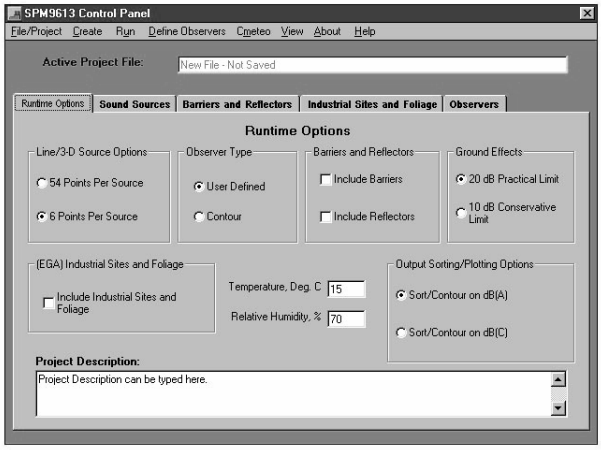
Power Acoustics, Inc.

Sound Propagation Model

SPM9613™

(Version 2) based on ISO 9613 parts 1 and 2



Sound Propagation Model 9613, or SPM9613, is a Windows based computer program based on the ISO 9613 standard parts 1 and 2.

ISO 9613-2:1996(E) specifies engineering procedures for calculating environmental noise from a variety of noise sources and attenuation effects for meteorological conditions favorable to sound propagation. The procedures include handling of; geometrical divergence, reflections, barriers, ground attenuation effects and miscellaneous attenuation due to industrial sites and foliage.

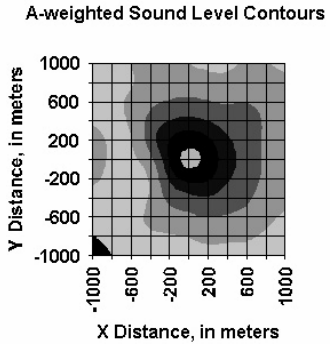
The program is developed to allow user's to perform quick but accurate calculations while working in a graphical Windows based environment.

Who Should Use SPM9613?

SPM9613 can be used by government authorities, acoustical engineers and consultants, environmental professionals, or anyone required to estimate noise from industrial facilities, power plants or construction activities.

Applications include:

- Community noise prediction
- Environmental Impact Assessment
- Mechanical equipment noise assessment/abatement



- Cooling tower siting
- Screening or noise barrier design
- Road or rail traffic
- Construction noise activities

Features and Extensions:

- MS Windows 95, 98, NT, 2000 and XP compatible
- Fast setup and calculation times
- Automatic breakdown of large 3-D or line sources into multiple point sources
- Multiple barriers
- Reflections - automatic first image sources
- Ground Attenuation Effects
- Miscellaneous Attenuation (Foliage and Industrial Sites)
- Extended Octave Band Center Frequency range - 16 to 8000 Hz
- Source sorting on A or C-weighted levels
- Graphical capability to assure correct user inputs including: plan views of equipment, barriers, foliage or industrial sites, observer locations. Source sound power level spectrum plots & directivity plots, Ground Hardness Contours & 3-D Ground Elevation
- Graphical Output includes: sorted sound source waterfall plots at each observer location and contour plotting on A or C weighted levels
- Fractional Cost of Competing Software

CALCULATION METHOD:	
International Standard	ISO 9613 parts 1 and 2

NOISE SOURCES:	
Maximum Number of Sources	200 physical or three dimensional sources Up to 10800 point sources when automatic breakdown is used
Source Types Handled	Line, 3-D Surface or Point, Automatically breaks down sources into multiple points located on surfaces or lines
Sound Power Level	1/1 Octave Bands - 16 Hz to 8000 Hz
Directivity	Vertical and Horizontal Directivity capability included

BARRIERS:	
Maximum Number of Barriers	200
Multiple Barriers (with separation)	Yes
Lateral Diffraction Included	Yes, for single barriers
Meteorological Correction	Yes

REFLECTIONS:	
Automatic Image sources	Yes, first reflections performed automatically

ATMOSPHERIC ABSORPTION:	
Included	Yes, per ISO 9613-1

GROUND ATTENUATION:	
User selectable ground types	Yes, (absorption coefficients entered at source and ground surface locations)

MISCELLANEOUS ATTENUATION:	
Maximum number of 3-D areas	200
5000 m radius curved path propagation	Yes
Attenuation through industrial sites	Yes
Attenuation through foliage	Yes

ESTIMATED ACCURACY:	**(without screening or reflections present)**
Observer-Source mean height < 5 m	± 3 dB(A) when d< 1000 m
Observer-Source mean height > 5 m but < 30m	± 1 dB(A) when d< 100 m, ±3 dB(A) when 100m < d <1000m

OBSERVERS:	
Single Point Observers	48 per run file, multiple run files easily created
Contour Observers	Automatic Grid over user defined area

GRAPHICAL OUTPUT:	
Included graphics	Contour Plots (A or C weighted), Sorted Spectrum Waterfall Plots, Equipment and Observer Plan Views, 3-D Ground Elevation, Ground Hardness Contours, Source Sound Power Level Spectra and Directivity
Bitmaps	Yes
Data availability for other applications	Yes, simply cut and paste data into other Windows applications or text files

SYSTEM REQUIREMENTS:	80486DX or Pentium computer running Windows 95, 98, NT, 2000 or XP Microsoft compatible mouse 32 M RAM 30 M hard disk space CDROM Drive Minimum Video resolution: 800x600

TYPICAL SETUP AND RUN TIME:	
(20 sources, 20 barriers, 20 observers)	Setup time: < 2 hours, Run time: < 10 seconds