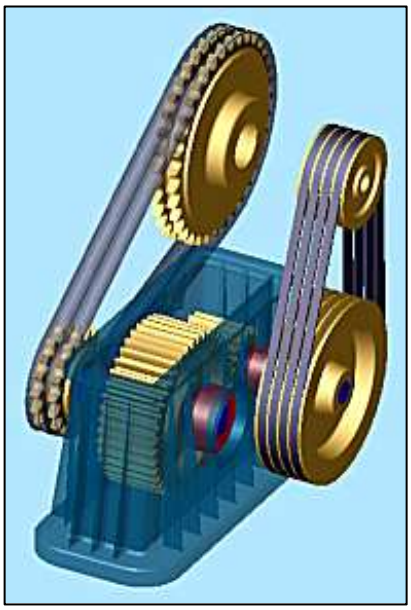
MITCalc MITCalc is a multi-language set of mechanical, industrial and technical calculations for the day-to-day routines. It will reliably, precisely, and most of all quickly guide customer through the design of components, the solution of a technical problem, or a calculation of an engineering point without any significant need for expert knowledge.

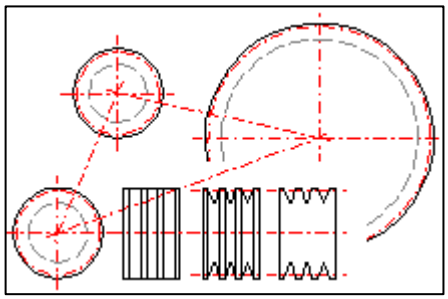


MITCalc contains both design and check calculations of many common tasks, such as: tooth, belt, and chain gear, beam, shaft, springs, bolt connection, shaft connection and many others. There are also many material, comparison, and decision tables, including a system for the administration of resolved tasks. The calculations support both Imperial and Metric units and are processed according to ANSI, ISO, DIN, BS, CSN and Japanese standards.

It is an open system designed in Microsoft Excel which allows not only easy user-defined modifications and user extensions without any programming skills, but also mutual interconnection of the calculations, which is unique in the development of tailor-made complex calculations. The sophisticated interaction with many 2D (AutoCAD, AutoCAD LT, IntelliCAD, Ashlar Graphite, TurboCAD) and 3D (Autodesk Inventor, SolidWorks) CAD systems allows the relevant drawing to be developed or 3D models to be inserted in a few seconds. OEM licensing of selected calculations or the complete product is available as well. MITCalc installation packages are available at www.mitcalc.com and after installation customer have 30 days to freely test the product.

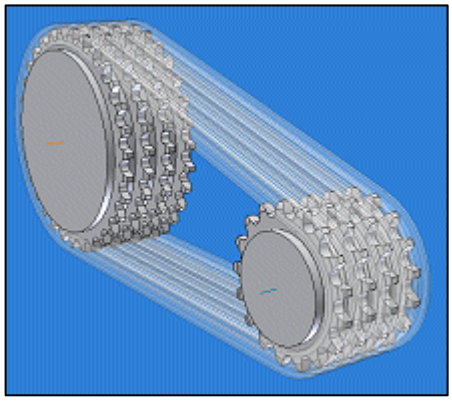
CAD support

2D CAD systems:



Most of the calculations allow direct output to major 2D CAD systems. Just choose your CAD system in the calculation and select the desired view (a projection type). A drawing is then saved directly in the CAD system with the correct scale and system of layers. Supported CAD systems at this time: DXF file, AutoCAD (12-2012), AutoCAD LT (95-2012), IntelliCAD, Ashlar Graphite, TurboCAD. The design is fully open, customer can connect other CAD systems or define new drawing templates based on the calculated values.

3D CAD systems:



These are installed in the form of individually installed plug-ins containing relevant parametric models and an interface between Excel and the selected CAD system. An assembly may consist of not only individual components but also groups of components (sub-assemblies). For example, you can insert one complete solution of a belt gear at once, which is fully associative, and the dimensions of the inserted component (sub-assembly) will change automatically in case you make changes to the calculation parameters later.

Supported CAD systems:

- **Autodesk Inventor**
  ver.: 5.3, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 2008, 2009, 2010, 2011, 2012 and next
- **SolidWorks**
  ver.: 2001 Plus; 2003; 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011 and next
- **Solid Edge**
  ver.: 15, 16, 17, 18, 19, 20, ST2, ST3 and next
- **Pro/ENGINEER** (Details: COGRAS spol. s r.o. – www.cogras.cz)

Autodesk Authorised Developer

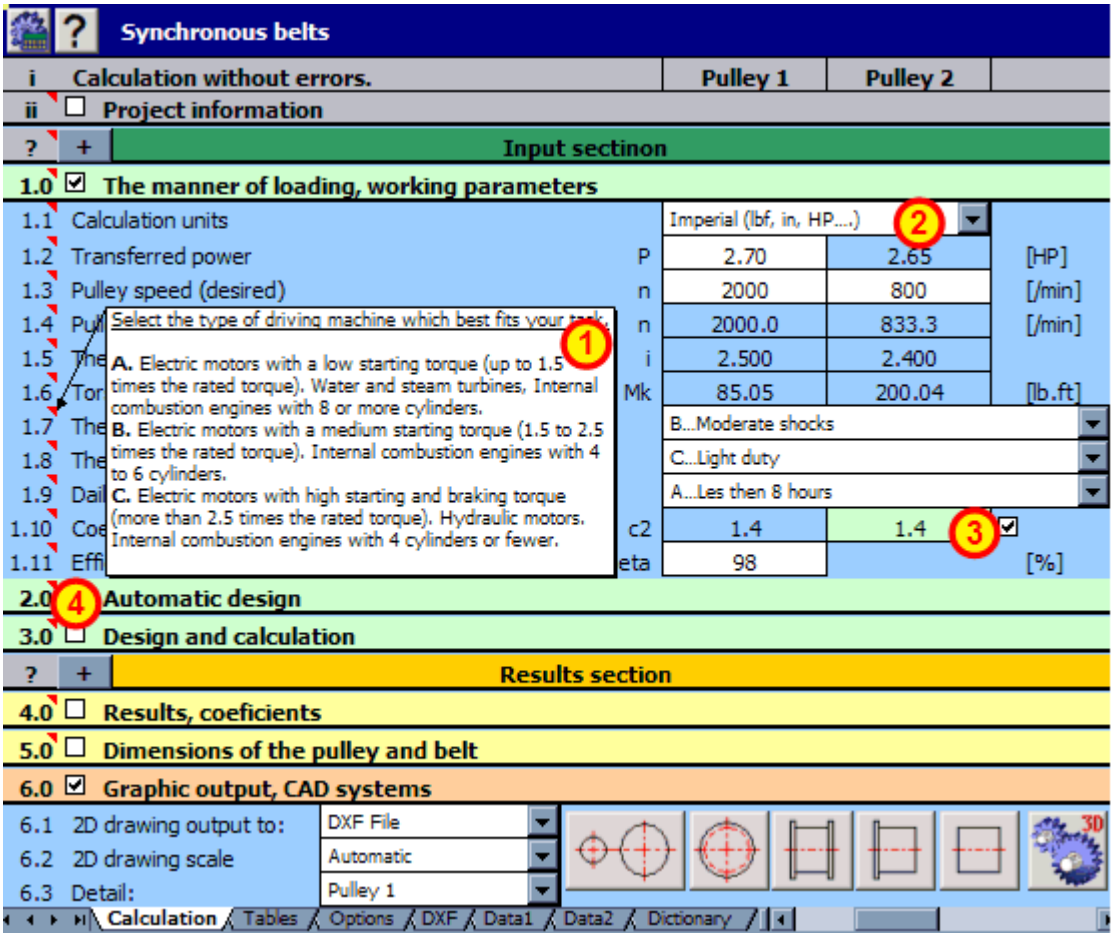
SOLID EDGE Voyager Program Certified Select Product

SOLIDWORKS Solution Partner

User interface

Most of the calculations have a similar user interface whose main advantage is its top-to-bottom layout – every task flows logically from an assignment to the results. In other words, the structure of a calculation is like what you are already accustomed to when solving the same task with a calculator and sheet of paper. Other advantages of our solution are:

- The "Expert Notes" system containing recommendations and tips for input and output values [1].
- Support of standard and imperial units [2].
- Recommended values – the calculation "knows" how to set (estimate) the right coefficients [3].
- Any change of parameters immediately results in recalculation of the entire task (a table).
- For most of the calculations, there is the "Automatic Design" mode available, which offers a set of solutions based on minimum input information and one parameter to optimize (e.g. weight, safety, dimensions) [4].



Why MS Excel is used.

The history of table calculators begins in the 1980's (1979 - Visicalc) and their use has considerably expanded since. Though, at the beginning, these calculators were used mostly in the field of economics, statistics and financial calculations, their use is more or less universal today and there probably aren't any technical workers who have no experience with a table calculator.
Microsoft Excel is obviously the best product. This program provides a wide scope of options and user modifications (control elements, programming language, table formatting, etc). This predestines it for use in engineering, industrial and technical calculations with the following main benefits.

- General knowledge of Excel, millions of users, multi-platform applications (Windows, Apple).
- User's interface - Excel enables us, for this type of task, to design a natural user environment.
- Open solution - The user can simply modify or extend the calculation according to their own requirements and usage.

- Complex solution - Interconnection of several calculations (even including separate tables) allows quick preparation of a solution for complex entries - tailored solution.
- Data sharing - A range of programs (including many CAD systems) can cooperate with Excel tables directly.
- Communication - Simple data transfer - sending a workbook also includes sending the data and procedure.
- Publication activity - easy publication of results on the Internet or Intranet, and simple modifications of print reports
- .....and many others.

Individual modules description

Detailed information about all calculations, used standards, tables, and tools are available in comprehensive documentation, which is accessible once the MITCalc application is installed (with a 30-day-testing period available). Some brief information about individual modules is available below.

MITCalc - Beam

The application is designed for calculations of straight, maximum three times static indefinite beams with constant axis-symmetrical profiles.
- Simple definition of the type of beam and its loading with visual check.
- Calculation of area characteristics of 20 types of cross sections.
- Calculation of reactions in supports.
- Calculation of minimum / maximum bending moment, stress and deflection of the beam.
- Calculation and graphic illustration of the moment, stress, deflection and bending angle of the loaded beam.

The application includes a table of materials and a table of area characteristics of W, S, C, L profiles acc. to ANSI/AISC and I, U, L a T profiles acc. to DIN/ISO. Used standards: DIN 1025, 1026, 1028, 1029, 1024, AISC W, S, C, L, LU

MITCalc - Shaft

The calculation is designed for geometrical design and complex strength check of shafts.
- Simple definition of installed shafts, including hollow ones.
- Options of definitions of necking-down, recesses, grooves and calculation of the relevant coefficients of stress concentration.
- Simple definition of spatial shaft load.
- Calculation of reactions, courses of forces, moments, stress, deflection and bending angle of the shaft and others.
- Calculation of critical speed and safety coefficients.

The calculation is based on data, procedures, algorithms and data from specialized literature and standards AGMA, ISO, DIN and BS.
List of standards (DIN 743)

MITCalc - Profiles

The calculation solves area characteristics of profiles created in a simple graphic editor and mass characteristics of solids created by extrusion or rotation of the profile.
- Creation of a profile in a simple graphic editor.
- Calculation of area characteristics (Ix, Sx) for main axes passing through the centre of gravity.
- Calculation of area characteristics (Ix, Sx) for randomly turned axes passing through the centre of gravity, including a graph.
- Calculation of characteristics for the turned axes which pass through a random point.
- Calculation of volume and mass characteristics (V, m, Im) of solids created by extrusion or rotation of the profile.

MITCalc - Slender strut buckling

The program is designed to calculate the optimum cross-section and perform strength check of slender struts strained for buckling. The program includes:
- Selection of six basic types of buckling.
- Calculation of area characteristics of 20 types of cross-sections.
- Design of optimum profile accommodating the set load.
- Strength check of the strut.
- Calculation and graphical representation of permitted stress dependent on slenderness rate.
- A table of materials and a table of area characteristics of W, S, C and L profiles according to ANSI/AISC and I, U, L and T profiles according to DIN/ISO.

The calculation is based on data, procedures, algorithms (Johnson, Tetmajer, Euler, Secant) and data from specialized literature and AISC, ISO, DIN and BS standards.
List of standards (DIN 1025, 1026, 1028, 1029, 1024, AISC W, S, C, L, LU ...)

MITCalc - Spur Gearing (external / internal)

Geometric design and strength check of spur gear with straight and helical toothing.
- Calculation of helical and straight toothing.
- Automatic design of a transmission with the minimum number of input requirements.
- Design for entered coefficients of safety (static, dynamic).
- Calculation of complete geometric parameters (including corrected toothing).
- Optimization of toothing by use of proper correction (balancing specific slips, miminizing specific slips, strength...).
- Calculation of strength parameters, safety check.
- Design of gearing for exact axis distance.
- Supplementary calculations (calculation of parameters of the existing gear, temperature rise, design of shafts, check dimensions)
- Optimization of parameters (dimensions, weight, volume, transmission ratio)
- Support of 2D and 3D CAD systems.
- Drawings of an accurate tooth shape including data (X,Y coordinates).

The calculations use procedures, algorithms and data from standards ANSI, ISO, DIN, BS and specialized literature.
Used List of standards: ISO 6336, ISO 1328, DIN 867, DIN 3990, ANSI B6.1-1968, AGMA 2001-C95, AGMA 2001-D04, AGMA 908-B89/95 and others

MITCalc - Bevel gear

The calculation is designed for geometric and strength designs and checks of bevel gear with straight, helical and curved teeth. The programme gives solutions to the following tasks:
- Calculation of helical and straight toothing.
- Automatic design of a transmission with the minimum number of input requirements.
- Design for entered coefficients of safety (static, dynamic).
- Calculation of complete geometric parameters (including corrected toothing).
- Calculation of strength parameters, safety check.
- Supplementary calculations (calculation of parameters of the existing gear, temperature rise, design of shafts)

The calculations use procedures, algorithms and data from standards ANSI, ISO, DIN, BS and specialized literature. Used standards: DIN 3971, DIN 3991 Kegelradern 1-4, ISO 6336 1-3, DIN 3965 Toleranzen für Kegelradverzahnungen 1-4, ISO 1328, DIN 3990, ANSI B6.1-1968, AGMA 2001-C95, AGMA 908-B89/95, AGMA 2003-A86/88, AGMA 2005-B88 and others.

MITCalc - Worm gear

The calculation is used for geometrical and strength designs and worm gearing check. The program solves the following tasks:
- Calculation of gearing dimensions.
- Automatic transmission design with minimum input requirements.
- Design for safety coefficients entered.
- Calculation of a table of proper solutions.
- Calculation of complete geometrical parameters.
- Calculation of strength parameters, safety check.
- Gearing design for precise centre-line distance.
- Auxiliary calculations (heating, shaft design).
- Support of 2D and 3D CAD systems.

The calculations use procedures, algorithms and data from standards ANSI, ISO, DIN, BS and specialized literature.
List of standards: ANSI/AGMA 6022-C93 (Revision of AGMA 341.02), ANSI/AGMA 6034-B92 (Revision of ANSI/AGMA 6034-A87), DIN 3996, DIN 3975-1, DIN 3975-2

Planet Gear

The calculation is intended for the geometric and stress design and inspection of the planetary gearing with straight and helical teeth. The revolution speeds for the individual members are easy to design, including for gear sets with two degrees of freedom (differentials). Gears can be designed for chosen safety factors. In addition, the design calculation makes it possible to use many optimization methods, such as the selection of appropriate corrections to offset relative sliding minimize relative sliding, required strength, etc. Besides a number of additional calculations (such as designing of accurate width between centers, calculation of inspection dimensions, etc.), tools for the plotting of the exact tooth shape are available. This makes it possible to use all the data in gear manufacturing and creation of an accurate 3D model.

MITCalc - Auxiliary calculations of gearing

This workbook includes two auxiliary calculations to calculations of gearing.
- Optimizing of parameters (dimensions, weight, volume) through distribution of the total transmission ratio "i" to individual pairs of gears with double reduction or triple reduction gearbox with spur gears.
- Optimizing of the number of teeth of gears to achieve an exact total transmission ratio "i" with single, double and triple reduction transmissions (toothed wheels, toothed belts, chains)

MITCalc - Roller bearings I (SKF), II (Inch), III (INA/FAG)

These modules can be used for the selection, calculation and check of rolling bearings. The software provides solutions to the following tasks:
- Selection and check of a suitable bearing. **Roller bearings I** - This module includes a database of approx. 10,000 different rolling bearings SKF in all basic types and design. **Roller bearings II** - This module includes a database of approx. 5,000 rolling bearings from RBC Bearings, Nice Ball Bearing, General Bearing Company, New Hampshire Ball Bearing, NMB USA Inc., MRC Bearing Group, Fafnir Bearings Company, Torrington Company, Timken Company, Barden Precision Bearing, McGill Manufacturing Co. Inc., NTN

Bearing Corporation and INA USA Corporation. **Roller bearings III** - This module includes a database of approx. 5,000 different rolling bearings INA/FAG in all basic types and design.
- Calculation of basic bearing parameters (life, static safety, etc.).
- Calculation of adjusted bearing life acc. to the new methodology of ISO 281.
- Calculation of load with a pair of tapered roller bearings or a pair angular contact ball bearings resp.
- Support of 2D and 3D CAD systems.

In addition to the above given basic calculations, the document also includes several other auxiliary calculations (e.g. a calculation of lubricant operational viscosity, calculation of mean loads for bearings loaded by variable loads, calculation of permitted bearing speed, etc.). The programme uses data, procedures, algorithms and other information from specialised literature, catalogues of rolling bearings SKF, ISO, ANSI, SAE standards and other sources.

MITCalc - V-Belts

The calculation is designed for a geometrical design and strength check of belt transmissions using V-belts.
- Calculation for 2 or 3 pulleys.
- Automatic design of a transmission with the minimum of input requirements.
- Design and calculation of geometrical parameters (diameters of pulleys, axis distances, length of the belt, weight of the transmission)
- Calculation of strength parameters (power transferred by the belt, number of belts, efficiency, etc.)
- Calculation of force conditions (prestressing, axis loading of the pulleys, etc.)

The calculations use procedures, algorithms and data from basic documents and standards ANSI, RMA (Rubber Manufacturers Association), ISO, DIN, BS, and basic documents from catalogues of companies CONTITECH (r) and Gates Rubber Company (r).
Used standards: Narrow V-Belts ANSI/RMA IP-22; Traditional V-Belts ANSI/RMA IP-20; Light Duty V-Belts ANSI/RMA IP-23; DIN 7753; DIN 2211; DIN 2215; ISO 4184

MITCalc - Timing Belts

The calculation is designed for a geometrical design and strength check of toothed belt transmissions.
- Selection of the type of belt with a suitable output power.
- Selection of an optimum transmission alternative in view of power, geometry and weight.
- Option of designing a non-standard transmission.
- Calculation of all necessary strength and geometrical parameters.
- Calculation of power parameters and axis loads.

The calculations use procedures, algorithms and data from ANSI, RMA (Rubber Manufacturers Association), ISO, DIN, BS and basic documents from catalogues of companies ContiTech(r) and Gates Rubber Company(r). The database of belts includes the 20 most frequently used types of toothed belts.
Used standards: Synchronous Belts ANSI/RMA IP-24, 1983; DIN 7721; DIN ISO 5296; ISO 5295; ISO 5294

MITCalc - Roller Chains

The calculation is designed for a geometrical design and strength check of common chain transmissions using roller chains.
- Selection of a power suitable type of chain.
- Selection of an optimum transmission alternative regarding power, geometry and weight.
- Calculation of geometric, strength, safety and operational parameters.
- Calculation of power parameters and axis loads.

The application includes corresponding databases of roller chains. The calculations use data, procedures, algorithms and data from ANSI/ASME, ACA (American Chain Association) ISO, DIN, BS and JIS.
Used standards: ANSI/ASME B29.1M (Dec2001), ANSI/ASME B29.3, DIN 8187, DIN 8181, DIN 8181, DIN 8164, DIN 8150, ISO R606, ISO 1275, BS 228, JIS B1801, JIS B1803

MITCalc - Multi-pulley

The calculation is developed for geometrical designs of belt and chain transmissions with more sprocket wheels (max. 15).
- Calculation of the necessary length of the belt (chain) using known positions and diameters of sprocket wheels
- Achieving the desired (table) length of the belt / chain using a change in the position of the selected sprocket wheel.
- Calculation of geometry (angles of wrapping, numbers of teeth in engagement, axis distances, etc.)
- Calculation of the radial force acting on the sprocket wheel axis.

MITCalc - Bolted connection

The calculation is designed for a geometrical design and strength check of a prestressed bolt connection, loaded by static or cyclic loading resp., acting both in the axis of the bolt and in the plane of the connected parts.
- Automatic design of a connection bolt of standard design.
- Calculation and check of connections fitted with special shanks.
- Design and calculation of necessary mounting prestressing of the connection and fastening torque.
- Calculation of force conditions of a loaded connection.
- Static and dynamic strength check.
- The application includes a table of commonly used materials of bolts according to ISO, SAE and ASTM, and a selection of materials of the connected parts according to AISI/SAE, DIN, BS, AF and others.

The calculations use data, procedures, algorithms and data from specialized literature and standards ANSI, ISO, DIN.
Used standards: ANSI B1.1, ANSI 273, ANSI B18.2.1, ANSI B18.2.2, ANSI B18.3, ANSI B18.6.2, ANSI B18.6.3, ANSI B18.22.1, ISO 273, ISO 1207, ISO 4016, ISO 4032, ISO 4035, ISO 4762, ISO 8738, VDI 2230

MITCalc - Shaft Connection

Geometric designs and strength checks of shaped connections of shafts with hubs.

- Design of a connection with parallel side keys.
- Design of a connection with Woodruff's keys.
- Design of a connection with straight-sided splines.
- Design of a connection with involute splines.
- Strength check of designed couplings.
- The application includes a table of keys and splines according to ISO, SAE, DIN, BS, JIS and CSN.

Used standards: ANSI B17.1, ANSI B17.2, ANSI B92.1, ANSI B92.2M, ISO R773, ISO 14, ISO 4156, DIN 6885, DIN 6888, DIN 5464, DIN 5471, DIN 5472, DIN 5480, BS 4235, BS 6, JIS B 1301, CSN 02 2562, CSN 30 1385, CSN 01 4942, CSN 4950

MITCalc - Force couplings of shafts with hubs

The calculation is intended for geometrical design and strength check of force couplings of shafts with hubs with a cylindrical contact area. The application provides solutions for the following tasks:
- Design of force fits, possibly shrink fits.
- Design of clamping connections with separated, or one-side cut hub.
- Strength check of designed couplings.
- Check of interference fit strained by additional radial force with bending moment.
- Check of interference fit working at specific service temperature.

The calculation is based on data, procedures and algorithms from specialized literature and standards ANSI, ISO, DIN and others.
List of standards: ANSI B4.1, ISO 286, DIN 7190

MITCalc - Pinned Couplings

The calculation is intended for the geometric design and strength check of couplings using pins and clevis pins. The program is used to solve the following tasks: design of pin for spring attachment, design of couplings with securing pins, design of cross pin in rod and sleeve, design of radial pin for shaft-hub connection, design of longitudinal pin for shaft-hub connection, design of clevis pin for rotating rod-clevis connection, strength check of designed couplings. The program includes dimensional tables for pins and clevis pins according to ANSI, ISO, DIN, BS, JIS and CSN and support of 2D CAD systems.

Welded connections

The calculation is intended for the geometric design and stress inspection of welded joints of carbon steel machinery structures under static loads. The program makes it possible to design over 50 of the most common forms of welded joints, exposed to various combinations of loads. Joints consisting of butt welds, fillet welds, plug welds, slot welds and spot (resistance) welds can be designed and inspected. The program offers approximately 700 carbon steels suitable for welding under a number of material standards, and dimension tables for a number of steel profiles under multiple standards.

MITCalc - Compression Springs

The calculation is intended for the purposes of geometric and strength designs of helical compression cylindrical springs made of wires and rods of circular sections, cold formed, loaded with static or fatigue loading.
- Automatic design of a spring.
- Selection of an optimal alternative of spring design in view of strength, geometry and weight.
- Static and dynamic strength check.
- Calculation of working forces of a spring of known production and installation dimensions.
- Calculation of installation dimensions for known loading and production parameters of the spring.
- The application includes a table of commonly used spring materials according to ISO, ASTM/SAE, DIN, BS, JIS and others.

The calculation is based on data, procedures, algorithms and data from specialized literature and standards EN 13906-1, DIN 2089-1, DIN 2095.

MITCalc - Tension Springs

The calculation is intended for the purposes of geometric and strength designs of helical tension cylindrical springs made of wires and rods of circular sections, cold formed, loaded with static loading.
- Automatic design of the spring.
- Selection of an optimal alternative of the spring design in view of strength, geometry and weight.
- Strength check of the spring.
- Calculation of working forces of a spring of known production and mounting dimensions.
- Calculation of mounting dimensions for a known loading and production parameters of the spring.
- The application includes a table of commonly used spring materials according to ISO, ASTM/SAE, DIN, BS, JIS and others.

The calculation is based on procedures and algorithms from specialized literature and standards EN 13906-2, DIN 2089-2, DIN 2097.

MITCalc - Torsion Springs

The calculation is intended for the purposes of geometric and strength designs of spiral cylindrical torsion springs made of wires and rods in circular sections, cold formed, loaded with a static or cyclic loading.
- Automatic design of the spring.
- Selection of the optimal design of the spring with respect to strength, geometry and weight.
- Static and dynamic strength tests.
- Calculation of the working forces of a spring with known production and mounting dimensions.
- Calculation of mounting dimensions for known spring loading and production parameters.
- The application includes a table of commonly used spring materials according to ISO, ASTM/SAE, DIN, BS, JIS and others.

The calculation is based on data, procedures and algorithms from specialized literature and the standards EN 13906-2, and DIN 2088.

MITCalc – Springs (15 types)

The calculation is to be used for geometrical and strength design of metal springs of various types and designs, subjected to static or cyclic loads. The program performs the following tasks:

- Geometrical design and calculation of working cycle parameters for metal springs of the following types and designs:
  - Helical cylindrical compression springs of round wires and bars
  - Helical cylindrical compression springs of rectangular wires and bars
  - Helical conical compression springs of round wires and bars
  - Helical conical compression springs of rectangular wires and bars
  - Belleville springs
  - Helical cylindrical tension springs of round wires and bars
  - Helical cylindrical tension springs of rectangular wires and bars
  - Spiral springs
  - Helical cylindrical torsion springs made of round wires a bars
  - Helical cylindrical torsion springs made of rectangular wires and bars
  - Torsion bar springs with round section
  - Torsion bar springs with rectangular section
  - Leaf springs with constant profile
  - Leaf springs with parabolic profile
  - Laminated leaf springs
- Automatic proposal (finding) of a spring with suitable dimensions.
- Static and dynamic strength check.

The application includes a table of commonly used spring materials according to EN, ASTM/SAE, DIN, BS, JIS, UNI, SIS, CSN and others.
The calculation is based on data, procedures, algorithms and data from specialized literature and standards EN 13906, DIN 2088, DIN 2089, DIN 2090, DIN 2091, DIN 2092, DIN 2093, DIN 2095, DIN 2096, DIN 2097.

MITCalc - Plates (circular, annular circular, rectangular)

This calculation deals with the deflection, stress and variation of forces in the loaded flat plates. The calculation is designed for plates that are flat, homogeneous, with the same thickness and made from one material. The plates may be circular, annular circular and rectangular. The plates may be loaded evenly (unevenly) on the whole surface (or its part) or they may be loaded by the force distributed on the circle. The calculation includes many graphs of all the figures calculated and provides for handling the minimum plate thickness and the maximum plate loading.

MITCalc - Tolerances

This calculation includes tables and calculations for easy option of fits of machine parts and determination of their dimensional tolerances and deviations.

- Selection of suitable fits of machine parts according to the international standard ISO 286.
- Determination of dimensional tolerances and deviations of machine parts according to the international standard ISO 286.
- Selection of preferred fits of machine parts and determination of their dimensional tolerances and deviations according to ANSI B4.1.
- Determination of non-prescribed limit deviations of linear and angular dimensions according to ISO 2768.
- Automatic design of a fit for the given clearance or fit interference respectively.

The data, procedures, algorithms and specialized literature and standards ANSI, ISO, DIN and others were used in the calculations.
Used standards: ANSI B4.1, ANSI B4.2, ISO 286, ISO 1829, ISO 2768, EN 20286, JIS B0401

MITCalc - Tolerance Analysis

Two programs are available for the analysis of linear, 2D and 3D dimensional chains, which in addition to the basic analysis (Worst case, Root Sum Squares, Monte Carlo...) also include a solution to some special matters, like analysis of a dimensional chain deformed as a result of temperature change and design of tolerances for a selective assembly.

Tolerance analysis of linear dimensional chains.

The program is designed for tolerance analysis of linear (1D) dimensional chains. The program solves the following problems:

- Tolerance analysis, synthesis and optimization of a dimensional chain using the arithmetic "WC" (Worst case) method, possibly the statistical "RSS" (Root Sum Squares) method.
- Analysis of a dimensional chain deformed as a result of temperature change.
- Extended statistic analysis of dimensional chain using the "6 Sigma" method.

Tolerance analysis of a dimensional chain during selective assembly including optimization of the number of assembled products.
All solved tasks enable work with standardized tolerance values, both in designing and in optimization of the dimensional chain.

Tolerance analysis of 2-D and 3-D dimensional chains.

The program is designed for the tolerance analysis of two-dimensional (2-D) and three-dimensional (3-D) dimensional chains. The program solves the following problems:

- Tolerance analysis of a dimensional chain using the "Worst case" method.
- Tolerance analysis of a dimensional chain using the "Monte Carlo" method.

In designing a dimensional chain, the program enables work with standardized tolerance values.
Data, methods, algorithms and information from professional literature and ANSI, ISO, DIN and other standards are used in calculation.
List of standards: ANSI B4.1, ISO 286, ISO 2768, DIN 7186

MITCalc - Conversion of units, tables

In addition to all the calculations, MITCalc also contains many comparison and conversion tables.
- Conversion of units. This table allows conversion of various units from various unit systems. It also allows conversions of a gearing (module, pitch, mm, inches), roughness, and material hardness conversions and material strengths.
- Tables of safety coefficients. Some commonly used theories and tables for determination of safety coefficients corresponding to certain design conditions.
- Comparison table of transmissions. Self-contained information allowing quick selection of a suitable and optimal type of a transmission with constant transmission ratio
- Comparison table of shaft connections. When selecting a shaft connection type with a hub, this table may be very useful. It compares basic properties of particular connection types.

MITCalc - Technical Formulas

Excel workbook contains solutions to dozens of basic formulas from physics, technology and mechanical engineering. Help, pictures as well as many selection tables with values of various coefficients and material properties are available for the formulas. The following matters are solved in the workbook:
- Characteristics of solids (volume, surface, weight, inertia moment)
- Rectilinear motion (speed, acceleration, trajectory, time, force, energy....)
- Rotation motion (speed, acceleration, trajectory, time, force, energy....)
- Thermal expansion (longitudinal, cubical)
- Friction (shear, rolling, journal, rope, belt)
- Design of engine capacity (pump, blower, hoist, crane)

MITCalc – Project, Searching of calculation

Most of the calculations include a uniform header that:
- Unifies the appearance and improves the orientation in printed outputs.
- Maintains uniform information on the performed calculations and enables their effective management.
- Enables fast retrieval of any calculation (project) using the delivered tool "Search calculation".

Searching of calculation

In case of more intensive use of calculations the volume of *.xls calculation files with various alternatives of solutions or files determinated for various project will be increasing. This tool is determinated for simple retrieval of a calculation and easy orientation among the calculation *.xls files and enables:
- Searching through the complete directory structure including hidden sub-directories.
- Uploading of all pieces of information from calculation headers into a well-arranged table.
- Simple filtration and searching according to the entered parameters.
- Fast opening of the selected file / calculation.

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