◆ ALGOR.

ALGOR PipePak provides piping system designers and engineers with a tool for defining complete piping systems and performing structural analysis in compliance with industry-standard piping codes. PipePak's capabilities for design, analysis, validation and reporting help engineers create better, more reliable piping systems faster.

Piping systems can be analyzed to determine static and dynamic stresses and to ensure compliance with piping code allowable stress values under applicable pressure, temperature and site loadings.

INTERNATIONALIZED FEA SOFTWARE
简体中文
Deutsch
English
Español
Français
Italiano
SIX LANGUAGES

Piping Design and Analysis

► Customer Application

"PipePak is an invaluable tool for performing structural analysis of piping systems. It can solve complex pipe routings, create useful reports of the model and results and help ensure compliance with piping codes for allowable stress under various loadings."

Don Morran
Rentech Boiler Systems, Inc.

Boiler Piping System

PipePak includes multiple design options including a 1) built-in spreadsheet for defining the piping layout. 2) The built-in graphics environment provides 3-D, full-color results visualization and more. 3) Formatted, customized reports can be generated using the Report Wizard.

Key Features

- define piping layout directly in the built-in, Windows-native spreadsheet

- draw the piping system using built-in modeling tools

- open a CAD universal file and then modify the geometry

- open files from other piping software packages

- displays deflected shapes, forces and moments, mode shapes, support reactions and stress contours including code stress, principal stress, longitudinal stress and hoop stress

- displays deflection and modal analysis result animations

- built-in checking of all results for ASME and ANSI code compliance

► Typical Application

Piping System for Sulfuric Acid

The Mosaic Company upgraded its sulfuric acid plant with new stainless steel piping. PipePak analysis results confirmed that the piping section would withstand the operational loads.

For the complete customer application story and more, visit:
http://www.algor.com/news_pub/default.asp

Piping Design and Analysis Features

ALGOR.

Analysis Capabilities
- Linear static stress analysis
- Natural frequency (modal)
- Response spectrum (single and multiple)
- Frequency response
- Time history
- Supports industry-standard piping codes including revisions through:
  - ASME B31.1-2001 Power Piping
  - ASME B31.3b-2002 Process Piping
  - ASME B31.4a-2002 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
  - ASME B31.8a-2000 Gas Transmission and Distribution Piping Systems
  - ASME Section III Division 1 - Subsection NC Class 2 Components (2002)
  - ASME Section III Division 1 - Subsection ND Class 3 Components (2002)
  - British Standard BS 806 (1993)
  - European Standard EN 13480-3:2002
- "In-line" analysis of flanges, reducers and rotating equipment
- Built-in nozzle flexibility calculations

Modeling
- Includes easy-to-use options for defining a complete piping system (pipe runs and components) using:
  - A spreadsheet to enter coordinates
  - A graphical drawing package
  - Various geometric import operations (CADPIPE, CAESAR II, Intergraph PDS, AutoCAD or IGES)
  - Any combination of graphical drawing, spreadsheet data entry or importing of geometry
- Includes industry-standard piping components including:
  - ANSI pipe size specifications
  - ANSI B16.5 (Gasket Diameter) flanges
- Hanger design and selection including:
  - Basic Engineers
  - Bergen Paterson
  - Flexider
  - Grinell
  - Power Piping
- Expansion joint design and selection
- Includes common piping data
  - Stress intensification factors
  - Concentrated forces
  - Concentrated weights
  - Concentrated masses
  - Cut short/long
- Support for underground piping systems
- Support for jacketed pipe
- Export model to CAESAR II (.cii) file

Element Library
- Pipes
- Bends
- Valves
- Reducers
- Bellows
- Flanges
- Tees

Material Models
- Isotropic
- Orthotropic
- Fiberglass-reinforced plastic (FRP)

Loading and Constraints
- Forces
- Moments
- Prescribed displacements
- Temperatures
- Pressures
- Occasional loads
  - Wind
  - Earthquake
  - Pitch and roll for shipboard piping
- Simultaneous, multiple pressure, thermal, displacement and occasional loads
- Includes common piping constraints and supports
  - Anchors
  - Rigid supports
  - Spring supports
  - Constant force hangers
  - Undesigned hangers
  - Snubber supports
  - Guide supports
  - Linestop supports
  - Rotational supports
  - Inclined supports
  - One-way restraint supports
  - Limitstop supports
  - Support displacement
- Includes effects of friction between pipe and supports

Solver Options
- Built-in, fast bandwidth minimization algorithm and sequential equation solver

Results Evaluation
- Viewing by diameter, schedule, wall thickness, corrosion allowance, insulation, content, material, pressure and temperature
- Display of piping networks in either wireframe or shaded view
- Control over model display options including the display of dimension lines, point names, labels and symbols
- Dynamic clipping planes for interactively slicing and hiding areas of a complex piping network
- Interactive selection of components of the piping network through either the tree view or OpenGL graphics window
- Displays deflected shapes, forces and moments, mode shapes, support reactions and stress contours including code stress, principal stress, longitudinal stress and hoop stress
- Displays deflection and modal analysis result animations
- Annotations that highlight the location of the minimum and maximum result values

- Text listing (time-varying where applicable) of:
  - Displacements
  - Forces
  - Moments
  - Support reactions
  - Stresses
- Built-in checking of all results for ASME and ANSI code compliance
- Automatic highlighting of output rows in an HTML report where the calculated stresses are above the allowable stresses
- Rotating equipment reports including:
  - API610 pumps (8th Edition)
  - NEMA SM23 turbines
- Built-in options to quickly change load cases to verify model and extract numerical data from any analysis visualization
- Inquire on analysis results by clicking on any component in the piping network

Results Presentation
- Output result contours and images of piping networks as BMP, JPG, TIF, PNG, PCX and TGA formats
- Built-in animation creation and display tools
- Report Wizard for automatic generation of HTML or text-based reports that summarize input, equipment data and analysis results, including code stress allowables and stress ratios

User Interface
- Windows-native interface with right-click functionality, multiple views and docking toolbars
- Tree view that provides easy navigation and review of all piping system data
- Data entry dialog view that facilitates easy data entry, review and modification
- Capability to cut, copy and paste data from individual and multiple spreadsheet cells and rows
- Capability to directly move to the spreadsheet rows that define the component(s) selected in the visualization view
- 3-D dynamic viewing options, including pan, rotate and zoom options
- Built-in library manager for adding, modifying and removing data for pipe size, material properties, allowable stress, valves, flanges, wind loads, seismic, pump allowables, hangers, plastic pipe properties and code allowables
- Built-in data checking for reasonable input
- Limit checking for allowable temperature ranges
- Support for standard and custom unit systems
- Easy application of stress intensification factors for piping components, such as lap joint flanges, valves and elbows, which have a varying thickness and other physical properties

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Note: For complete details on our piping design and analysis features, see the "Products" section of www.ALGOR.com. ALGOR's web site contains additional information about our wide range of simulation capabilities including static stress and Mechanical Event Simulation (MES) with linear and non-linear material models, linear dynamics, fatigue, steady-state and transient heat transfer, steady and unsteady fluid flow, electrostatics, full multiphysics and piping.