ENGINEERING NOISE CONTROL SOFTWARE

Graphical, Windows – Based
by Causal Systems

Special features

Common to all modules are:

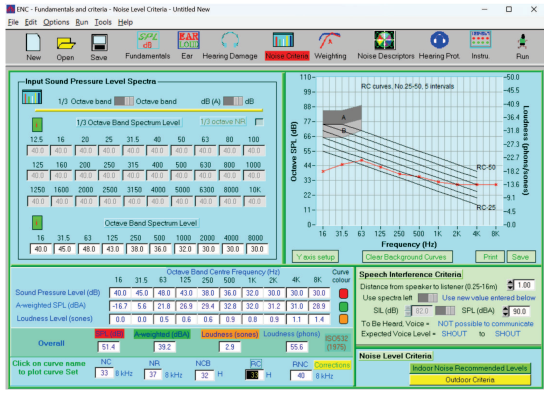
- ability to use your own material properties or use the in-built extensive data base
- multiple curves placed one at a time on the same axes to compare the effect of parameter changes
- Graphical windows interface with pop-up menus and data plots

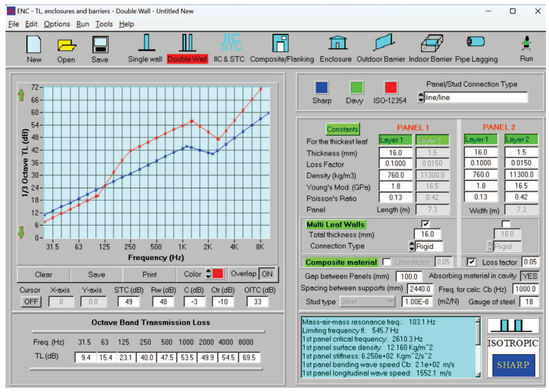
No longer is it necessary to do tedious and risky hand calculations. All of the calculation procedures in the book, Engineering Noise Control, 6th edn. by **D.A. Bies, C.H. Hansen, C.Q. Howard and K.L. Hansen** have been verified and encapsulated in a windows graphical user interface which is extraordinarily simple to use and provides results in tabular and graphical form. The calculation procedures have been thoroughly tested and checked and are highly reliable.

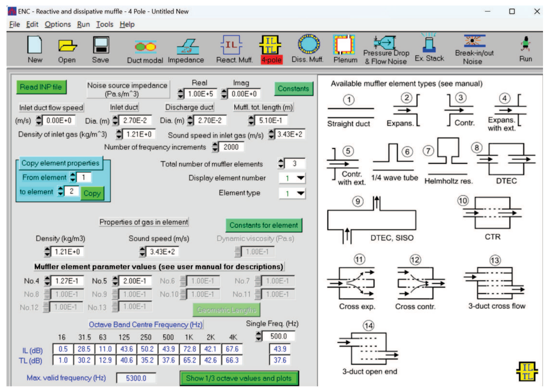
A useful feature of ENC is its ability to run an analysis several times and plot the results for each run on the same axes to explore the effect of changing various input parameters and to allow a design goal to be achieved quickly. Targeted users are mechanical engineers, noise and vibration consultants and students undertaking noise control courses, although anyone interested in noise control or who has a noise problem would benefit. However, the more complex modules and pages do assume that the user has a good knowledge and understanding of acoustics and noise control. The software is divided into nine modules, corresponding to various sections of the text book.

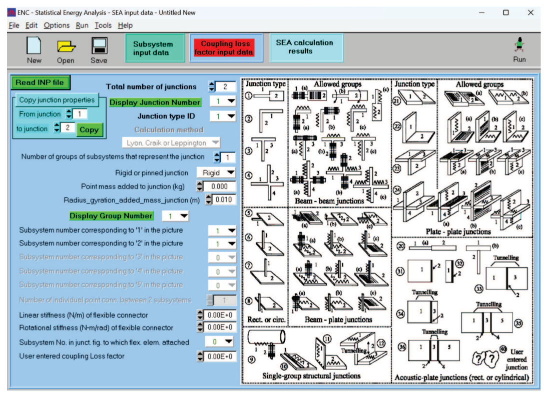
ENC software is updated regularly (approximately twice per year) and the low price has remained the same since 2021. As a result of the updates, the software includes considerably more content than covered by the latest 6th edition “Noise Control Engineering” textbook by Bies, Hansen, Howard and Hansen. As an example, in the 4-pole analysis section, ENC includes the ability to cascade any muffler element type from a choice of 15 types and includes additional elements such as perforated sheets and sound absorbing material placed at the entrance of Helmholtz resonators and 1/4 – wave tubes. Additional content is discussed in detail in the comprehensive 400+ page manual that accompanies the software. The user manual also contains detailed instructions on how to use ENC.

The demo version of ENC is the same as the full version. However, if the computer or network server has no USB key (or dongle) inserted, ENC will reset itself to its default state every 60 seconds and all user input data will be reset to their default values.









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Single user license – $USD2590.(Incl. USB key)

Detailed software contents – 9 Modules

1. Fundamentals, subjective response to sound, noise criteria & instrumentation (Chs. 1, 2 & 3)

– Calculation of speed of sound in liquids, solids and gases
– Sound power from sound power level and vice versa
– Sound pressure from sound pressure level and vice versa
– Sound intensity from sound intensity level and vice versa
– Addition & subtraction of coherent & incoherent sound levels
– Combining noise reductions involving several paths from source to receiver
– Loudness in phons and sones given octave or 1/3 octave band levels
– Calculation of NC, NR, NCB, RC and spectral character from octave band data
– A-weighted sound levels from octave or 1/3 octave band linear levels
– Allowed exposure time (European, USA criteria)
– Daily noise dose from dB(A) noise levels and time of exposure to each level
– Hearing damage risk calculations using ISO 1999 and Bies/Hansen methods
– Impact noise dose calculation & speech interference calculations

2. Sound power of sources (Ch. 4)

– Sound pressure at a distance due to monopoles, dipoles, quadrupoles, line sources (coherent and incoherent) and plane sources, given the source sound power or source strength. Inverse calculations are also available.
– Radiation field of a source (near, geometric or far field or transition)
– Sound power from reverberant & anechoic room measurements
– Sound power from field measurements
  semi-reverberant field (3 methods)
  near field measurements (3 methods) & vibration measurements

3. Outdoor sound propagation (Ch. 5)

– OCMA, CONCAWE and textbook analysis
– Air absorption & meteorological effects, with & without turbulence (3 procedures)
– Ground effects (plane or spherical wave reflection)
– Barrier & obstacle effects

4. Room acoustics and sound absorption (Ch. 6, App. D)

– Resonance freq., modal density, modal overlap for rectangular & cylindrical rooms
– Room absorption (& room constant) from reverberation time and vice versa (Sabine & Millington - Sette)
– Room sound pressure levels from sound power of source in room and vice versa
– Sabine rooms, flat rooms (specularly and diffusely reflecting walls) and tunnels or long rooms (specularly and diffusely reflecting walls)
– Calculation of statistical absorption coefficient averaged over room from data for individual room surfaces
– Statistical absorption coefficient calculated from material flow resistivity & thickness
  porous material layer only or with impervious skin, perforated sheet or both
– Design of panel sound absorbers given desired absorption coefficients
  empirical method and analytical methods
– Effect of adding absorbing material on sound levels in a room
– Optimum reverberation times for a specified space size and use

5. Transmission loss, enclosure design, barriers (indoor & outdoor) & pipe wrappings (Ch. 7)

– Single partition TL using both Sharpe and Davy/Hansen methods
  isotropic panels & ribbed panels; STC & critical frequencies
– Double partition TL using both Sharpe and Davy methods with steel or wood studs
– Overall TL for a wall with windows, doors, cracks etc.
– Enclosure noise reduction calculations
  includes cooling air flow requirements, effect of cracks and openings & effect of enclosure internal conditions
– Outdoor barrier noise reduction for single and double-edge barriers
  includes diffraction around sides and top and ground absorption
  point or line sources plus wind & temperature gradient effects
– Indoor barrier noise reduction
– Pipe lagging noise reduction (2 calculation methods)

6. Dissipative and reactive muffler design & duct breakout noise calculations (Ch. 8)

– Impedances of orifices, expansion chambers & ducts (resistive and reactive)
– IL and TL calculations for 1/4-wave tubes, Helmholtz resonators, expansion chambers, low pass filters, small engine exhausts
– 4-pole method for complex reactive muffler design with perforated tubes
– Pressure drop estimates for specified dissipative or reactive mufflers
– Flow generated noise due to silencers and duct bends
– Dissipative muffler design
  sound absorptive liners with and without impervious and perforated facings
  corrections due to reflection at inlet and outlet & expansion in lined section
– Duct breakout and break-in noise calculations
– Lined plenum chamber noise reduction
– Exhaust stack directivity and noise reduction vs height

7. Vibration isolation and damping (Ch. 9)

– Mass on spring isolator
  resonance frequency for damped and undamped systems
  frequency of maximum displacement, velocity and acceleration
  force transmissibility vs excitation frequency, resonance frequency & damping
  effect of flexibility in the foundation or mounted mass on the transmitted force
– Machine mounted on 4 isolators – resonance frequencies calculations
– Vibration absorber design
  optimum stiffness and damping & resonance vibration amplitude of absorber
– Relations between different damping measures

8. Sound power estimates for specific source types (Ch. 10)

– fans, compressors, cooling towers, pumps, fluid jets, fluid flow in pipes
– control valves, boilers, furnaces
– gas & steam turbines, wind turbines
– IC engines, electric motors, generators, large transformers, gears

9. Statistical energy analysis (SEA) (Ch. 11)

– A vibro-acoustic system is divided into substructures by the user
– Mechanical and/or acoustic properties entered by the user for each subsystem
– Coupling loss factors are calculated for each junction connecting two or more subsystems
– Coupling loss factors are calculated from user entered junction types
– Data inputs are checked and many possible user errors are flagged
– Users can choose 1/3-octave or octave band analysis & band centre frequency
– Calculated results include subsystem average vibration or sound pressure levels
  No. of modes in each subsystem in each frequency band
  coupling loss factors, junction TLs, sound radiation efficiencies