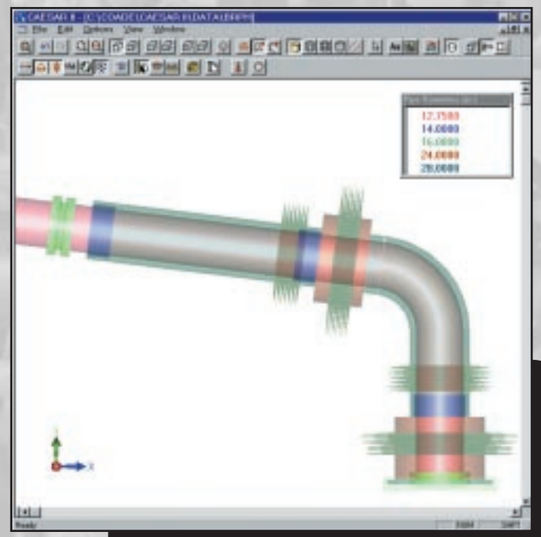
COADE®
ENGINEERING SOFTWARE

CAESAR II®

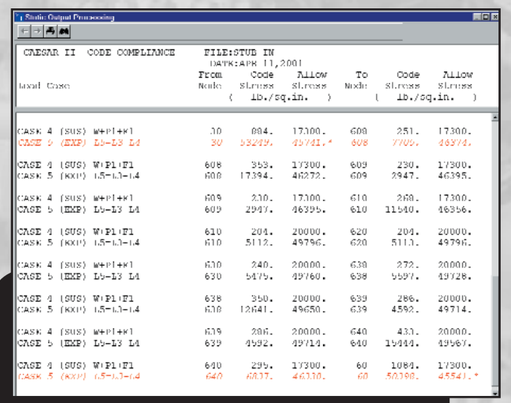
Pipe Stress Analysis Software

CAESAR II is a complete pipe stress analysis software program that allows quick and accurate analysis of piping systems subjected to weight, pressure, thermal, seismic and other static and dynamic loads. It can analyze piping systems of any size or complexity.

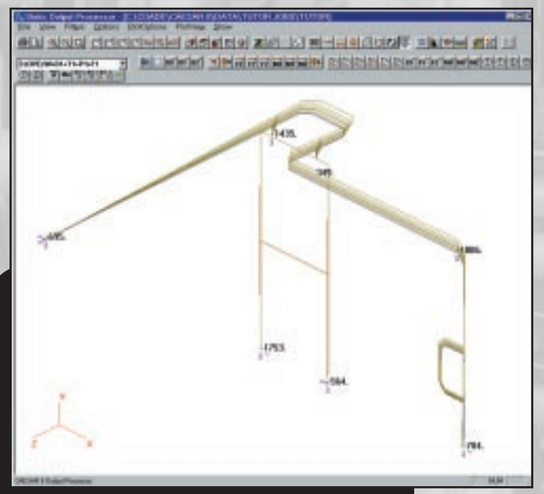
CAESAR II is unique, incorporating calculation methods and analysis options not found in any other program. Whether you are designing a new system or trouble-shooting an existing one, CAESAR II produces results that completely describe the system behavior based on guidelines and design limits from accepted industry standards. With CAESAR II, you can do more in less time and with less chance of error.



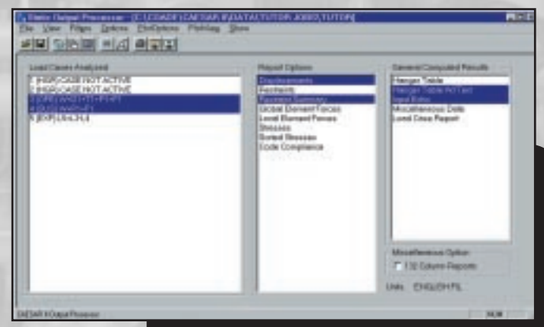
A transparency feature allows you to see what's in the pipe (as in this core and jacket piping).



The code compliance report clearly defines overstressed points in the system.



Displaced shapes and other program results are easily reviewed graphically.



Output reports can be generated to show any data for any load case.

CAESAR II: World's standard for pipe stress analysis

Since its introduction in 1984, CAESAR II from COADE has become the world's most widely used pipe stress analysis software and is considered the industry's de facto standard. There are many reasons for the software's success.

Technically Comprehensive & Flexible
CAESAR II includes more options and more technical capabilities than any competitive software, and you can tailor the program to fit your exact needs.

Easy to Use
CAESAR II provides instant context-sensitive, on-line help plus error checking and smart modeling graphics to check your work.

Proven Product
CAESAR II has proven stable and reliable in constant and heavy use.

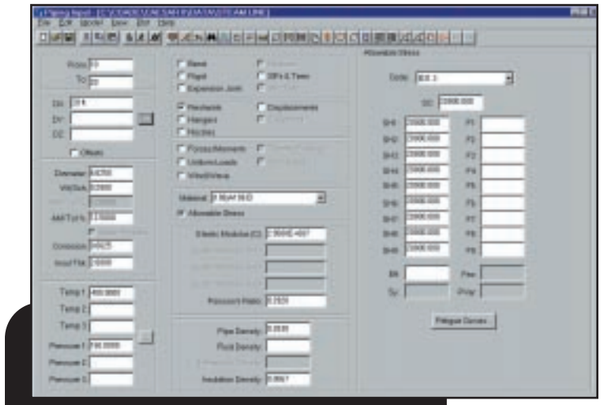
Universal Acceptance
CAESAR II is licensed by most of the world's major engineering and energy firms.

Technical Support
Experienced pipe stress analysts and program developers answer customers' questions. Customers give high marks to COADE's knowledgeable, reliable and timely technical support.

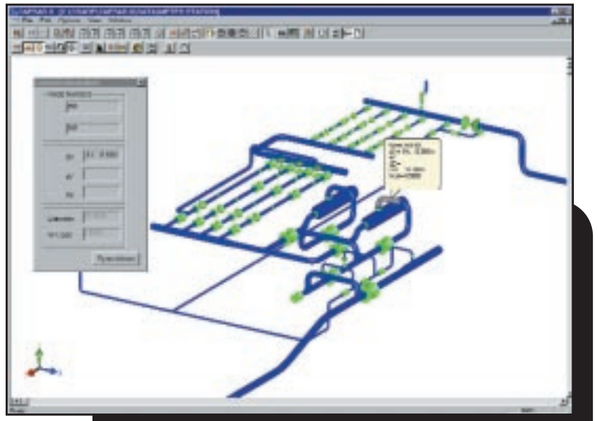
Quality Assurance
COADE is committed to quality software. COADE tests all software using its stringent quality assurance (QA) standards.

Continual Software Enhancement & Integration
COADE is committed to continual development and improvement of the software in response to changing technology, customer applications and code specifications. COADE also is committed to integrating its software with related programs. COADE listens to its customers. Many capabilities of CAESAR II are the direct result of users' requests.

Stable Company
COADE has been in business since 1983 and many employees have been with the company for over a decade. This means the people you contact are likely to be around when you call in the future.



Each piping element is defined on a well laid out, intuitive spreadsheet, making model building effortless.



The completed model can be rendered for visual confirmation or for presentation.

Input & Modeling Capabilities

CAESAR II input capabilities have revolutionized the way pipe stress engineers approach flexibility analysis. The architecture, speed and responsiveness of CAESAR II's input format reduce modeling time for typical jobs from hours to minutes.

The on-line help combined with a nested hierarchy of less frequently used features ensure that you are not distracted with complex screens or confusing options. You see only what you need to see, when you need to see it.

Once a computer model is complete, extensive automatic error checking reviews the input to ensure that the model makes sense from a "piping" perspective and warns of possible mistakes. When satisfied that your model is ready for analysis, you simply tell CAESAR II to perform the analysis. Input and modeling capabilities include:

Interactive Graphics
Let you walk around your model, taking you just one step short of holding the model in your hand. CAESAR II supports single-line, volume, wire frame and rendered graphics.

Extensive On-Line Help
Provides instant context-sensitive Help specific to each field. Complete documentation is available on-line, as well.

Wide Selection of Restraint Types
Provides the widest range of support types for boundary conditions.
- Anchors with or without displacements
- Single or double acting translational
- Single or double acting rotational
- Translational with bi-linear stiffness
- Snubbers
- Guides and limit stops
- Bottomed-out springs
- Tie rod assemblies
- Gaps and friction
- Connecting nodes for nodal interdependence
- Large rotation rod supports

Extensive Databases
Provides a comprehensive material database with temperature dependent allowable stresses. Includes valve and flange databases with built-in length and weight information. Provides the ability to add your own data.

Structural Steel Modeling
Helps you set realistic boundary conditions, not idealistic ones. CAESAR II includes structural steel databases from many international standards.

Interactive List Editing Input Format
Lets you view and edit data in a full screen, multiple element spreadsheet. This format is often preferred because of its block-edit features such as Rotate, Duplicate, Mirror, Delete and Node Renumbering.

Extensive FRP (Fiberglass) Pipe Capabilities
Includes two piping codes specifically for fiberglass reinforced plastic pipe plus vendors data for modeling and analysis.

Automatic Expansion Joint Modeling
Creates input for expansion joint assemblies with parameters extracted from vendor supplied databases.

Other Input & Modeling Capabilities Include:
- Either Y or Z as vertical
- "Undo/Redo" input correction
- User-tailored units
- Cold spring elements
- Bend/intersection Stress Intensification Factor (SIF) calculator and library
- Multiple job batch processing
- Automatic buried pipe modeling
- Thermal bowing

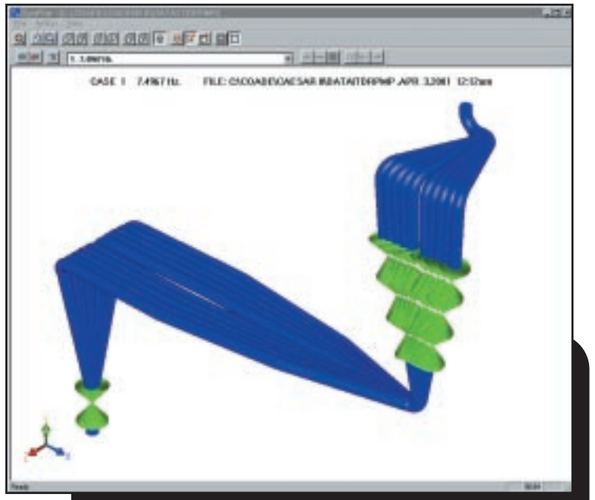
Static Analysis Capabilities

CAESAR II begins a static analysis by recommending load cases necessary to comply with piping code stress requirements. In most cases users choose the built-in default load cases but still have complete freedom to alter, add or delete load cases. This ability to perform algebraic combinations of displacements, forces and stresses gives you freedom to alter, add or delete up to 99 load cases.

CAESAR II allows you to analyze piping and structural models together, and you can observe the effect of the non-linear pipe-structure interaction both graphically and numerically. The ability to interactively control the static analysis process provides you with the most comprehensive solution module available today. Static analysis capabilities include:

Automatic, Comprehensive Error Checking
Speeds the process and protects you from oversights.

Extensive Spring Hanger Selection Options
Provides numerous built-in manufacturer catalogs. CAESAR II permits hanger selections to multiple thermal cases, cold or hot load design and standard or extended load ranges. It selects the appropriate spring support from many manufacturers' catalogs based on a variety of proposed operating and installation positions.



Animated graphics are quite useful in learning about the dynamic response of a piping system.

ASCE Wind Load Generation
Lets you automatically apply and analyze up to 4 wind load sets according to American Society of Civil Engineers (ASCE) #7 or allows you to specify your own pressure or velocity profile.

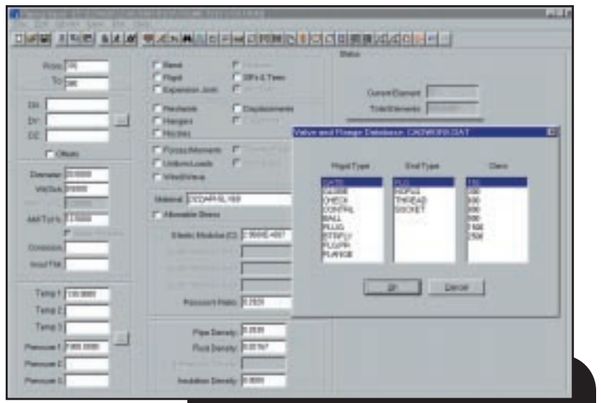
Nozzle Flexibilities and Stresses
Includes nozzle flexibilities as defined in Welding Research Council (WRC) Bulletin 297, American Petroleum Institute (API) Standard 650 and British Standard PD 5500. It evaluates nozzle and vessel stresses using rules in WRC 297, WRC 107 and ASME Section VIII Division 2.

Equipment Load Checks
Performs load evaluations to the following standards:
- Steam turbines (NEMA SM23)
- Centrifugal pumps (API 610)
- Centrifugal compressors (API 617)
- Closed feedwater heaters (HEI)
- Air cooled exchangers (API 661)

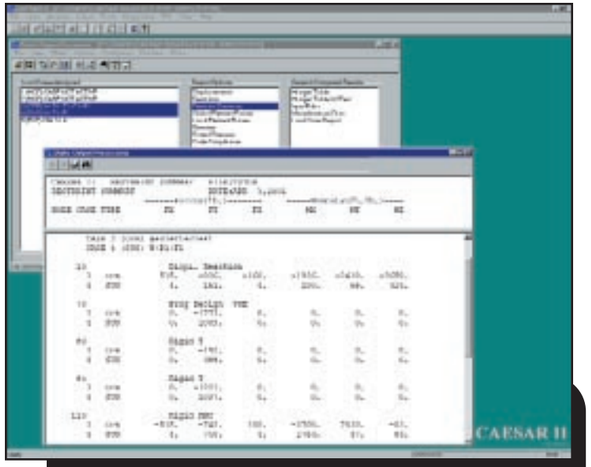
Flange Leakage and Stresses
Includes simple leakage checks, ANSI B16.5 ratings and ASME Section VIII Division 1 stress calculations for evaluating flange loads.

Fatigue Analysis and Cumulative Usage Report
Calculates the remaining life based on material fatigue curve data and an assigned number of cycles. A cumulative usage report will provide a total usage factor for all fatigue cases selected at one time.

Offshore Piping Analysis
Allows individual pipe elements to experience loading due to hydrodynamic effects of ocean waves and ocean currents. Various wave theories and current profiles are incorporated.



CAESAR II provides built-in databases for valves and flanges, expansion joints, materials, structural steel and much more.



Output reports may be viewed on screen, printed or saved to a file.

Dynamic Analysis Capabilities

CAESAR II guides you through the specification or acquisition of data needed for dynamic analysis. Dynamic analysis begins with the specifications of the dynamic input data such as lumped masses, imposed vibration, snubbers and spectrum definitions. You can use the built-in shock spectra or define your own. Dynamic analysis capabilities include:

Mode Shape and Natural Frequency Calculations
Saves you time since many operating problems can be examined or avoided by reviewing the system's natural modes of vibration.

Harmonic Forces and Displacements
Lets you evaluate the vibration response of a damped system to a range of harmonic forces or displacements to simulate mechanical and acoustic line vibrations.

Shock Spectrum Analysis and Independent Support Motion (Including Anchor Movements)
Includes independent support motion and library of NRC and UBC earthquake spectra. The program defaults to standard calculation methods, or you may choose from a variety of modal and spatial summation methods.

Force Spectrum Analysis
Allows analysis of general impact loads such as water and steam hammer, slug flow and relief valve discharge. It includes a routine to convert time history loads into the appropriate frequency response data.

Modal Time History Analysis
Provides an accurate and complete evaluation of the system response through time when the timing of dynamic loads is well defined.

Animation of Dynamic Response
Helps you verify simulations. Animating mode shapes is one of the most valuable tools in diagnosing dynamic problems. CAESAR II also animates the results from time history analysis.

Missing Mass/Force Corrections
Improves dynamic solution accuracy by accounting for system high frequency modal response.

Static/Dynamic Load Combinations
Allows you to combine any variety of dynamic and static loads to properly address occasional load requirements of the piping codes.

Relief Valve Load Synthesis
Calculates dynamic thrust load and transient pressures from relief valves in open discharge systems.

Data Interfaces
Converts the results from hydraulic analysis packages such as Stoner's LIQT and Sunrise Systems' PIPENET automatically into response spectrum data for use in CAESAR II.

Piping Code Options

- B31.1 and B31.1 (1967) - Power
- B31.3 - Process Piping
- B31.4 - Liquids Transportation
- B31.4 - Chapter IX - Offshore
- B31.5 - Refrigeration
- B31.8 - Gas Transportation
- B31.8 - Chapter VIII - Offshore
- ASME Sec. III, Class 2&3 - Nuclear Power
- British Standard 806
- US Navy Spec. 505
- Z662 - Canadian Gas Transportation
- RCC-M Section C & D - French Nuclear Power
- Stoomwezen - Dutch
- BS 7159 - British Fiberglass Reinforced Plastic Pipe

(Piping Code Options continued…)

- CODETI - French
- TBK 5-6 - Norwegian
- FDBR - German
- UKOOA - UK Offshore
- IGE/TD/12 - UK Gas
- Det Norske Veritas

Output Capabilities

CAESAR II output reports include input echo, hanger selection and individual load case listings of displacement, local forces and moments and code defined stresses compared with their allowable limits. You can review all or part of this information on the screen before any hard copy is generated. This output review speeds the design cycle by displaying results that are useful in diagnosing piping trouble areas.

CAESAR II output modules provide you with interactive flexibility. Load case and report selection and heading control combine to give you a complete tool for reviewing analysis results. The output graphics show displaced shapes, forces, moments, stresses and animated motions. And, with output report filters, you see what you want, and only what you want, when you want it.

Import/Export Features

CAESAR II provides data interfaces to programs for both import and export. This eliminates time consuming data entry and enhances the value of your existing data and programs.

CADWorx/PIPE
CAESAR II offers a seamless link to CADWorx/PIPE, COADE's AutoCAD-based pipe drafting and design software. This is the first intelligent, fully functional, bi-directional link between CAD and a pipe stress analysis program. Engineers and designers working together save time and improve accuracy with this powerful link.

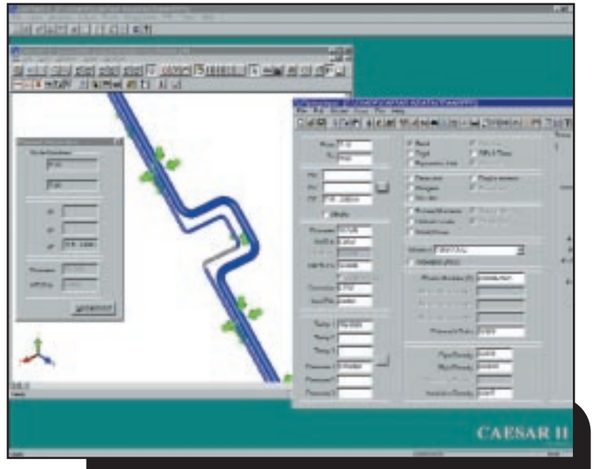
CAESAR II also imports model data from the following:
- PDS by Intergraph
- CADPIPE
- AUTOPLANT
- ComputerVision
- ISOMET
- PRO-ISO

CAESAR II has a neutral data file format for independent use in exchanging data with other programs such as CadCentre's PDMS and Jacobus' 3DM. It also produces AutoCAD DXF files for simple input plots.

Both piping input and output can be directed to an ODBC database (e.g. MS Access®) for data review and manipulation outside CAESAR II. This is very useful in comparing results between several analyses or creating unique reports and plots.

Options

CAESAR II includes many other features and options such as thermal bowing, an internal accounting system, an expansion joint rating program, B31G corrosion evaluation and AISC unity checks.



Interactive model input and display eliminates errors.

Hardware/Software Requirements:

- Intel Pentium processor (or equivalent)
- Microsoft Windows (95, 98, NT 4.0 or higher) Operating System
- 64 Mbytes RAM (recommended)
- 60 Mbytes of disk space
- CD ROM Drive
- SVGA monitor (800x600)

CAESAR II Licenses

All CAESAR II licenses provide the following as standard:

- Complete CAESAR II program
- One complete set of program manuals
- One external software lock (ESL) allowing access to CAESAR II
- Technical newsletter subscription
- Phone, fax, web site and e-mail access for technical support

Full License provides:

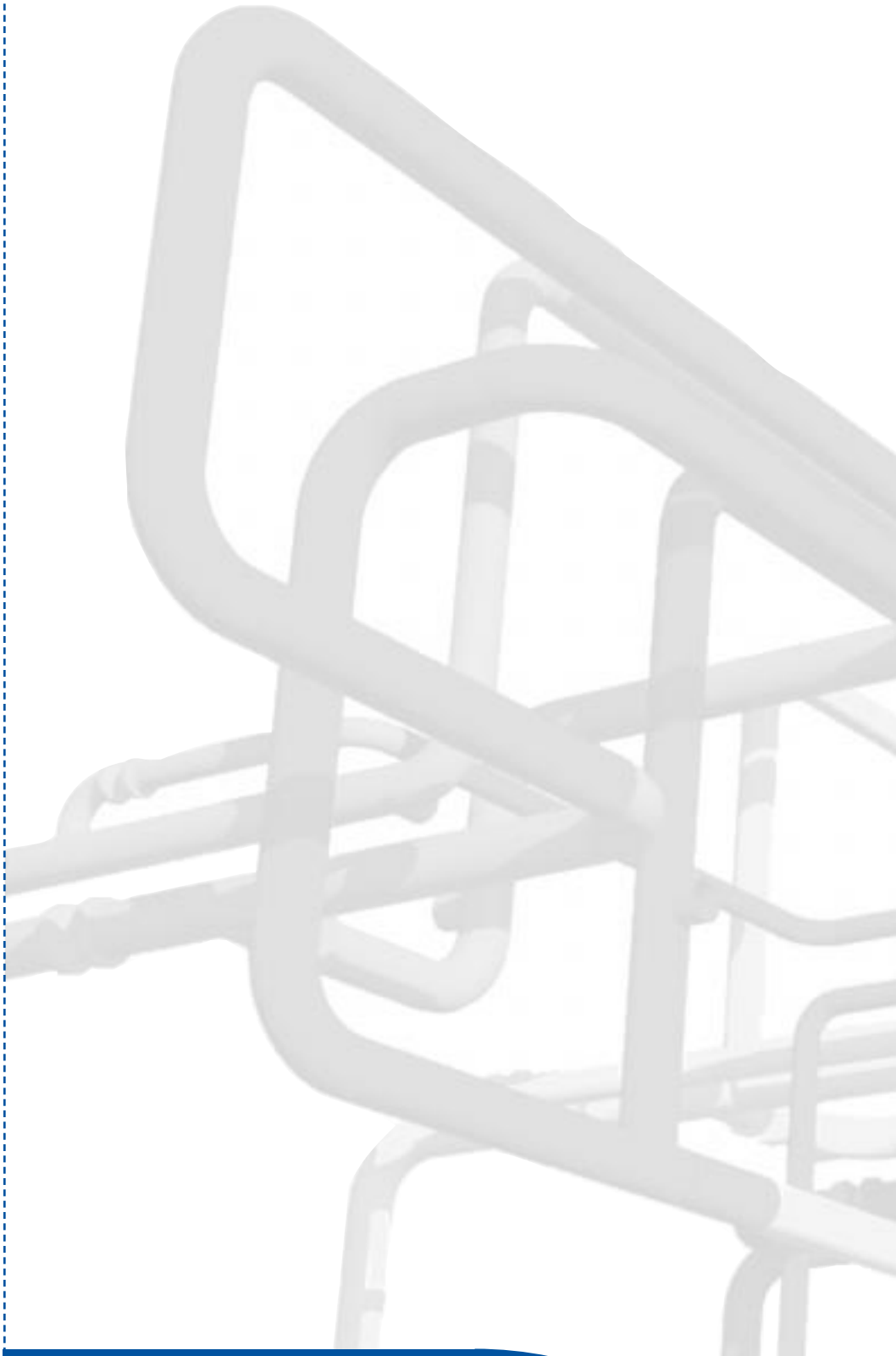
- Perpetual single license with no limit on the amount or duration of use
- One full year of automatic upgrades from date of purchase
- Eligibility for annual extensions of automatic upgrades
- Eligibility for discounts on additional CAESAR II Full License purchases

Monthly Lease provides:

- Full License copy on a monthly rental basis
- Option to apply first month lease when converting to a Full License purchase

Limited Run (Pay-Per-Use) provides:

- Full program with a limit on the number of actual analyses (50 Minimum)
- Option to add runs over the phone or fax without a modem



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