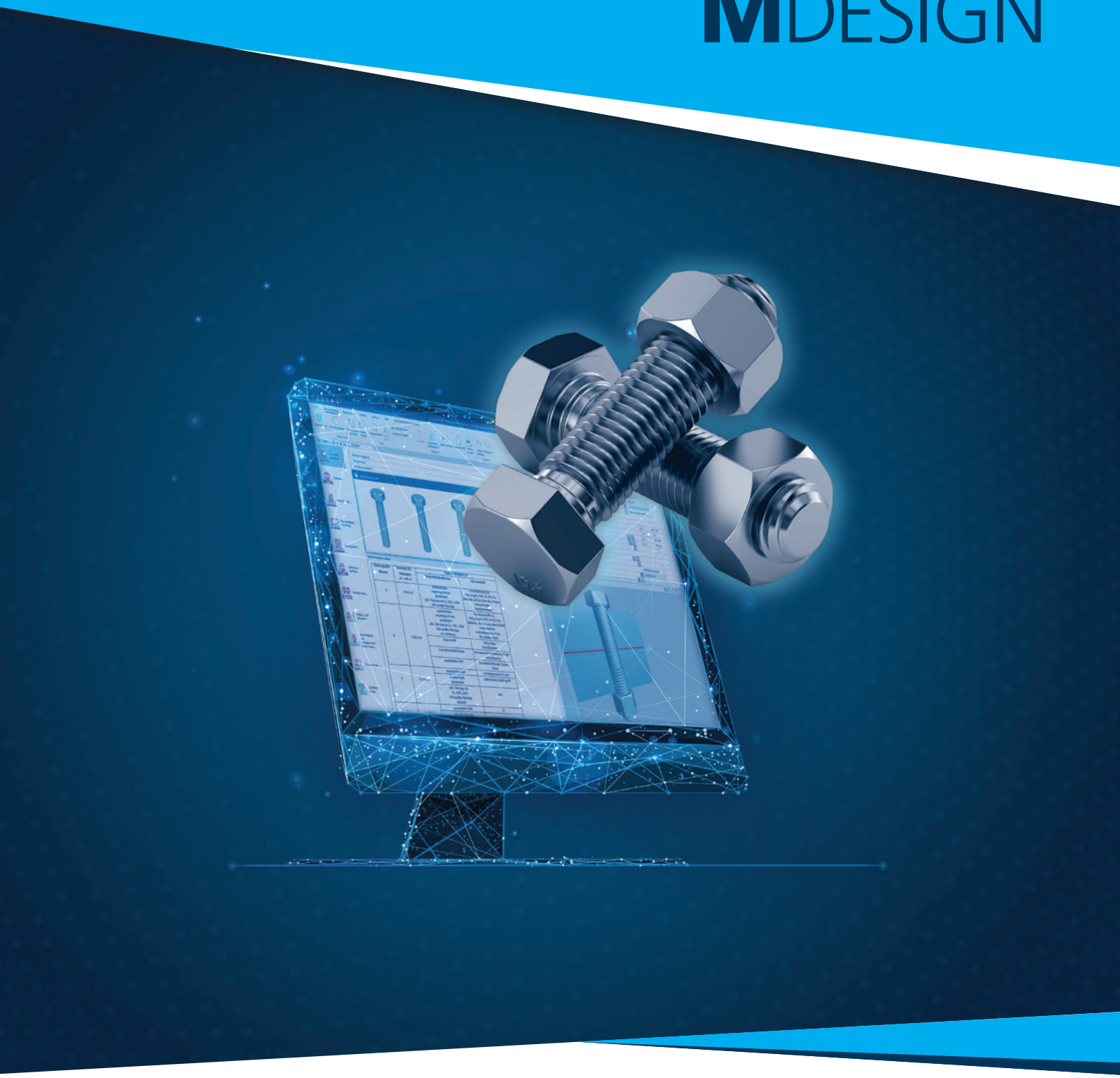
MDESIGN



MODULEOVERVIEW

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

- 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

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

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

- Splined shaft connection
- Parallel key connection
- Split hub
- Split lever hub
- Tapered connection
- Clamping device joint
- Axial bracing
- Cylindrical press-fit connection
- Tapered press-fit connection NEW!
- 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 ▶ Power screws ▶ Power Screws, Mott ▶ Moment loaded joints ▶ Bracket joints ▶ Bolted connections	**MDESIGN bolt** ▶ Bolted joint, VDI 2230 advanced calculations: • 3D assistent NEW! • Eccentric load case • Factory bolt geometries • Hollow bolts, flange bolts, stud bolts • Countersunk 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 • Transfer of forces from FE results • Extended plate detailing • Dynamic stressing diagrams ▶ Bolted connection, Eurocode 3 • Load ratios **MDESIGN multibolt** ▶ Multi-bolt connection • Calculation according to VDI 2230 sheet 2 • Load distribution / multi bolted connection • Integrated solver • Free flange and adjacent construction • Bolt patterns / arbitrary arrangements • Determination of the highest loaded bolt • Strength verification, VDI 2230 sheet 1 • Export in Step, STL, HTML format
▶ 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	**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 NEW! ▶ Ring gear, rim influence
▶ 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	
▶ Gears			**MDESIGN gearbox** ▶ Gearbox assembly **MDESIGN LVR** ▶ Tooth contact analysis, spur gear **MDESIGN LVR planet** ▶ Tooth contact analysis, planetary gear
▶ Belt-, chain drives		▶ Synchronous belt ▶ Belt contact ▶ Normal V-belts ▶ Narrow V-belt ▶ Roller chain ▶ V-belt, Mott	

MDESIGN mechanical

	Basic module MDESIGN explorer	Calculation module MDESIGN mechanical	Expert module
▶ Roller bearing		▶ Ball and Roller bearing (DIN) Standard scope: • Nominal / extended life	MDESIGN bearing ▶ Ball and Roller bearings (DIN, ISO/TS) · Bearing combinations · Nominal reference life · Modified reference life
▶ Plane bearing		▶ Plain thrust bearings ▶ Radial plain bearing ▶ Plain bearing, Mott	
▶ Linear technology		▶ Linear guides ▶ Ball screw	
▶ Elastic Springs		▶ Compression spring ▶ Tension spring ▶ Torsion spring ▶ Disc spring ▶ Torsion bar spring ▶ Helical extension	
▶ Shock Absorbers		▶ ACE shock absorber	
▶ Beams, Frames	▶ 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	▶ Beam ▶ Column ▶ Stat. determinate beam. Mott ▶ Stat. indeterminate beam, Mott ▶ Structure (2D)	
▶ Clutches and brakes	▶ Brake	▶ Clutche ▶ Plate-type ▶ Cone	
▶ Sealing		▶ O-ring	

	Basic module MDESIGN explorer	Calculation module	Expert module
MDESIGN process		only included in MDESIGN process	**MDESIGN espresso**
▶ Apparatus, Pipelines	▶ Thick-walled cylindrical shell ▶ Thick-walled spherical shell ▶ Cylindrical shell, wall thickness ▶ Cylindrical shell, tension	▶ Flange, EN 1591 ▶ Flange, AD 2000 ▶ Pressure loss in pipelines ▶ Flat end, plate ▶ Support bracket ▶ Support feet NEW!	▶ 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		

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