

# MDESIGN formula

The fast and easy formulary - Numerous formulas and mathematical solutions from various disciplines

2012

- Geometry
  - General tolerance
  - Axial moments of inertia of an area
  - Calculation of Triangle
  - Geometry Data (2D)
  - Geometry Data (3D)
  - Torsional moments of inertia of an area
  - Cross-Section Properties
- Hydraulics
  - Sealing-Surface Pressure acc. to DIN EN 1514
  - Calculation of the Wall Thickness against Inner Pressure
  - Hydraulic press
  - Viscosity, ISO Normal Oils
  - Cylindrical Shells
  - Compression load, buoyancy in liquids
  - Pumping capacity
  - Shape of Flow
  - Flow Velocity and Inner Pipe Diameter
- Hydrostatics
  - Force on Flat Surface with constant Width
- Mechanical Design
  - Statics
    - Buckling of rods
    - Statically Determinate Beams
    - Statically Indeterminate Beams
    - Thermal Expansion
    - Calculation of elongation
    - Round plates
    - Beam Resting on Elastic Support
    - Friction on the bearing / ring pin
    - Pressure Between Elastic Bodies
    - Frames
  - Shells of Revolution
    - Cylindrical Shell, Membrane Stresses and Deformations
    - Conical Shell, Membrane Stresses and Deformations
    - Spherical Shell, Membrane Stresses and Deformations
    - Membrane Stresses and Deformations
    - Toroidal Shell, Membrane Stresses and Deformations
    - Cylinder Shell, Bending and Membrane Stresses
    - Partial Spherical Shell, Bending and Membrane Stresses
    - Long Conical Shell with Edge Loads and Bending
    - Cylindrical Shell with Open and Closed Ends
    - Toroidal Shell, Bending and Membrane Stresses
    - Thick-walled cylinder under internal and external pressure
    - Thick-walled sphere under internal and external pressure
  - Buckling Loads and Buckling Length
    - Bar Loaded with Linearly Varying Longitudinal Force
    - Connected Bars
    - Restrained Bar with Pendulum Bearings
    - Frames with Restrained and Pivoting Supports
    - Connected columns
    - Framed Roof
  - Dynamics
    - Dynamic Stress in a Tightrope
    - Stress of a Beam as a Result of Shock Loading
    - Stresses in a Beam
    - Torsional Stress in the Shaft
    - Forces on hoisting devices
    - Mechanical power at rotary motion
    - Shearing Strain
    - Inclined Plane
    - Efficiency Factor, Total Efficiency
  - Manufacturing Methods
    - Metal-cutting
    - Deep-drawing
    - Bending forming
    - Main Machine Time and Cutting Speed
    - Partition of Lengths
    - Full Forward extrusion presses
  - Machine Elements
    - Shafts, Axes, Beams
      - Designed Diameter for Axes and Shafts
      - Snap Rings for Shafts
      - Reduced Shafts
      - Grooved Shafts
      - Parallel Key Notches
      - Splined Shaft Notches
      - Crossed Bored Shafts
    - Connections
      - Bolt Sizes
      - Forces on the bolt
      - Riveted Joints
      - Soldering joint
      - Design of prestressed boltings
    - Surface Pressure
      - Hertzian pressure
      - Surface Pressure
      - Surface pressure for serrated profile
      - Surface pressure of conical press-fit joints
    - Gears
      - Layout of gear pair
  - Physics

**MDESIGN formula supports designers with their day to day conceptual work. Fast dimensioning, iterations, verification of ideas and assumptions are the jobs this MDESIGN library is designed for.**

Looking at the content you can see that most of the important subjects in mechanical design are addressed. Machine elements like beams, shafts and bolts as well as hydraulics and mechanical problems are dealt with. The formulas come from various scientific fields and form one comprehensive formulary to assist you with all different tasks in your daily work.

## Content of MDESIGN formula:

Geometry

Hydraulics, Hydrostatics

Mechanical Design, Statics, Dynamics

Manufacturing Methods

Machine Elements, (Shafts, Axes, Beams,

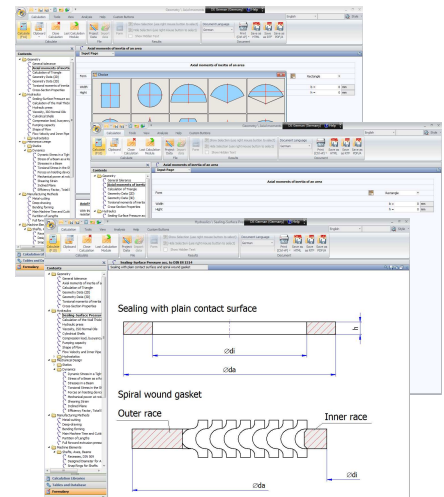
Connections, Surface Pressure, Gear)

Physics

**MDESIGN formula offers easy formulas with complex background to simplify your job.**

In order to fully understand all the intelligence of the formulas you might need a closer look. MDESIGN does not only present input fields and results but gives valuable information and assistance, either in textual or in graphical form. That means the user environment never lets you get lost.

The formulary is part of the MDESIGN explorer and can now also be obtained as a single module. In version MDESIGN 2012 again many new formulas have been included which will provide quick and targeted solutions, and moreover, save a lot of time.



**TEDATA GmbH**  
Königsallee 4, D-44789 Bochum  
phone: +49 (0) 234-30703-0  
fax: +49 (0) 234-30703-99

[www.tedata.com](http://www.tedata.com)

[info@tedata.de](mailto:info@tedata.de)

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