PIPESTRESS

The Reference for Nuclear Pipe Stress Analysis

PIPESTRESS is a complete calculation system for nuclear and non-nuclear piping codes. It has been continuously maintained in accordance with nuclear QA procedures for more than 40 years. Several major nuclear engineering organizations use PIPESTRESS as their principal piping analysis program and has been used by engineering organizations all over the globe to analyze piping in more than 50 nuclear power plants.

Capabilities:

- Linear and non-linear calculations
- Fully featured Nuclear Class 1 analysis
- Advanced floor spectrum analysis
- Time history analysis
- Buried piping
- Flange verification
- Strain energy weighted composite modal damping
- Automatic mass point generation
- Dynamic susceptibility

Piping Codes

- ASME Section III Classes 1, 2 and 3 (1967 to 2021)
- ANSI/ASME B31.1 (1972 to 2020)
- ANSI/ASME B31.3 (1999 to 2018)
- CODETI (1982 to 2016)
- RCC-M Classes 1 and 2 (1983 to 2020)
- RCC-MX (2008)
- KTA Classes 1 and 2 (1980 to 1992)
- EDF Piping Code for Composite Materials, Indice D
- EN 13480-3 Piping Code (2002 to 2017 - A4:2021)
- ASME HDPE Piping Code (2011 to 2017) includes Code Case N-7555 and Section III Appendix XXVI

Advanced Modeling

PIPESTRESS has the capability to model very large structures and complex loadings with up to 900 user-defined load and combination cases. It includes a complete set of piping elements and supports including straight pipes, elbows, miter bends, expansion joints, flanges, linear and non-linear restraints with gaps and friction, spring hangers, snubbers, etc. In addition, you can model beam elements with a non-prismatic cross-section.

Static Analysis

By using PIPESTRESS you have access to an extensive set of static loads: operating and test weight, thermal expansion, snow and wind, settlement, cold springing, variable pseudo-static acceleration, applied support movements, variable fluid density, uniform and trapezoidal loads, horizontal and non-horizontal stratification effects.

Dynamic Analysis

PIPESTRESS offers advanced dynamic capabilities for floor response analysis and time history analysis. Increase the precision of your calculations by enabling the rigid mode correction ("left-out-force" method), avoid unnecessary conservatism by calculating the displacements, rotations and accelerations in user-defined local coordinates, define the most complex loads with up to 3800 independent support levels, compensate uncertainties of the modal extraction by enabling the shift option, and use the strain energy weighted composite modal damping defined in ASME-1233.

Customize your methods with a large variety of options for complete floor response analysis:

- Intermodal combination method according to RG 1.92 up to revision 3: SRSS, absolute, 10% grouping, double sum, Rosenblueth, Der Kiureghian (CQC)

- In-phase and out-phase interlevel combination methods

- Gupta and Lindley-Yow methods for hybrid modes

Use special tools to generate an amplified spectrum at the decoupling point between run piping and branch piping.

Calculate water hammer, blast, valve discharge, seismic accelerograms or other time history analysis with modules based on the modal superposition method that can take into account gapped restraints. With PIPESTRESS, seismic analyses can utilize artificial accelerograms for seismic analyses from response spectrum data.

The THIST post-processor can be used to obtain more detailed results, including time history plots for selected degrees-of-freedom.

Class 1 Piping Analysis

Build your nuclear power plant with confidence. PIPESTRESS performs analysis of piping systems in accordance with nuclear standards and codes, including detailed stress analysis according to ASME III NB-3600, RCC-M, RCC-MX and KTA codes.

- Precise stress evaluation at fittings

- Evaluation of thermal stresses due to fluid transients

- Fatigue usage factor calculation

- Elastic shakedown criteria

- Simplified elastic-plastic analysis

- Thermal ratchet criteria

- Evaluation of environmental effects

- Alternative penalty factor per Code Case N-779

Buried Piping

Benefit from simplified workflows with automatic soil spring generation. Springs can be either elastic (as per ASME B31.1 Appendix VII) or elastic-plastic (as per ASCE code). An integrated soil calculator provides easier modeling workflows in accordance with ASME B31.1 App. VII.

Flange Calculation

Flange modules automatically retrieve results of piping analysis and input them in flange verification, according to codes EN 13480, ASME III and RCC-M, and various methods (equivalent pressure, Taylor Forge, etc.).

PIPESTRESS Quality Assurance Program (PQAP)

PQAP has a rigorous development methodology and well-proven QA procedures. PIPESTRESS has earned the trust of engineers for decades by providing accurate analysis results. PQAP conforms to 10CFR50 Appendix B and 10CFR21 Reporting.

Graphical User Interface

Users can view and manipulate models with ease. PIPESTRESS offers a smart input file editor with syntax coloring, interactive piping view, and translucent view for jacketed pipes. It also proposes a quick pipe wizard to speed up the input of engineering data.

Rapidly check the model with data tables and tree view. Benefit from easy post-processing with animated vibration modes, deformed shapes, forces and moment diagrams, colored stress ratios and support reactions. Export the model views to various graphic formats and automatically generate stress reports based on customizable templates.

Use the automatic validation tool to run the QA problems and verify that the results generated on the hardware are the same as the ones generated by the Hexagon QA team.

About Hexagon

Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Hexagon's Asset Lifecycle Intelligence division helps clients design, construct, and operate more profitable, safe, and sustainable industrial facilities. We empower customers to unlock data, accelerate industrial project modernization and digital maturity, increase productivity, and move the sustainability needle.

Our technologies help produce actionable insights that enable better decision-making and intelligence across the asset lifecycle of industrial projects, leading to improvements in safety, quality, efficiency, and productivity, which contribute to Economic and Environmental Sustainability.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 23,000 employees in 50 countries and net sales of approximately 4.6bn USD. Learn more at hexagon.com and follow us @HexagonAB.