MDESIGN

MODULEOVERVIEW2026

Discover the calculation system for
mechanical and plant engineering

Information · Calculation · Optimization · Verification · Documentation

Basic module
MDESIGN explorer

Calculation module
MDESIGN mechanical

Expert module

MDESIGN technology

MDESIGN technology

- ▶ Hertzian pressure
- ▶ Equivalent stress
- ▶ Hardness values
- ▶ Stress concentration
- ▶ General tolerance
- ▶ Thermal expansion
- ▶ SO-Fit system
- ▶ Tolerance calculation
- ▶ Pressure between bodies
- ▶ Efficiency factor
- ▶ Surface pressure
- ▶ Cylindrical shell
- ▶ Conical shell
- ▶ Spherical shell
- ▶ Rotationally symmetrical shell
- ▶ Toroidal shell, membrane stress
- ▶ Pipe
- ▶ Long conical shell
- ▶ Cylindrical shell with ends
- ▶ Bending and membrane tension
- ▶ Spherical shell

- ▶ Material data
  - Determination of characteristic data:
  - • depending on size
  - • temperature-dependent

MDESIGN technology

- ▶ General strength assessment
  - • according to FKM guideline
  - • dynamic and static strength
  - • welded/non-welded components

MDESIGN mechanical

MDESIGN mechanical

- ▶ Shaft, Axles

- ▶ Parallel key notches
- ▶ Grooved shafts
- ▶ Splined shaft notches
- ▶ Crosed bored shafts
- ▶ Snap rings for shafts
- ▶ Reduced shafts
- ▶ Friction on bearing/ring pin
- ▶ Design diameter for axes
- ▶ Stresses in a beam
- ▶ Recesses DIN 509
- ▶ Combined stress, Mohr´s circle
- ▶ Shaft, ANSI

- ▶ Shaft, DIN 743
  - Standard scope:
  - • Up to 8 fillets
  - • Up to 2 bearing units

MDESIGN shaft

- ▶ Shaft, DIN 743
  - extended calculations:
  - • Up to 100 fillets, also conical
  - • Up to 12 bearing units
  - • Individual notch factors
  - • Bearing stiffnesses
  - • Bending-critical speeds
  - • Hollow shaft, vertical shaft
  - • Use of own materials
  - • Geometry import in step format
  - • Export in step, STL, HTML format

- ▶ Shaft, FKM
  - • Strength verification, FKM guideline
  - • Use of FE data
  - • Integrated solver
  - • Dynamic and static strength
  - • Export in Step, STL, HTML format

- ▶ Shaft-hub connections

- ▶ Surface press. con. press-fit joints
- ▶ Surface press. serrated profile

- ▶ Face Splines
- ▶ Splined shaft connection
- ▶ Parallel key connection
- ▶ Split hub
- ▶ Split lever hub
- ▶ Tapered connection
- ▶ Clamping device joint
- ▶ Axial bracing
- ▶ Cyl. / tapered press-fit connection
- ▶ Serrated shaft
- ▶ Polygonprofile, P3G and P4C
- ▶ Parallel key, Woodruff key, Mott

- ▶ Welded connections

- ▶ Weld, standard
  - Standard scope:
  - • Calculation according to DVS
- ▶ Weldet Joint, AISC

MDESIGN weld

- ▶ Weld
  - • Calculation according to Eurocode 3
  - • Calculation according to FKM guideline

MDESIGN mechanical

	Basic module MDESIGN explorer	**Calculation module** MDESIGN mechanical	**Expert module**

▶ Screw connections	▶ Forces on the bolt
	▶ Design of prestressed boltings
	▶ Bolt sizes
		▶ Bolted joint, VDI 2230
		  Standard scope:
		  • Centric load
		  • Standard bolts
		  • 2 braced components
		  • Material database
		  • Strength verification according to
		    VDI 2230 Sheet 1
		
		▶ Power screws
		▶ Power Screws, Mott
		▶ Moment loaded joints
		▶ Bracket joints
		▶ Bolted connections
			MDESIGN bolt
			
			▶ Bolted joint, VDI 2230
			  advanced calculations:
			  • 3D assistent for modeling
			  • Eccentric load case
			  • Factory bolt geometries
			  • Hollow bolts, flange bolts, stud bolts
			  • Countersunk head bolts, plug screws, hook bolts
			  • Bolts with inch diam. (UNC, UNF, UNEF)
			  • Up to 10 braced components / plates
			  • Temperature consideration
			  • Use of own materials
			  • Use of own bolt dimensions
			  • Extended material database according FKM
			  • Clamping washers / self-locking nuts
			  • Serrated lock washer / wedge-locking washer
			  • Transfer of forces from FE results
			  • Extended plate detailing
			  • Dynamic stressing diagrams
			  • Assembly documentation acc. to VDI 2230-3
			  • AI assistant for tightening torque
			
			▶ Bolted connection, Eurocode 3
			  • Load ratios
			
			MDESIGN multibolt
			
			▶ Multi-bolt connection
			  • Calculation according to VDI 2230 sheet 2
			  • Load distribution / multi bolted connection
			  • Free flange and adjacent construction
			  • Bolt patterns / arbitrary arrangements
			  • Determination of the highest loaded bolt
			  • Safety devices according to VDI 2230 Sheet 1

▶ Bonded joints		▶ Bonded joint, tensile load ▶ Bonded joint, tangential load ▶ Bonded joint, torsional load	
▶ Riveted, soldering joints	▶ Riveted joint ▶ Soldering joint		
▶ Bolts, Pins	▶ Shearing strain	▶ Crossbolt ▶ Guiding pin ▶ Longitudinal pin ▶ Transverse pin	
▶ Gearing	▶ Layout of gear pair	▶ Cylindrical gear, standard DIN ▶ Cylindrical gear, gear rack ▶ Bevel gear, hypoid gear DIN ▶ Cylindrical worm gear ▶ Splines, US standard ▶ Worm gear, US standard ▶ Bevel gear, US standard ▶ Helical gear, US standard ▶ Spur gear, US standard	**MDESIGN gear** ▶ Cylindrical gear (AGMA, ISO) ▶ Cylindrical gear, tooth flank fract. ▶ Cylindrical gear, micropitting ▶ Cylindrical gear, plastic ▶ Bevel-, hypoid gear (AGMA, DNVGL) ▶ Crown gear ▶ Crossed helical gear ▶ Ring gear, rim influence
▶ Gears			**MDESIGN gearbox** ▶ Gearbox assembly
▶ Belt-, chain drives		▶ Synchronous belt ▶ Belt contact ▶ Normal V-belts ▶ Narrow V-belt ▶ Roller chain ▶ V-belt, Mott	**MDESIGN LVR** ▶ Tooth contact analysis, spur gear **MDESIGN LVR planet** ▶ Tooth contact analysis, planetary gear

MDESIGN mechanical

Basic module	Calculation module	Expert module
MDESIGN explorer	MDESIGN mechanical	

MDESIGN bearing

▶ Roller bearing

▶ Plane bearing

▶ Linear technology

▶ Elastic Springs

▶ Shock Absorbers

▶ Beams, Frames

▶ Clutches and brakes

▶ Sealing

Calculation module

▶ Ball and Roller bearing (DIN)
Standard scope:
• Nominal / extended life

▶ Plain thrust bearings
▶ Radial plain bearing
▶ Plain bearing, Mott

▶ Linear guides
▶ Ball screw

▶ Compression spring
▶ Tension spring
▶ Torsion spring
▶ Disc spring
▶ Torsion bar spring
▶ Helical extension

▶ ACE shock absorber

▶ Beam
▶ Column
▶ Stat. determinate beam. Mott
▶ Stat. indeterminate beam, Mott
▶ Structure (2D)

▶ Clutche
▶ Plate-type
▶ Cone

▶ O-ring
▶ O-ring, dimensions

Basic module

▶ Buckling of rods
▶ Statically determinate beam
▶ Statically indeterminate beam
▶ Round plates
▶ Beam resting on elastic support
▶ Frames
▶ Restrained bar, pendulum bearing
▶ Bar loaded, longitudinal force
▶ Connected bars
▶ Frame with diff. support
▶ Connected columns
▶ Framed roof
▶ Selection of beam profiles
▶ Strain calculation
▶ Torsional moments of inertial

▶ Brake

Expert module

▶ Ball and Roller bearings (DIN, ISO/TS)
• Bearing combinations
• Nominal reference life
• Modified reference life

Basic module
MDESIGN explorer

Calculation module

Expert module

MDESIGN **process**

▶ Apparatus, Pipelines

- ▶ Thick-walled cylindrical shell
- ▶ Thick-walled spherical shell
- ▶ Cylindrical shell, wall thickness
- ▶ Cylindrical shell, tension

only included in MDESIGN process

- ▶ Flange, EN 1591
- ▶ Flange, AD 2000
- ▶ Pressure loss in pipelines
- ▶ Flat end, plate
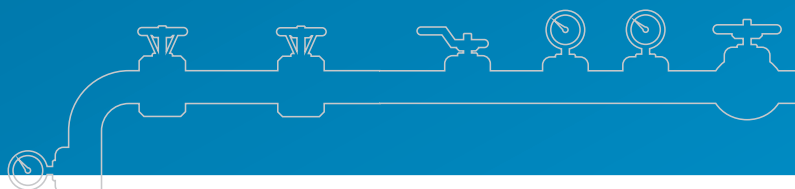- ▶ Support bracket
- ▶ Support feet

MDESIGN **espresso**

- ▶ Pressure vessel
  - · Pressure vessel assembly
  - · 3D Assistant
  - · Export in Step, STL, HTML format

▶ Hydraulics

- ▶ Hydraulic press
- ▶ Hydro power
- ▶ Pump
- ▶ Tube, Reynolds number
- ▶ Tube, speed
- ▶ Oil viscosity
- ▶ Sealing surface pressure

only included in MDESIGN process

- ▶ Pipe, thin-walled

MDESIGN **nature**

▶ Physics

- ▶ Mechanics of deformable bodies
- ▶ Hydrostatics and hydrodynamics
- ▶ Kinematics
- ▶ Dynamics
- ▶ Gravity
- ▶ Rotat. movement of rigid bodies
- ▶ Damped mechanic oscillation
- ▶ Superposition of mec. oscillations
- ▶ Undamped mech. oscillation
- ▶ Calculation of elongation
- ▶ Mass moments of inertia
- ▶ Moments of inertia of the area
- ▶ Axial mass moments of inertia
- ▶ Axial moments of inertia of area
- ▶ Compression load, buoyancy

▶ Geometry

- ▶ Geometry data (2D)
- ▶ Geometry data (3D)
- ▶ Calculation of triangle
- ▶ Cross-section properties
- ▶ Partitions of lengths

▶ Dynamics

- ▶ Torsional stress in a shaft
- ▶ Dynamic stress in a tightrope
- ▶ Forces on hoisting devices
- ▶ Mech. Power at rotary motion
- ▶ Inclined plane
- ▶ Stress of a beam/shock loading

Basic module
MDESIGN explorer

Calculation module

Expert module

MDESIGN manufacture

▶ Main machine time, cutting speed
▶ Full forward extrusion
▶ Metal-cutting
▶ Deep drawing
▶ Bending forming
▶ Appr. calculation roughness dim.
▶ Manufacturing technique, surface roughness

MDESIGN control

▶ Materials, springs
▶ Dimensions, beam
▶ Dimensions, bolted joint
▶ Materials, bolted joint
▶ Plastics
▶ Lubricants
▶ Materials, plant
▶ Characteristic values, gasket
▶ Reference profiles, gears
▶ Materials, shaft