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.63
37	419.52	222.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 16 to 28 row 1

Section	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	177.39	350.60	435.93	470.57	462.63	410.89	301.94	0.00	0.00	0.00
4	0.00	193.77	418.39	553.06	640.92	695.65	719.83	715.05	681.24	616.50	514.74	359.25	0.00
5	271.87	478.75	617.00	719.72	791.63	837.97	859.06	855.57	827.57	774.44	693.96	581.81	430.04
6	471.83	622.59	737.55	827.20	891.65	933.84	953.46	950.83	926.05	878.91	808.38	712.76	590.89
7	590.04	719.24	822.34	904.56	964.59	1004.30	1023.10	1021.15	998.53	955.26	890.82	804.55	697.21
8	673.34	790.42	886.13	963.49	1020.59	1058.64	1076.97	1075.60	1054.61	1014.12	953.93	873.89	775.53
9	736.25	845.39	935.99	1009.91	1064.91	1101.81	1119.87	1119.02	1099.35	1061.01	1004.02	928.53	836.40
10	785.55	889.03	975.88	1047.22	1100.68	1136.75	1154.66	1154.30	1135.73	1099.15	1044.70	972.73	885.26
11	825.04	924.25	1008.23	1077.58	1129.86	1165.31	1183.18	1183.28	1165.66	1130.56	1078.21	1009.08	925.26
12	857.02	952.90	1034.62	1102.40	1153.77	1188.77	1206.66	1207.21	1190.45	1156.62	1106.04	1039.27	958.41
13	883.04	976.26	1056.16	1122.67	1173.34	1208.01	1225.97	1226.96	1210.97	1178.27	1129.23	1064.47	986.06
14	904.13	995.18	1073.61	1139.10	1189.23	1223.67	1241.75	1243.16	1227.88	1196.19	1148.51	1085.48	1009.15
15	921.04	1010.31	1087.54	1152.20	1201.92	1236.21	1254.44	1256.27	1241.66	1210.89	1164.41	1102.91	1028.36
16	934.30	1022.11	1098.36	1162.35	1211.77	1245.98	1264.40	1266.64	1252.66	1222.72	1177.34	1117.18	1044.17
17	944.31	1030.90	1106.37	1169.83	1219.04	1253.23	1271.86	1274.52	1261.14	1231.97	1187.57	1128.62	1056.96
18	951.33	1036.94	1111.77	1174.83	1223.91	1258.15	1277.01	1280.09	1267.27	1238.83	1195.33	1137.45	1066.97
19	955.56	1040.37	1114.72	1177.49	1226.52	1260.84	1279.97	1283.45	1271.19	1243.42	1200.74	1143.84	1074.39
20	957.07	1041.27	1115.27	1177.84	1226.90	1261.34	1280.76	1284.67	1272.93	1245.79	1203.87	1147.85	1079.32
21	954.87	1038.53	1112.23	1174.63	1223.72	1258.30	1278.01	1282.33	1271.12	1244.61	1203.44	1148.27	1080.60
22	953.27	1036.82	1110.60	1173.13	1222.49	1257.37	1277.46	1282.22	1271.48	1245.48	1204.86	1150.28	1083.14
23	947.93	1031.46	1105.35	1168.04	1217.69	1252.88	1273.36	1278.55	1268.29	1242.79	1202.71	1148.70	1082.07
24	939.82	1023.50	1097.65	1160.60	1210.61	1246.17	1267.06	1272.71	1262.91	1237.88	1198.30	1144.78	1078.54
25	928.83	1012.85	1087.41	1150.74	1201.20	1237.17	1258.52	1264.63	1255.30	1230.70	1191.56	1138.45	1072.49
26	914.73	999.33	1074.46	1138.30	1189.31	1225.77	1247.61	1254.20	1245.31	1221.12	1182.36	1129.58	1063.76
27	897.21	982.63	1058.54	1123.06	1174.73	1211.74	1234.12	1241.22	1232.77	1208.95	1170.50	1117.94	1052.14
28	875.82	962.39	1039.32	1104.68	1157.14	1194.81	1217.79	1225.41	1217.40	1193.90	1155.69	1103.24	1037.29
29	849.95	938.06	1016.31	1082.73	1136.16	1174.60	1198.24	1206.42	1198.83	1175.62	1137.56	1085.09	1018.80
30	818.73	908.90	988.86	1056.63	1111.23	1150.57	1174.97	1183.74	1176.57	1153.59	1115.58	1062.92	996.05
31	780.94	873.90	956.07	1025.57	1081.59	1122.02	1147.29	1156.71	1149.95	1127.13	1089.03	1035.98	968.23
32	734.77	831.54	916.66	988.38	1046.21	1087.96	1114.25	1124.38	1118.02	1095.27	1056.92	1003.20	934.15
33	677.38	779.57	868.72	943.40	1003.54	1046.96	1074.48	1085.43	1079.46	1056.65	1017.81	963.04	892.11
34	603.97	714.37	809.27	888.06	951.29	996.88	1025.94	1037.84	1032.24	1009.21	969.52	913.14	839.45
35	505.20	629.47	733.31	818.14	885.75	934.31	965.39	978.47	973.22	949.69	908.60	849.70	771.78
36	357.61	511.46	631.28	726.04	800.40	853.36	887.32	901.95	897.00	872.49	829.04	765.98	681.05
37	0.00	320.50	480.59	595.43	682.02	742.47	781.04	797.99	793.26	766.79	718.96	648.13	549.57
38	0.00	0.00	178.27	376.25	495.59	573.04	621.15	642.45	637.67	606.59	548.54	458.27	318.48
39	0.00	0.00	0.00	0.00	0.00	205.48	304.24	342.92	336.36	282.52	155.79	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Details for bearing: B5

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Spherical roller bearing
Manufacturer		Generic
Bearing name		23040
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	310.000 mm
Bearing width	B	82.000 mm
Number of rolling elements	Z	25
Roller diameter	Dw	26.000 mm
Pitch diameter	Dpw	255.000 mm
Length of Roller	Lwe	27.100 mm
Conformity inner race	fi	0.5
Conformity outer race	fe	0.5
Conformity roller	fr	0.485
Nominal contact angle	α	9.1341 °
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal diametral clearance	Pd	0.1650 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	158.824 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	-592.1073 μ m
Displacement Y	uy	-23.7340 μ m
Displacement Z	uz	9.8483 μ m
Rotation around Y	ry	-0.2614 mrad
Rotation around Z	rz	0.3235 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOmax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s
Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³

Oil temperature	ϑ_{Oil}	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	$\nu(\vartheta)$	51.794 mm ² /s
Operating oil density	$\rho(\vartheta)$	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	25
Roller diameter	Dw	26.000 mm
Pitch diameter	Dpw	255.000 mm
Length of Roller	Lwe	27.100 mm
Conformity inner race	fi	0.5
Conformity outer race	fe	0.5
Conformity roller	fr	0.485
Nominal contact angle	α	9.1341 °
Nominal diametral clearance	Pd	0.1650 mm
Nominal axial clearance	Pa	0.6175 mm
Diameter inner race	di	232.112 mm
Diameter outer race	de	284.275 mm
Radius inner race	ri	142.138 mm
Radius outer race	re	142.138 mm
Radius roller	rr	137.873 mm
Change of clearance	ΔPd	0.0000 mm
Effective diametral clearance	Pdeff	0.1650 mm
Distance between rolling elements	δRE	5.9600 mm
Axial distance between rows	δR	41.000 mm

Forces and displacement

Axial force	Fx	-39.1313 kN
Radial force Y	Fy	-83.4503 kN
Radial force Z	Fz	34.630 kN
Displacement X	ux	-592.1073 μ m
Displacement Y	uy	-23.7340 μ m
Displacement Z	uz	9.8483 μ m
Moment Y	My	-15.4856 Nm
Moment Z	Mz	-37.3244 Nm
Rotation around Y	ry	-0.2614 mrad
Rotation around Z	rz	0.3235 mrad
Maximal pressure inner race	pmax_i	2588.6 MPa
Maximal pressure outer race	pmax_e	2499.9 MPa
Maximal pressure	pmax	2588.6 MPa
Static safety factor	SF	2.3877

Life

Dynamic load capacity	Cr	792.411 kN
Static load capacity	C0r	1382.5 kN
Fatigue load limit	Cur	118.035 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	1.23339
Contamination factor	eC	0.519557
Life modification factor	aISO	0.460668

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Reference load	Pref	228634 N
Basic reference rating life	L10r	63.0038
Basic reference rating life	L10rh	6611.5 h
Modified reference rating life	Lnmr	29.0238
Modified reference rating life	Lnmrh	3045.7 h

Life according ISO 281

Dynamic radial load factor	X	0.67
Dynamic axial load factor	Y	4.16707
Dynamic equivalent load	P	223598 N
Basic life	L10	67.8592
Basic life	L10h	7121.0 h
Modified life	Ln	66.6881
Modified life	Ln	6998.1 h

Thermal permissible speed

Factor for load independent losses	f0r	4.5
Factor for load dependent losses	f1r	0.00017
Surface for heat transfer	Ar	131381 mm ²
Thermal transmission coefficient	kq	230.408 W/m ² ·K
Load for reference speed	P1r	69124.4 N
Viscosity at reference conditions	vr	12.000 mm ² /s
Load independent friction moment	M0r	5.5510 Nm
Load dependent friction moment	M1r	2.9965 Nm
Thermal reference speed	ntr	1690.9 rpm
Factor for load independent losses	f0	4.5
Factor for load dependent losses	f1	0.000283429
Load for permissible speed	P1	259603 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M0	7.0445 Nm
Load dependent friction moment	M1	18.763 Nm
Thermal permissible speed	nt	560.066 rpm
Friction moments and temperature increase for current speed (n=158.824)		
Load independent friction moment for current speed	M0_n	3.0406 Nm
Load dependent friction moment for current speed	M1_n	18.763 Nm
Total friction moment for current speed	M_n	21.803 Nm
Temperature difference for current speed	Δθ_n	11.979 °C

Subsurface stresses

Maximal shear stress for inner race	τmax_i	777.881 MPa
Depth for maximal shear stress inner race	h(τmax_i)	0.4181 mm
Shear yield stress for core inner race	τYield_i	510.000 MPa
Shear fatigue limit for core inner race	τα_i	306.000 MPa
Shear stress at core inner race	τ_i	306.000 MPa
Maximal shear stress for outer race	τmax_e	750.231 MPa
Depth for maximal shear stress outer race	h(τmax_e)	0.4948 mm
Shear yield stress for core outer race	τYield_e	510.000 MPa
Shear fatigue limit for core outer race	τα_e	306.000 MPa
Shear stress at core outer race	τ_e	306.000 MPa
Required hardness depth inner race	hdmin_i	2.1530 mm
Required hardness depth outer race	hdmin_e	2.4486 mm

Damage Frequencies

Speed of inner ring	ni	2.65 1/s	(159rpm)
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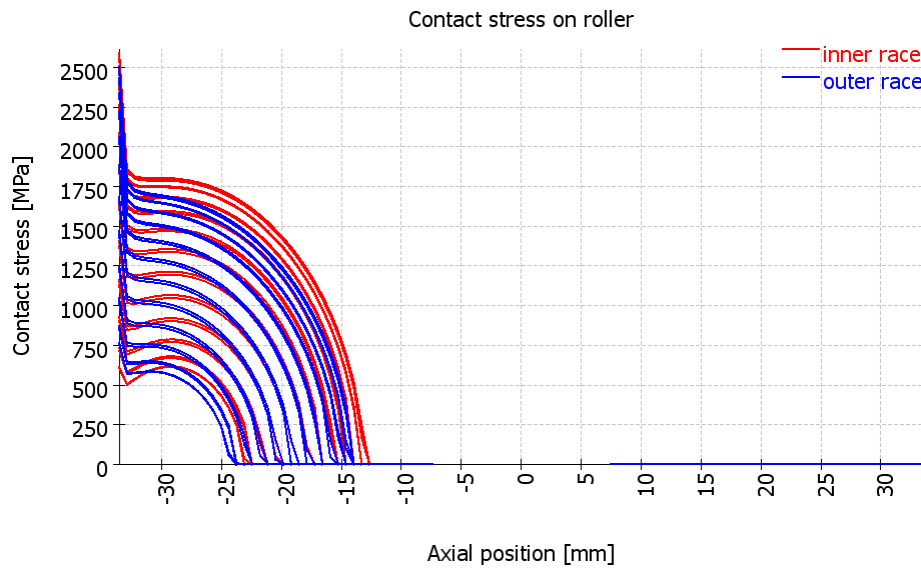
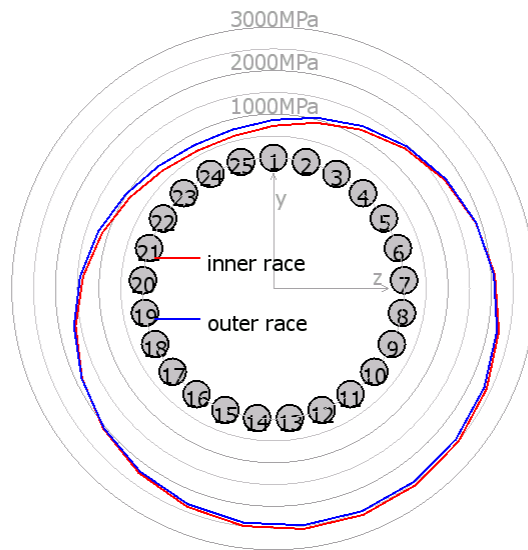
MESYS Shaft and Rolling bearing calculation

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Speed of outer ring	ne	0.00 1/s	(0rpm)
Rotation speed of cage	fc	1.19 1/s	(71rpm)
Damage frequency for inner race	fip	36.42 1/s	(2185rpm)
Damage frequency for outer race	fep	-29.76 1/s	(-1785rpm)
Damage frequency for rolling element	frp	-25.70 1/s	(-1542rpm)

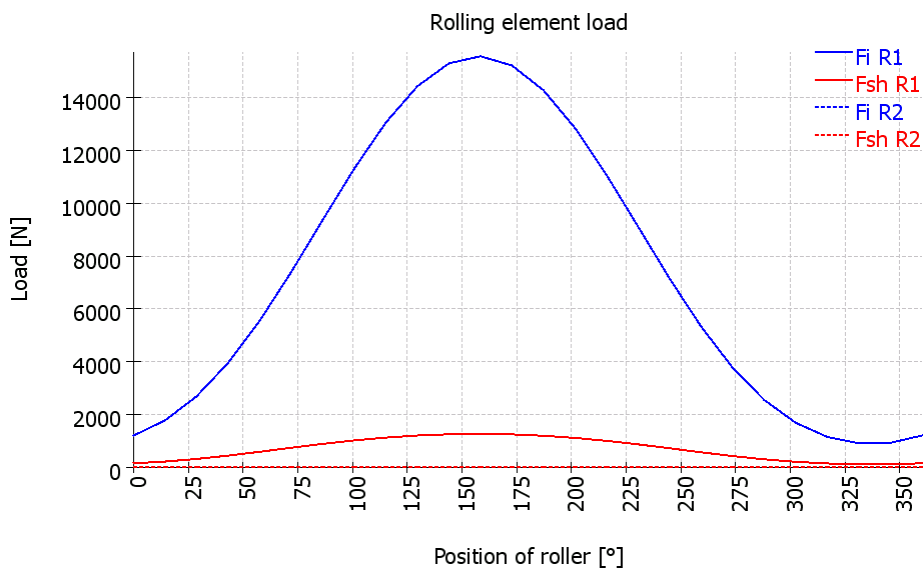
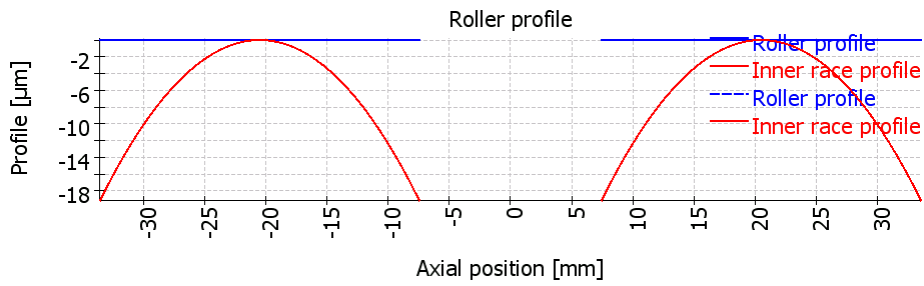
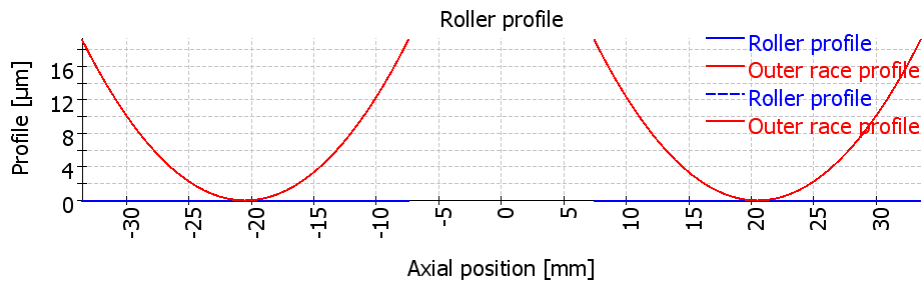
Bearing stiffness matrix

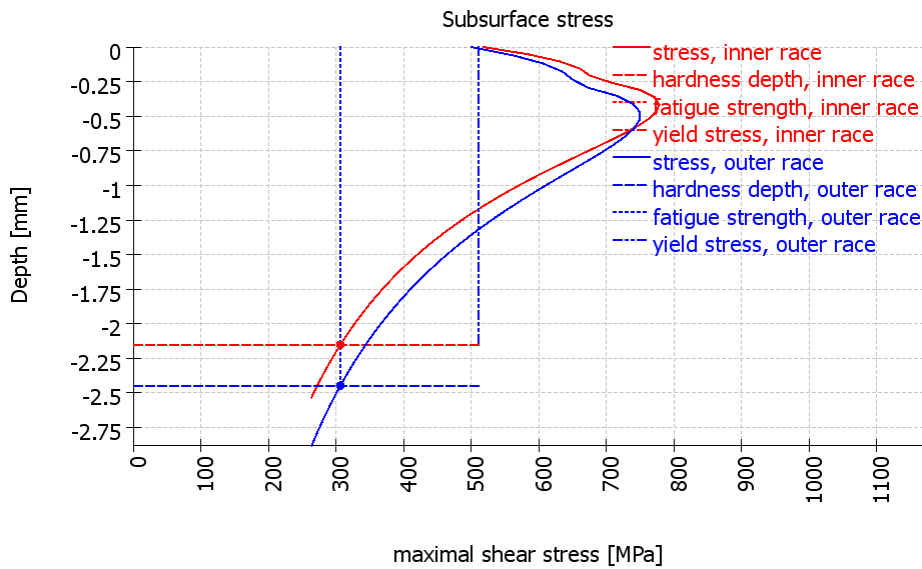
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	300.369	210.828	-88.505	0.000	0.000
Fy [N]	213.290	3414.245	45.717	0.000	0.000
Fz [N]	-89.547	45.436	3497.675	0.000	0.000
My [Nm]	0.043	-0.029	-1.555	0.000	0.000
Mz [Nm]	0.104	1.502	0.029	0.000	0.000



MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini





Result table for bearing 1

Results for row 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	1207.01	274.738	-1175.33	0	0.668882	156.187
2	14.4	1783.36	401.807	-1682.91	-432.099	0.967262	222.797
3	28.8	2695.05	599.395	-2302.54	-1265.83	1.42392	321.525
4	43.2	3960.77	868.113	-2817.07	-2645.4	2.03364	447.713
5	57.6	5553.75	1199.08	-2905.66	-4578.59	2.77038	592.467
6	72	7397.43	1574.03	-2233.58	-6874.26	3.59011	744.248
7	86.4	9371.68	1967.32	-575.341	-9144.78	4.43422	890.821
8	100.8	11312.9	2347.32	2073.7	-10870.7	5.23646	1021.9
9	115.2	13052.8	2682.66	5438.99	-11558.4	5.93368	1129.19
10	129.6	14424	2943.78	9000.7	-10880	6.47307	1207.61
11	144	15290	3107.32	12111.7	-8799.68	6.80591	1254.5
12	158.4	15560.9	3158.32	14167	-5609.12	6.91083	1268.82
13	172.8	15209.7	3092.2	14774.6	-1866.47	6.77482	1250.25
14	187.2	14271.6	2914.91	13860.5	1750.99	6.41457	1199.19
15	201.6	12844.4	2642.71	11686.9	4627.16	5.8521	1116.77
16	216	11067.8	2299.73	8758.6	6363.5	5.13792	1006.09
17	230.4	9113.57	1916.3	5679.34	6865.14	4.32495	872.438
18	244.8	7148.73	1523.83	2973.82	6319.7	3.48144	724.502
19	259.2	5329.49	1152.97	974.998	5111.12	2.66919	573.018
20	273.6	3775.16	829.144	-231.256	3675.71	1.94617	430.055
21	288	2555.05	569.372	-769.7	2368.89	1.35513	306.983
22	302.4	1689.72	381.31	-882.04	1389.87	0.919417	212.262
23	316.8	1155.89	263.327	-820.454	770.458	0.641781	150.005
24	331.2	912.686	208.962	-778.549	428.011	0.512327	120.453
25	345.6	929.255	212.678	-876.171	224.962	0.521158	122.492

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

Results for row 2

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	0	-0	-0	-0	0	0
2	14.4	0	-0	-0	-0	0	0
3	28.8	0	-0	-0	-0	0	0
4	43.2	0	-0	-0	-0	0	0
5	57.6	0	-0	-0	-0	0	0
6	72	0	-0	-0	-0	0	0
7	86.4	0	-0	-0	-0	0	0
8	100.8	0	-0	0	-0	0	0
9	115.2	0	-0	0	-0	0	0
10	129.6	0	-0	0	-0	0	0
11	144	0	-0	0	-0	0	0
12	158.4	0	-0	0	-0	0	0
13	172.8	0	-0	0	-0	0	0
14	187.2	0	-0	0	0	0	0
15	201.6	0	-0	0	0	0	0
16	216	0	-0	0	0	0	0
17	230.4	0	-0	0	0	0	0
18	244.8	0	-0	0	0	0	0
19	259.2	0	-0	0	0	0	0
20	273.6	0	-0	-0	0	0	0
21	288	0	-0	-0	0	0	0
22	302.4	0	-0	-0	0	0	0
23	316.8	0	-0	-0	0	0	0
24	331.2	0	-0	-0	0	0	0
25	345.6	0	-0	-0	0	0	0

ψ : Position of roller

|F| : Absolute value of force on inner race

Fx : Axial force

Fy : Radial force Y

Fz : Radial force Z

M : Moment load on inner race

Fsh : Force on shoulder

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	aISO row 1	aISO row 2
1	-33.535	0.661	0.00	0.39	0.00
2	-32.883	0.661	0.00	0.62	0.00
3	-32.230	0.661	0.00	0.65	0.00
4	-31.578	0.661	0.00	0.66	0.00
5	-30.926	0.661	0.00	0.66	0.00
6	-30.273	0.661	0.00	0.66	0.00
7	-29.621	0.661	0.00	0.66	0.00
8	-28.968	0.661	0.00	0.67	0.00
9	-28.316	0.661	0.00	0.67	0.00
10	-27.664	0.661	0.00	0.68	0.00
11	-27.011	0.661	0.00	0.69	0.00
12	-26.359	0.661	0.00	0.70	0.00
13	-25.707	0.661	0.00	0.71	0.00
14	-25.054	0.661	0.00	0.73	0.00
15	-24.402	0.661	0.00	0.76	0.00
16	-23.749	0.661	0.00	0.78	0.00
17	-23.097	0.661	0.00	0.82	0.00
18	-22.445	0.661	0.00	0.86	0.00
19	-21.792	0.661	0.00	0.91	0.00
20	-21.140	0.661	0.00	0.97	0.00
21	-20.488	0.661	0.00	1.06	0.00
22	-19.835	0.661	0.00	1.16	0.00
23	-19.183	0.661	0.00	1.30	0.00
24	-18.530	0.661	0.00	1.49	0.00
25	-17.878	0.661	0.00	1.77	0.00
26	-17.226	0.661	0.00	2.21	0.00
27	-16.573	0.661	0.00	2.97	0.00
28	-15.921	0.661	0.00	4.48	0.00
29	-15.269	0.661	0.00	8.37	0.00
30	-14.616	0.661	0.00	24.81	0.00
31	-13.964	0.661	0.00	50.00	0.00
32	-13.311	0.661	0.00	50.00	0.00
33	-12.659	0.661	0.00	0.00	0.00
34	-12.007	0.661	0.00	0.00	0.00
35	-11.354	0.661	0.00	0.00	0.00
36	-10.702	0.661	0.00	0.00	0.00
37	-10.050	0.661	0.00	0.00	0.00
38	-9.397	0.661	0.00	0.00	0.00
39	-8.745	0.661	0.00	0.00	0.00
40	-8.093	0.661	0.00	0.00	0.00
41	-7.440	0.661	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	734.65	928.89	1161.04	1406.73	1649.77	1878.96	2085.34	2262.04	2403.94	2507.71	2569.50	2588.63	2563.80	2496.68	2387.82
2	583.10	711.66	868.51	1036.74	1204.56	1363.65	1507.43	1630.84	1730.12	1802.75	1846.06	1859.46	1842.07	1795.02	1718.81
3	609.22	727.40	873.39	1031.37	1189.90	1340.77	1477.50	1595.08	1689.80	1759.13	1800.52	1813.31	1796.71	1751.74	1679.00
4	636.21	748.92	889.21	1041.89	1195.74	1342.55	1475.86	1590.69	1683.29	1751.08	1791.59	1804.09	1787.87	1743.83	1672.71
5	657.43	766.87	903.65	1053.02	1203.93	1348.19	1479.38	1592.51	1683.80	1750.63	1790.62	1802.94	1786.95	1743.48	1673.35
6	671.88	779.46	914.11	1061.41	1210.42	1353.00	1482.79	1594.79	1685.22	1751.41	1791.05	1803.24	1787.41	1744.31	1674.86
7	679.42	786.21	919.80	1065.93	1213.83	1355.37	1484.26	1595.53	1685.41	1751.16	1790.57	1802.69	1786.97	1744.10	1675.09
8	680.04	786.94	920.38	1066.14	1213.56	1354.58	1483.00	1593.86	1683.42	1748.91	1788.19	1800.25	1784.60	1741.87	1673.12
9	673.63	781.54	915.66	1061.78	1209.31	1350.28	1478.58	1589.32	1678.77	1744.14	1783.38	1795.40	1779.79	1737.10	1668.47
10	659.99	769.81	905.47	1052.65	1200.86	1342.23	1470.76	1581.64	1671.17	1736.56	1775.82	1787.84	1772.24	1729.51	1660.86
11	638.72	751.47	889.60	1038.58	1188.05	1330.25	1459.36	1570.64	1660.44	1725.96	1765.33	1777.36	1761.74	1718.89	1650.08
12	609.16	726.10	867.75	1019.35	1170.69	1314.20	1444.23	1556.16	1646.41	1712.20	1751.73	1763.80	1748.14	1705.09	1635.99
13	570.29	693.07	839.53	994.69	1148.57	1293.88	1425.20	1538.05	1628.96	1695.13	1734.91	1747.04	1731.30	1687.97	1618.45
14	520.44	651.43	804.39	964.23	1121.44	1269.10	1402.11	1516.18	1607.93	1674.63	1714.74	1726.94	1711.10	1667.41	1597.32
15	456.76	599.76	761.55	927.51	1088.99	1239.63	1374.77	1490.36	1583.19	1650.56	1691.07	1703.37	1687.40	1643.25	1572.44
16	373.67	535.72	709.87	883.89	1050.78	1205.16	1342.94	1460.42	1554.56	1622.76	1663.76	1676.19	1660.05	1615.35	1543.65
17	256.91	455.17	647.67	832.48	1006.30	1165.33	1306.35	1426.11	1521.85	1591.04	1632.63	1645.22	1628.88	1583.52	1510.75
18	0.00	349.16	572.18	772.03	954.81	1119.65	1264.64	1387.17	1484.80	1555.20	1597.49	1610.26	1593.68	1547.54	1473.48
19	0.00	187.38	478.40	700.64	895.34	1067.51	1217.37	1343.23	1443.14	1514.96	1558.08	1571.08	1554.20	1507.14	1431.55
20	0.00	0.00	355.00	615.24	826.45	1008.06	1163.94	1293.84	1396.46	1469.98	1514.08	1527.34	1510.12	1461.98	1384.56
21	0.00	0.00	156.38	509.66	745.24	939.14	1102.42	1237.10	1342.86	1418.32	1463.51	1477.07	1459.46	1410.10	1330.61
22	0.00	0.00	0.00	373.16	651.55	863.31	1036.73	1177.83	1287.79	1365.85	1412.51	1426.48	1408.34	1357.34	1275.07
23	0.00	0.00	0.00	146.59	535.54	773.81	960.51	1109.52	1224.48	1305.57	1353.92	1368.35	1349.61	1296.74	1211.20
24	0.00	0.00	0.00	0.00	382.84	667.60	873.01	1032.33	1153.54	1238.34	1288.74	1303.74	1284.26	1229.11	1139.58
25	0.00	0.00	0.00	0.00	115.09	536.77	771.16	944.52	1073.78	1163.24	1216.15	1231.84	1211.46	1153.52	1058.95
26	0.00	0.00	0.00	0.00	0.00	360.69	649.47	843.38	983.44	1078.91	1135.01	1151.56	1130.05	1068.57	967.50
27	0.00	0.00	0.00	0.00	0.00	0.00	496.30	724.35	879.87	983.42	1043.65	1061.32	1038.35	972.25	862.38
28	0.00	0.00	0.00	0.00	0.00	0.00	273.43	578.50	758.58	873.72	939.62	958.80	933.86	861.41	738.80
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	382.18	611.03	744.65	818.93	840.28	812.49	730.62	587.33
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	415.41	585.86	674.24	699.07	666.71	568.76	382.53
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	368.06	488.62	520.40	478.84	342.80	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	186.41	248.75	164.39	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 16 to 25 row 1

Section	16	17	18	19	20	21	22	23	24	25
1	2241.21	2059.91	1850.46	1619.03	1374.70	1129.59	900.78	713.99	606.41	614.17
2	1616.26	1489.70	1343.82	1183.25	1014.71	847.13	692.88	569.64	500.52	505.48
3	1581.16	1460.64	1321.92	1169.70	1010.61	853.40	710.03	596.95	534.45	538.93
4	1577.07	1459.42	1324.18	1176.09	1021.78	869.96	732.31	624.57	565.51	569.76
5	1579.06	1463.21	1330.11	1184.61	1033.32	884.85	750.72	646.16	589.10	593.22
6	1581.45	1466.80	1335.12	1191.31	1041.96	895.60	763.58	660.81	604.83	608.89
7	1582.26	1468.39	1337.60	1194.84	1046.63	901.44	770.46	668.43	612.84	616.90
8	1580.62	1467.19	1336.87	1194.61	1046.89	902.06	771.20	669.01	613.22	617.31
9	1576.08	1462.80	1332.57	1190.33	1042.49	897.28	765.69	662.47	605.89	610.07
10	1568.37	1454.98	1324.46	1181.79	1033.24	886.93	753.73	648.59	590.61	594.93
11	1557.30	1443.52	1312.39	1168.81	1018.97	870.78	735.03	626.94	566.84	571.35
12	1542.72	1428.30	1296.17	1151.22	999.44	848.53	709.15	596.86	533.67	538.46
13	1524.50	1409.14	1275.64	1128.80	974.37	819.77	675.41	557.23	489.58	494.77
14	1502.46	1385.87	1250.59	1101.27	943.38	783.90	632.79	506.28	431.93	437.73
15	1476.46	1358.30	1220.77	1068.32	905.98	740.08	579.74	440.89	355.53	362.39
16	1446.28	1326.20	1185.88	1029.49	861.47	687.10	513.66	354.80	247.24	256.45
17	1411.70	1289.26	1145.52	984.22	808.92	623.07	429.80	230.72	0.00	35.04
18	1372.43	1247.13	1099.19	931.75	746.94	544.87	317.23	0.00	0.00	0.00
19	1328.10	1199.34	1046.25	871.00	673.44	446.59	129.22	0.00	0.00	0.00
20	1278.24	1145.28	985.79	800.44	584.90	313.70	0.00	0.00	0.00	0.00
21	1220.95	1083.00	915.60	716.95	474.14	49.83	0.00	0.00	0.00	0.00
22	1160.96	1016.28	837.99	619.77	326.27	0.00	0.00	0.00	0.00	0.00
23	1091.78	938.75	746.06	497.93	0.00	0.00	0.00	0.00	0.00	0.00
24	1013.48	849.48	636.19	332.21	0.00	0.00	0.00	0.00	0.00	0.00
25	924.22	745.11	498.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	821.06	619.44	306.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	699.00	458.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	547.87	208.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	338.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pi in MPa on inner race for rollers 16 to 25 row 2

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pe in MPa on outer race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	872.36	1045.82	1252.72	1470.39	1684.38	1884.64	2064.22	2217.77	2340.93	2430.01	2483.69	2499.88	2478.87	2420.29	2326.59
2	647.47	766.21	909.38	1061.13	1211.01	1351.72	1478.14	1586.35	1673.23	1736.12	1774.01	1785.45	1770.60	1729.26	1663.12
3	644.77	756.41	892.11	1036.74	1180.10	1315.00	1436.38	1540.37	1623.89	1684.42	1720.86	1731.88	1717.58	1677.83	1614.19
4	648.75	756.94	889.22	1030.77	1171.44	1304.04	1423.45	1525.82	1608.07	1667.72	1703.62	1714.49	1700.37	1661.23	1598.53
5	650.06	756.37	886.87	1026.89	1166.27	1297.79	1416.31	1517.93	1599.59	1658.85	1694.49	1705.30	1691.27	1652.42	1590.13
6	646.63	752.13	881.92	1021.37	1160.29	1291.45	1409.65	1511.00	1592.44	1651.56	1687.10	1697.89	1683.88	1645.15	1583.01
7	637.67	743.25	873.22	1012.87	1151.96	1283.28	1401.59	1503.01	1584.48	1643.65	1679.18	1689.98	1675.96	1637.24	1575.06
8	622.67	729.21	860.19	1000.74	1140.58	1272.51	1391.29	1493.04	1574.75	1634.10	1669.71	1680.56	1666.48	1627.68	1565.32
9	601.09	709.55	842.41	984.58	1125.72	1258.69	1378.27	1480.61	1562.73	1622.40	1658.17	1669.07	1654.92	1615.96	1553.27
10	572.27	683.77	819.50	964.05	1107.07	1241.52	1362.22	1465.40	1548.13	1608.23	1644.21	1655.20	1640.94	1601.75	1538.61
11	535.21	651.23	791.02	938.82	1084.36	1220.75	1342.93	1447.20	1530.70	1591.35	1627.63	1638.71	1624.32	1584.82	1521.11
12	488.39	611.02	756.41	908.52	1057.31	1196.16	1320.17	1425.79	1510.26	1571.59	1608.23	1619.43	1604.88	1565.00	1500.58
13	429.23	561.79	714.92	872.68	1025.58	1167.48	1293.75	1401.01	1486.65	1548.78	1585.85	1597.20	1582.47	1542.12	1476.85
14	352.83	501.39	665.49	830.68	988.78	1134.43	1263.42	1372.65	1459.68	1522.76	1560.35	1571.87	1556.92	1516.01	1449.74
15	246.95	426.03	606.54	781.72	946.41	1096.66	1228.93	1340.50	1429.16	1493.37	1531.55	1543.27	1528.06	1486.51	1419.06
16	9.23	327.60	535.54	724.63	897.81	1053.75	1189.96	1304.31	1394.89	1460.39	1499.28	1511.22	1495.72	1453.41	1384.59
17	0.00	179.15	447.89	657.69	842.10	1005.12	1146.11	1263.76	1356.60	1423.61	1463.32	1475.52	1459.68	1416.49	1346.08
18	0.00	0.00	333.31	578.14	778.02	950.08	1096.91	1218.49	1314.00	1382.76	1423.42	1435.91	1419.69	1375.47	1303.20
19	0.00	0.00	151.48	480.95	703.71	887.62	1041.70	1168.04	1266.69	1337.52	1379.27	1392.11	1375.44	1330.02	1255.58
20	0.00	0.00	0.00	354.76	616.16	816.34	979.64	1111.78	1214.20	1287.44	1330.49	1343.73	1326.54	1279.71	1202.70
21	0.00	0.00	0.00	153.05	509.35	733.35	908.58	1047.80	1154.66	1230.69	1275.22	1288.91	1271.13	1222.70	1142.72
22	0.00	0.00	0.00	0.00	372.93	638.46	830.89	979.72	1092.47	1172.15	1218.60	1232.87	1214.33	1163.80	1079.93
23	0.00	0.00	0.00	0.00	150.52	521.90	739.89	901.32	1021.36	1105.41	1154.13	1169.10	1149.66	1096.64	1008.10
24	0.00	0.00	0.00	0.00	0.00	369.10	632.30	811.63	941.23	1030.80	1082.33	1098.13	1077.61	1021.50	927.04
25	0.00	0.00	0.00	0.00	0.00	93.83	499.55	707.18	850.03	946.83	1001.95	1018.81	996.91	936.86	834.60
26	0.00	0.00	0.00	0.00	0.00	0.00	317.72	581.53	744.45	851.24	911.13	929.36	905.66	840.35	727.23
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	419.67	618.47	740.32	806.96	827.09	800.91	728.10	598.40
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	152.20	458.73	607.23	684.45	707.43	677.51	592.85	432.95
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	213.95	435.93	533.39	561.35	524.86	416.98	162.42
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	149.67	323.70	364.42	310.81	98.63	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pe in MPa on outer race for rollers 16 to 25 row 1

Section	16	17	18	19	20	21	22	23	24	25
1	2199.22	2042.39	1859.52	1656.95	1442.03	1224.91	1020.84	853.88	758.86	766.01
2	1573.30	1462.74	1334.06	1191.79	1041.31	890.06	749.02	634.92	570.74	575.53
3	1527.84	1421.58	1298.07	1161.71	1017.82	873.74	740.18	633.04	573.27	577.69
4	1513.50	1408.88	1287.39	1153.40	1012.24	871.27	741.16	637.42	579.89	584.12
5	1505.72	1401.83	1281.29	1148.40	1008.55	869.14	740.83	638.96	582.68	586.79
6	1498.83	1395.20	1275.00	1142.50	1003.10	864.27	736.68	635.63	579.92	583.96
7	1490.85	1387.12	1266.83	1134.18	994.58	855.53	727.78	626.67	570.94	574.96
8	1480.86	1376.75	1255.99	1122.73	982.35	842.37	713.60	611.56	555.22	559.27
9	1468.38	1363.63	1242.06	1107.73	966.00	824.36	693.68	589.76	532.15	536.28
10	1453.10	1347.45	1224.73	1088.88	945.19	801.10	667.50	560.57	500.86	505.13
11	1434.79	1327.97	1203.75	1065.91	919.59	772.13	634.38	522.94	459.95	464.46
12	1413.25	1305.00	1178.89	1038.50	888.81	736.86	593.34	475.25	407.12	412.01
13	1388.30	1278.31	1149.87	1006.33	852.33	694.49	542.91	414.73	337.92	343.51
14	1359.74	1247.66	1116.41	968.98	809.53	643.86	480.73	335.88	241.60	248.78
15	1327.35	1212.79	1078.15	925.92	759.51	583.23	402.45	224.13	55.16	75.56
16	1290.87	1173.37	1034.62	876.44	701.02	509.73	298.19	0.00	0.00	0.00
17	1249.98	1128.98	985.25	819.60	632.14	417.93	127.21	0.00	0.00	0.00
18	1204.31	1079.13	929.26	754.03	549.71	294.63	0.00	0.00	0.00	0.00
19	1153.36	1023.13	865.61	677.67	447.77	58.03	0.00	0.00	0.00	0.00
20	1096.51	960.09	792.76	587.11	311.52	0.00	0.00	0.00	0.00	0.00
21	1031.82	887.80	707.65	475.36	30.73	0.00	0.00	0.00	0.00	0.00
22	962.79	808.42	609.52	328.19	0.00	0.00	0.00	0.00	0.00	0.00
23	883.18	715.08	487.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	791.85	603.94	322.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	685.00	464.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	555.41	265.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	385.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	44.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pe in MPa on outer race for rollers 16 to 25 row 2

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Details for bearing: B6

Rolling Bearing Calculation

Input data

Bearing Geometry

Type of rolling bearing		Spherical roller bearing
Manufacturer		Generic
Bearing name		23040
Bearing inner diameter	d	200.000 mm
Bearing outer diameter	D	310.000 mm
Bearing width	B	82.000 mm
Number of rolling elements	Z	25
Roller diameter	Dw	26.000 mm
Pitch diameter	Dpw	255.000 mm
Length of Roller	Lwe	27.100 mm
Conformity inner race	fi	0.5
Conformity outer race	fe	0.5
Conformity roller	fr	0.485
Nominal contact angle	α	9.1341 °
Definition of clearance		From database
Definition of bearing tolerance		Not considered
Nominal diametral clearance	Pd	0.1650 mm
Selection for clearance		Calculation for medium clearance

Loading

Speed of inner ring	ni	158.824 rpm
		inner ring rotates relative to load
Speed of outer ring	ne	0.0000 rpm
		outer ring is stationary relative to load
Displacement X	ux	0.0000 μ m
Displacement Y	uy	83.498 μ m
Displacement Z	uz	84.411 μ m
Rotation around Y	ry	-0.2027 mrad
Rotation around Z	rz	0.3849 mrad
Reliability	reliability	90.000 %
Maximal permissible value for aISO	aISOmax	50
Temperature of shaft	T_i	20.000 °C
Temperature of housing	T_e	20.000 °C

Material

Surface hardness inner race	HRC_i	58
Surface hardness outer race	HRC_e	58
Ultimate strength of core inner race	Rm_i	1200.0 MPa
Ultimate strength of core outer race	Rm_e	1200.0 MPa
Material for inner ring		Steel
Material for outer ring		Steel
Material for rolling element		Steel

Lubrication

Lubricant		ISO VG 220 mineral oil
Kinematic viscosity at 40°C	v40	220.000 mm ² /s
Kinematic viscosity at 100°C	v100	19.000 mm ² /s
Oil density	rhoOil	890.000 kg/m ³

Oil temperature	ϑ_{Oil}	70.000 °C
Oil does not contain effective EP additives		
Operating kinematic viscosity	$\nu(\vartheta)$	51.794 mm ² /s
Operating oil density	$\rho(\vartheta)$	851.593 kg/m ³
Lubricant cleanness		Oil lubrication with on-line filter ISO4406 -/17/14

Results

Centrifugal loads are not considered

Bearing inner geometry

Bearing inner geometry is approximated

Number of rolling elements	Z	25
Roller diameter	Dw	26.000 mm
Pitch diameter	Dpw	255.000 mm
Length of Roller	Lwe	27.100 mm
Conformity inner race	fi	0.5
Conformity outer race	fe	0.5
Conformity roller	fr	0.485
Nominal contact angle	α	9.1341 °
Nominal diametral clearance	Pd	0.1650 mm
Nominal axial clearance	Pa	0.6175 mm
Diameter inner race	di	232.112 mm
Diameter outer race	de	284.275 mm
Radius inner race	ri	142.138 mm
Radius outer race	re	142.138 mm
Radius roller	rr	137.873 mm
Change of clearance	ΔPd	0.0000 mm
Effective diametral clearance	Pdeff	0.1650 mm
Distance between rolling elements	δRE	5.9600 mm
Axial distance between rows	δR	41.000 mm

Forces and displacement

Axial force	Fx	0.0000 kN
Radial force Y	Fy	48.540 kN
Radial force Z	Fz	49.288 kN
Displacement X	ux	0.0000 μ m
Displacement Y	uy	83.498 μ m
Displacement Z	uz	84.411 μ m
Moment Y	My	0.0000 Nm
Moment Z	Mz	0.0000 Nm
Rotation around Y	ry	-0.2027 mrad
Rotation around Z	rz	0.3849 mrad
Maximal pressure inner race	pmax_i	1381.0 MPa
Maximal pressure outer race	pmax_e	1248.5 MPa
Maximal pressure	pmax	1381.0 MPa
Static safety factor	SF	8.38891

Life

Dynamic load capacity	Cr	792.411 kN
Static load capacity	C0r	1382.5 kN
Fatigue load limit	Cur	118.035 kN
Life modification factor for reliability	a1	1
Viscosity ratio	χ	1.23339
Contamination factor	eC	0.519557
Life modification factor	aISO	1.72603

MESYS Shaft and Rolling bearing calculation

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Reference load	Pref	77669.3 N
Basic reference rating life	L10r	2303.23
Basic reference rating life	L10rh	241697 h
Modified reference rating life	Lnmr	3975.44
Modified reference rating life	Lnmrh	417176 h

Life according ISO 281

Dynamic radial load factor	X	1
Dynamic axial load factor	Y	2.79878
Dynamic equivalent load	P	69176.4 N
Basic life	L10	3388.25
Basic life	L10h	355557 h
Modified life	Ln	18265.8
Modified life	Ln _{mh}	1.91678e+006 h

Thermal permissible speed

Factor for load independent losses	f _{0r}	4.5
Factor for load dependent losses	f _{1r}	0.00017
Surface for heat transfer	A _r	131381 mm ²
Thermal transmission coefficient	k _q	230.408 W/m ² ·K
Load for reference speed	P _{1r}	69124.4 N
Viscosity at reference conditions	ν _r	12.000 mm ² /s
Load independent friction moment	M _{0r}	5.5510 Nm
Load dependent friction moment	M _{1r}	2.9965 Nm
Thermal reference speed	n _{tr}	1690.9 rpm
Factor for load independent losses	f ₀	4.5
Factor for load dependent losses	f ₁	0.000167768
Load for permissible speed	P ₁	69176.4 N
Temperature difference between bearing and surroundings	Δθ	50.000 °C
Load independent friction moment	M ₀	10.743 Nm
Load dependent friction moment	M ₁	2.9594 Nm
Thermal permissible speed	n _t	1054.8 rpm
Friction moments and temperature increase for current speed (n=158.824)		
Load independent friction moment for current speed	M _{0_n}	3.0406 Nm
Load dependent friction moment for current speed	M _{1_n}	2.9594 Nm
Total friction moment for current speed	M _n	6.0001 Nm
Temperature difference for current speed	Δθ _n	3.2966 °C

Subsurface stresses

Maximal shear stress for inner race	τ _{max_i}	415.002 MPa
Depth for maximal shear stress inner race	h(τ _{max_i})	0.2230 mm
Shear yield stress for core inner race	τ _{Yield_i}	510.000 MPa
Shear fatigue limit for core inner race	τ _{a_i}	306.000 MPa
Shear stress at core inner race	τ _i	306.000 MPa
Maximal shear stress for outer race	τ _{max_e}	374.669 MPa
Depth for maximal shear stress outer race	h(τ _{max_e})	0.2471 mm
Shear yield stress for core outer race	τ _{Yield_e}	510.000 MPa
Shear fatigue limit for core outer race	τ _{a_e}	306.000 MPa
Shear stress at core outer race	τ _e	306.000 MPa
Required hardness depth inner race	h _{dmin_i}	0.5290 mm
Required hardness depth outer race	h _{dmin_e}	0.4955 mm

Damage Frequencies

Speed of inner ring	n _i	2.65 1/s	(159rpm)
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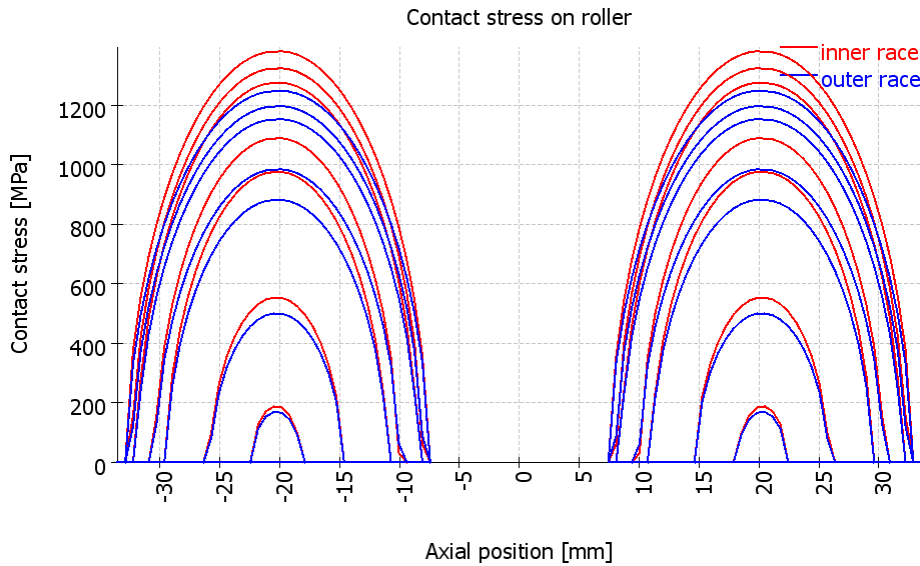
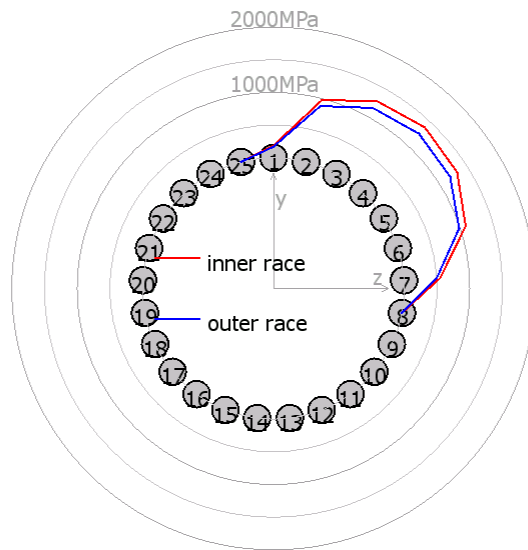
MESYS Shaft and Rolling bearing calculation

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Speed of outer ring	ne	0.00 1/s	(0rpm)
Rotation speed of cage	fc	1.19 1/s	(71rpm)
Damage frequency for inner race	fip	36.42 1/s	(2185rpm)
Damage frequency for outer race	fep	-29.76 1/s	(-1785rpm)
Damage frequency for rolling element	frp	-25.70 1/s	(-1542rpm)

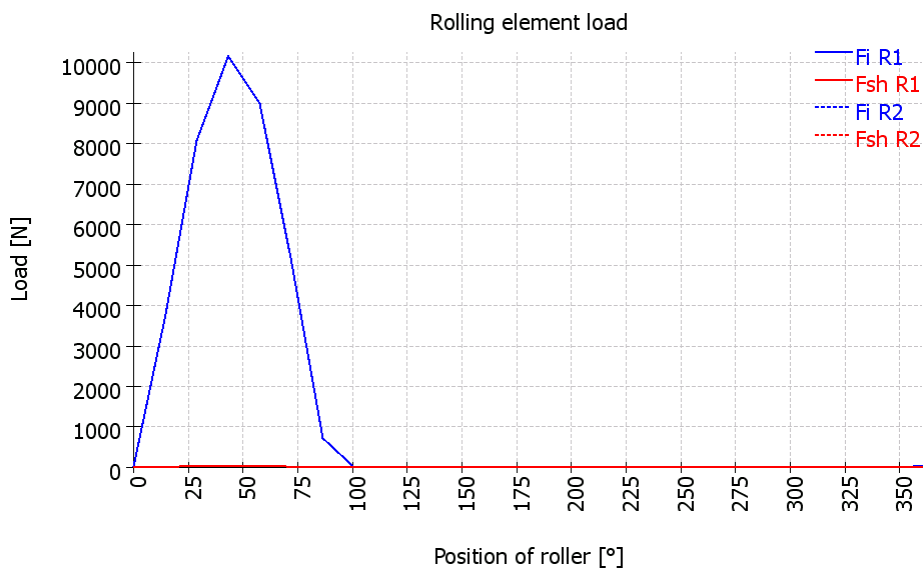
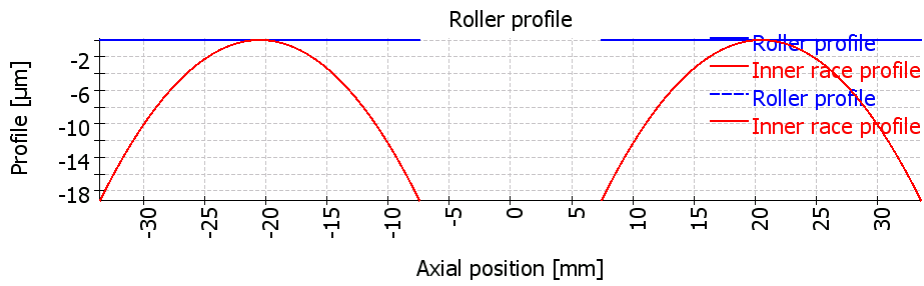
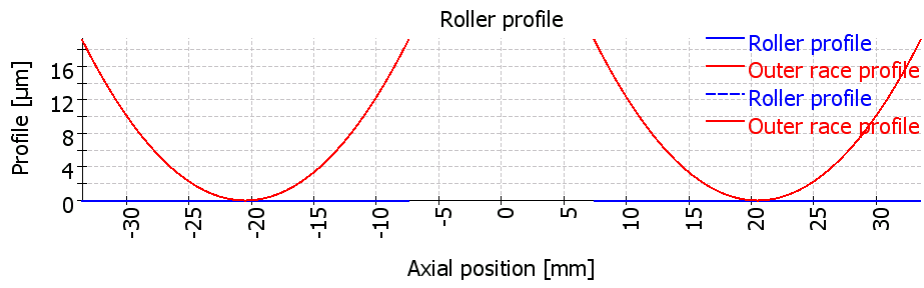
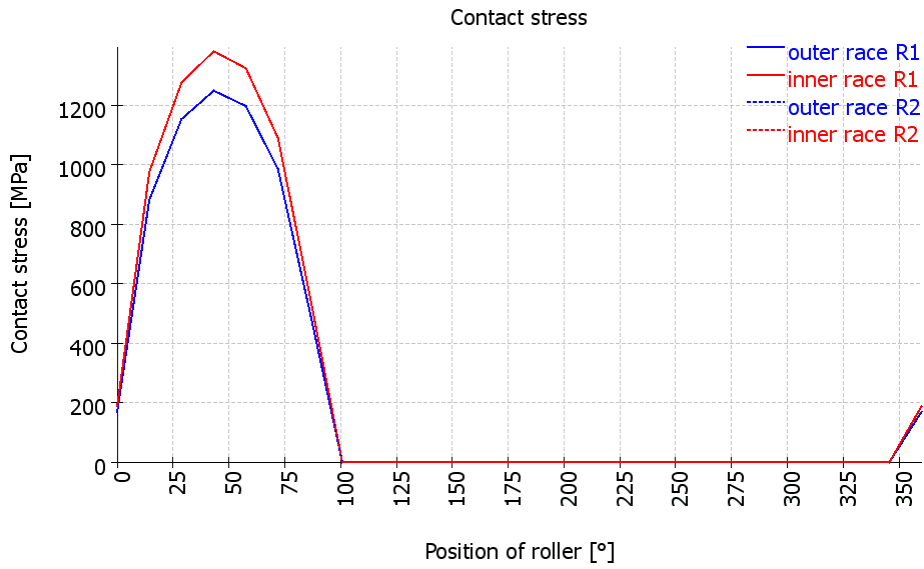
Bearing stiffness matrix

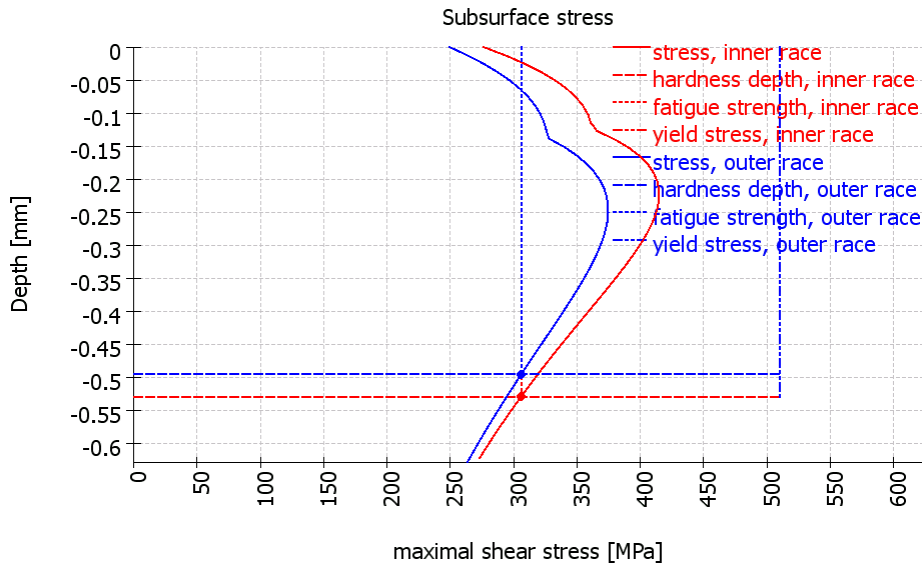
	ux [μm]	uy [μm]	uz [μm]	ry [mrad]	rz [mrad]
Fx [N]	117.074	-0.000	-0.000	0.000	0.000
Fy [N]	-0.000	2082.890	1549.540	0.000	0.000
Fz [N]	0.000	1550.055	2213.351	0.000	0.000
My [Nm]	0.041	0.000	-0.000	0.000	0.000
Mz [Nm]	-0.040	-0.000	0.000	0.000	0.000



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Result table for bearing 1

Results for row 1

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	31.8706	5.00129	-31.4757	0	0.000435713	0.108818
2	14.4	3724.4	583.643	-3562.82	-914.776	0.0596275	14.1898
3	28.8	8078.45	1264.15	-6991.99	-3843.88	0.143998	34.1453
4	43.2	10164.9	1589.6	-7318.74	-6872.75	0.188918	44.936
5	57.6	8995.3	1407.32	-4760.57	-7501.46	0.16318	38.5829
6	72	5109.85	800.493	-1559.53	-4799.75	0.0846227	19.9438
7	86.4	721.513	113.253	-44.7426	-711.163	0.0101295	2.40017
8	100.8	0	-0	0	-0	0	0
9	115.2	0	-0	0	-0	0	0
10	129.6	0	-0	0	-0	0	0
11	144	0	-0	0	-0	0	0
12	158.4	0	-0	0	-0	0	0
13	172.8	0	-0	0	-0	0	0
14	187.2	0	-0	0	0	0	0
15	201.6	0	-0	0	0	0	0
16	216	0	-0	0	0	0	0
17	230.4	0	-0	0	0	0	0
18	244.8	0	-0	0	0	0	0
19	259.2	0	-0	0	0	0	0
20	273.6	0	-0	-0	0	0	0
21	288	0	-0	-0	0	0	0
22	302.4	0	-0	-0	0	0	0
23	316.8	0	-0	-0	0	0	0
24	331.2	0	-0	-0	0	0	0
25	345.6	0	-0	-0	0	0	0

- ψ : Position of roller
- |F| : Absolute value of force on inner race
- Fx : Axial force
- Fy : Radial force Y
- Fz : Radial force Z
- M : Moment load on inner race
- Fsh : Force on shoulder

Results for row 2

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Roller	ψ [°]	F [N]	Fx [N]	Fy [N]	Fz [N]	M [Nm]	Fsh [N]
1	0	31.8706	-5.00129	-31.4757	-0	0.000435714	0.108818
2	14.4	3724.4	-583.643	-3562.82	-914.776	0.0596275	14.1898
3	28.8	8078.45	-1264.15	-6991.99	-3843.88	0.143998	34.1453
4	43.2	10164.9	-1589.6	-7318.74	-6872.75	0.188918	44.936
5	57.6	8995.3	-1407.32	-4760.57	-7501.46	0.16318	38.5829
6	72	5109.85	-800.493	-1559.53	-4799.75	0.0846227	19.9438
7	86.4	721.513	-113.253	-44.7426	-711.163	0.0101295	2.40017
8	100.8	0	-0	0	-0	0	0
9	115.2	0	-0	0	-0	0	0
10	129.6	0	-0	0	-0	0	0
11	144	0	-0	0	-0	0	0
12	158.4	0	-0	0	-0	0	0
13	172.8	0	-0	0	-0	0	0
14	187.2	0	-0	0	0	0	0
15	201.6	0	-0	0	0	0	0
16	216	0	-0	0	0	0	0
17	230.4	0	-0	0	0	0	0
18	244.8	0	-0	0	0	0	0
19	259.2	0	-0	0	0	0	0
20	273.6	0	-0	-0	0	0	0
21	288	0	-0	-0	0	0	0
22	302.4	0	-0	-0	0	0	0
23	316.8	0	-0	-0	0	0	0
24	331.2	0	-0	-0	0	0	0
25	345.6	0	-0	-0	0	0	0

ψ : Position of roller

|F| : Absolute value of force on inner race

Fx : Axial force

Fy : Radial force Y

Fz : Radial force Z

M : Moment load on inner race

Fsh : Force on shoulder

Roller profile and aISO

Section	x_rel [mm]	dx [mm]	profile_r [μm]	aISO row 1	aISO row 2
1	-33.539	0.661	0.00	0.00	0.00
2	-32.886	0.661	0.00	0.00	50.00
3	-32.234	0.661	0.00	50.00	50.00
4	-31.581	0.661	0.00	50.00	41.95
5	-30.929	0.661	0.00	38.11	15.50
6	-30.276	0.661	0.00	14.60	8.47
7	-29.623	0.661	0.00	8.13	5.63
8	-28.971	0.661	0.00	5.46	4.19
9	-28.318	0.661	0.00	4.09	3.35
10	-27.666	0.661	0.00	3.29	2.81
11	-27.013	0.661	0.00	2.77	2.45
12	-26.360	0.661	0.00	2.42	2.19
13	-25.708	0.661	0.00	2.17	2.00
14	-25.055	0.661	0.00	1.99	1.86
15	-24.403	0.661	0.00	1.85	1.76
16	-23.750	0.661	0.00	1.75	1.68
17	-23.097	0.661	0.00	1.67	1.62
18	-22.445	0.661	0.00	1.61	1.58
19	-21.792	0.661	0.00	1.58	1.55
20	-21.140	0.661	0.00	1.55	1.54
21	-20.487	0.661	0.00	1.55	1.55
22	-19.834	0.661	0.00	1.54	1.55
23	-19.182	0.661	0.00	1.55	1.58
24	-18.529	0.661	0.00	1.58	1.61
25	-17.877	0.661	0.00	1.62	1.67
26	-17.224	0.661	0.00	1.68	1.75
27	-16.571	0.661	0.00	1.76	1.85
28	-15.919	0.661	0.00	1.86	1.99
29	-15.266	0.661	0.00	2.00	2.17
30	-14.614	0.661	0.00	2.19	2.42
31	-13.961	0.661	0.00	2.45	2.77
32	-13.308	0.661	0.00	2.81	3.29
33	-12.656	0.661	0.00	3.35	4.09
34	-12.003	0.661	0.00	4.19	5.46
35	-11.351	0.661	0.00	5.63	8.13
36	-10.698	0.661	0.00	8.47	14.60
37	-10.045	0.661	0.00	15.50	38.11
38	-9.393	0.661	0.00	41.95	50.00
39	-8.740	0.661	0.00	50.00	50.00
40	-8.088	0.661	0.00	50.00	0.00
41	-7.435	0.661	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	378.77	155.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	284.22	559.08	426.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	484.17	691.78	585.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	622.36	799.32	706.56	157.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	731.57	890.04	806.13	387.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	287.93	822.29	968.18	890.47	527.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	443.13	899.53	1036.25	963.13	634.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	554.07	966.12	1095.87	1026.29	720.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	641.55	1023.89	1148.18	1081.39	792.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	713.16	1074.06	1194.01	1129.45	854.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	772.74	1117.51	1233.96	1171.22	906.07	98.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	822.54	1154.89	1268.50	1207.23	950.13	263.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	864.01	1186.68	1298.00	1237.92	987.21	356.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	898.11	1213.25	1322.73	1263.62	1017.94	422.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	925.54	1234.87	1342.91	1284.56	1042.81	470.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	946.78	1251.77	1358.70	1300.93	1062.14	506.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	128.03	962.15	1264.07	1370.21	1312.86	1076.18	531.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	171.54	971.87	1271.84	1377.48	1320.40	1085.06	547.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	187.97	974.97	1273.73	1379.01	1322.12	1087.66	553.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	184.25	975.92	1275.50	1381.04	1324.02	1088.93	552.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	158.29	970.31	1271.41	1377.37	1320.14	1083.98	543.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	97.96	959.15	1262.87	1369.51	1311.92	1073.96	524.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	942.33	1249.83	1357.46	1299.36	1058.78	495.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	919.58	1232.20	1341.13	1282.36	1038.29	455.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	890.53	1209.82	1320.41	1260.78	1012.20	401.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	854.67	1182.47	1295.13	1234.43	980.16	328.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	811.23	1149.85	1265.07	1203.04	941.65	221.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	759.14	1111.58	1229.93	1166.30	896.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	696.79	1067.17	1189.35	1123.74	842.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	621.63	1015.92	1142.85	1074.82	778.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	529.16	956.93	1089.80	1018.76	703.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	409.94	888.89	1029.37	954.50	613.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	233.88	809.89	960.40	880.55	501.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	716.83	881.23	794.61	349.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	604.17	789.28	692.87	31.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	459.66	680.20	568.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	239.13	545.23	401.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	359.04	61.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pi in MPa on inner race for rollers 16 to 25 row 1

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 1 to 15 row 2

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	359.04	61.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	239.13	545.23	401.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	459.66	680.20	568.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	604.17	789.28	692.87	31.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	716.83	881.23	794.61	349.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	233.88	809.89	960.40	880.55	501.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	409.94	888.89	1029.37	954.50	613.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	529.16	956.93	1089.80	1018.76	703.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	621.63	1015.92	1142.85	1074.82	778.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	696.79	1067.17	1189.35	1123.74	842.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	759.14	1111.58	1229.93	1166.30	896.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	811.23	1149.85	1265.07	1203.04	941.65	221.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	854.67	1182.47	1295.13	1234.43	980.16	328.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	890.53	1209.82	1320.41	1260.78	1012.20	401.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	919.58	1232.20	1341.13	1282.36	1038.29	455.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	942.33	1249.83	1357.46	1299.36	1058.78	495.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	97.96	959.15	1262.87	1369.51	1311.92	1073.96	524.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	158.29	970.31	1271.41	1377.37	1320.14	1083.98	543.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	184.25	975.92	1275.50	1381.04	1324.02	1088.93	552.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	187.97	974.97	1273.73	1379.01	1322.12	1087.66	553.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	171.54	971.87	1271.84	1377.48	1320.40	1085.06	547.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	128.03	962.15	1264.07	1370.21	1312.86	1076.18	531.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	946.78	1251.77	1358.70	1300.93	1062.14	506.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	925.54	1234.87	1342.91	1284.56	1042.81	470.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	898.11	1213.25	1322.73	1263.62	1017.94	422.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	864.01	1186.68	1298.00	1237.92	987.21	356.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	822.54	1154.89	1268.50	1207.23	950.13	263.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	772.74	1117.51	1233.96	1171.22	906.07	98.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	713.16	1074.06	1194.01	1129.45	854.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	641.55	1023.89	1148.18	1081.39	792.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	554.07	966.12	1095.87	1026.29	720.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	443.13	899.53	1036.25	963.13	634.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	287.93	822.29	968.18	890.47	527.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	731.57	890.04	806.13	387.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	622.36	799.32	706.56	157.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	484.17	691.78	585.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	284.22	559.08	426.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	378.77	155.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pi in MPa on inner race for rollers 16 to 25 row 2

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 1 to 15 row 1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	331.91	120.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	245.68	498.34	377.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	430.91	619.82	523.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	557.44	717.96	634.15	128.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	657.10	800.64	724.89	344.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	252.64	739.76	871.79	801.67	472.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	395.60	810.08	933.75	867.79	569.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	497.05	870.68	988.00	925.24	648.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	576.84	923.24	1035.61	975.36	714.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	642.10	968.89	1077.31	1019.08	769.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	696.37	1008.43	1113.68	1057.08	817.23	79.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	741.73	1042.46	1145.14	1089.86	857.33	234.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	779.51	1071.42	1172.03	1117.81	891.09	319.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	810.61	1095.65	1194.59	1141.24	919.10	379.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	835.65	1115.40	1213.04	1160.36	941.78	424.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	855.08	1130.86	1227.51	1175.34	959.46	456.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	112.91	869.20	1142.17	1238.10	1186.30	972.34	479.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	153.75	878.19	1149.38	1244.86	1193.29	980.55	494.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	169.51	881.20	1151.27	1246.43	1195.02	983.09	500.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	166.98	882.26	1153.05	1248.45	1196.91	984.42	499.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	144.52	877.40	1149.54	1245.32	1193.57	980.12	491.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	92.01	867.53	1141.99	1238.40	1186.32	971.25	474.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	852.54	1130.40	1227.70	1175.14	957.73	449.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	832.21	1114.66	1213.13	1159.96	939.40	413.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	806.21	1094.63	1194.61	1140.64	916.03	365.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	774.06	1070.12	1171.97	1117.02	887.30	299.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	735.10	1040.86	1145.02	1088.87	852.74	204.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	688.38	1006.52	1113.49	1055.88	811.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	632.45	966.64	1077.07	1017.67	763.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	565.06	920.62	1035.32	973.72	706.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	482.26	867.64	987.69	923.36	639.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	375.80	806.56	933.44	865.65	558.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	220.24	735.66	871.53	799.25	457.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	652.23	800.50	722.13	323.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	551.39	718.08	630.95	63.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	422.55	620.47	519.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	228.88	500.13	371.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	335.93	90.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pe in MPa on outer race for rollers 16 to 25 row 1

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pressure pe in MPa on outer race for rollers 1 to 15 row 2

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	335.93	90.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	228.88	500.13	371.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	422.55	620.47	519.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	551.39	718.08	630.95	63.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	652.23	800.50	722.13	323.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	220.24	735.66	871.53	799.25	457.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	375.80	806.56	933.44	865.65	558.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	482.26	867.64	987.69	923.36	639.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	565.06	920.62	1035.32	973.72	706.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	632.45	966.64	1077.07	1017.67	763.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	688.38	1006.52	1113.49	1055.88	811.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	735.10	1040.86	1145.02	1088.87	852.74	204.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	774.06	1070.12	1171.97	1117.02	887.30	299.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	806.21	1094.63	1194.61	1140.64	916.03	365.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	832.21	1114.66	1213.13	1159.96	939.40	413.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	852.54	1130.40	1227.70	1175.14	957.73	449.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	92.01	867.53	1141.99	1238.40	1186.32	971.25	474.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	144.52	877.40	1149.54	1245.32	1193.57	980.12	491.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	166.98	882.26	1153.05	1248.45	1196.91	984.42	499.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	169.51	881.20	1151.27	1246.43	1195.02	983.09	500.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	153.75	878.19	1149.38	1244.86	1193.29	980.55	494.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	112.91	869.20	1142.17	1238.10	1186.30	972.34	479.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	855.08	1130.86	1227.51	1175.34	959.46	456.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	835.65	1115.40	1213.04	1160.36	941.78	424.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	810.61	1095.65	1194.59	1141.24	919.10	379.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	779.51	1071.42	1172.03	1117.81	891.09	319.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	741.73	1042.46	1145.14	1089.86	857.33	234.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	696.37	1008.43	1113.68	1057.08	817.23	79.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	642.10	968.89	1077.31	1019.08	769.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	576.84	923.24	1035.61	975.36	714.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	497.05	870.68	988.00	925.24	648.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	395.60	810.08	933.75	867.79	569.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	252.64	739.76	871.79	801.67	472.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	657.10	800.64	724.89	344.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	557.44	717.96	634.15	128.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	430.91	619.82	523.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	245.68	498.34	377.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	331.91	120.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MESYS Shaft and Rolling bearing calculation

Change this text in mesys.ini

Pressure pe in MPa on outer race for rollers 16 to 25 row 2

Section	16	17	18	19	20	21	22	23	24	25
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00