

### Glossary Speaker Technology

TERM	SYMBOL	UNIT	DEFINITION
Compliance equivalent volume	Vas	l	Comparison air quantity resulting from the compliance (Cms) and the effective cone area (Sd) of a speaker which is required to determine the characteristics in certain air quantities. Result of the TSP measurement (Thiele Small Parameters).
Moving mass	Mms	g	The total mass of the vibrating part of the speaker and the attached air quantity. Result of the TSP measurement.
Effective cone area	Sd	cm <sup>3</sup>	Effective area of the vibrating part, usually measured on an even level from surround centre to surround centre.
Electrical Q factor	Qes		Electromagnetically founded damping of a speaker (Q factors).
Recommended crossover frequency	fmax	Hz	Recommended max. crossover frequency, weighted qualitatively.
f3 (lower limit frequency)	f3	Hz	Maximum frequency range. The lower limit frequency of the transmission range with a level decline of 3 dB. This frequency is determined by the reciprocal influence of the characteristics of bass speaker and speaker cabinet used and can reasonably only be indicated as a variable.
Diagram of frequency response	y: dB x: Hz		The sound pressure curve of the speaker, measured in a standard sound wall of 100 x 140 cm, flush fitted, laying, in 1 m distance from the surround, with an applied power of 1 W, weighted according to the standard impedance (impedance, medium sound pressure). The measurement is made in an anechoic room with a lower limit frequency of approx. 200 Hz.
fx (lower crossover frequency)	fx	Hz	The lower crossover frequency with midrange speakers and tweeters to be selected by the user. The indicated capabilities of the speaker in wired condition are only reached if fx is not below fmax (12 dB/oct.) (recommended crossover frequency). If fx is selected considerably above this fmax, the speaker capability may increase!
Total Q factor	Qts		Especially important resulting value: Qts = Qms x Qes / (Qms + Qes) (electrical Q factor, mechanical Q factor)
DC resistance	Re		Ohmic resistance of the voice coil. Measurement with ohmmeter.
Q factors	Qindex		Measurement units of the damping effects of vibrating systems. Damping factors, also called 'Q-factors', are entered as calculation values without units into corresponding calculations of the vibration behaviour and the radiation of a speaker resulting from it. Results of the TSP measurement.
Impedance	Z		Rated resistance; standard division in 4 Ω and 8 Ω. The value of the rated impedance must not be more than 20 % below the indicated transmission range but it may be exceeded as desired.
Force factor	BL	Tm	Also called 'converter constant'. Product of flux density of the magnetic field in the air gap and the wire length of the voice coil located in this field. Relevant for the calculation of No (reference efficiency). Result of the TSP measurement.
Linear excursion	X <sub>MAX</sub>	± mm	Maximum amplitude of the vibrating part of the cone under constant drive force (force factor) in one direction each. This is calculated using this simple method: (Voice coil winding height - air gap height) / 2 For the rare type of voice coils with the winding height lower than the air gap height: (Air gap height - voice coil winding height) / 2 X <sub>MAX</sub> which may deviate from this calculation method are the result from measurements taken with audio analysing systems (e.g. Klippel).
Maximum power capability	P <sub>MAX</sub>	W	Short-term acceptable electrical capability of the speaker system in which the corresponding speaker is correctly inserted together with others. Empirically determined.
Maximum frequency range		Hz	Application-oriented statement on the transmission bandwidth to be obtained with relatively good transmission characteristics.
Mechanical Q factor	Qms		Damping of a speaker based on friction loss (Q factors)
Mechanical resistance	Rms	kg/s	Kinetic resistance of the cone suspension. Result of the TSP measurement.
Medium sound pressure	SPL	dB/W/m	Sound pressure in the medium application range with an applied power of 1 W measured in 1 m. (4 Ω speaker with an applied voltage of 2 V, 8 Ω speaker with an applied voltage of 2 V, 8 Ω speaker with 2.83 V)
Suspension compliance	Cms	mm/N	Also 'compliance'. Softness of cone suspension. Result of the TSP measurement.
Power rating	P <sub>RMS</sub>	W	Electrical and mechanical continuous rating of the speaker system in which the corresponding speaker is correctly inserted together with others. Empirically determined.
Reference efficiency	No	%	The amount of the supplied energy radiated as sound from the speaker in the undistorted frequency band above the fundamental resonance frequency. Not identical with SPL, as it is not influenced by resonance and beaming effects! Result of the TSP measurement, calculated on half-space conditions.
Resonant frequency	fs	Hz	Frequency of free air resonance with speaker not mounted. Determined by the maximum value of the AC current resistance in the lower transmission range.
Voice coil inductance	Le	mH	Inductance of the voice coil centred in the air gap. Measurement with inductance meter at 1 kHz.
Thiele Small Parameters	TSP		Data record to determine the characteristics of speakers in cabinets. Named after the authors of the comprehensive essays. After the speaker has been played for a while and then cooled off, it is measured in standing position vertically to the moving axis.
Volume displacement	Vd	cm <sup>3</sup>	The air quantity displaced by the cone during the maximum linear excursion. Calculated: X <sub>MAX</sub> (in cm) x Sd (effective cone area).

## CAAD-4.2

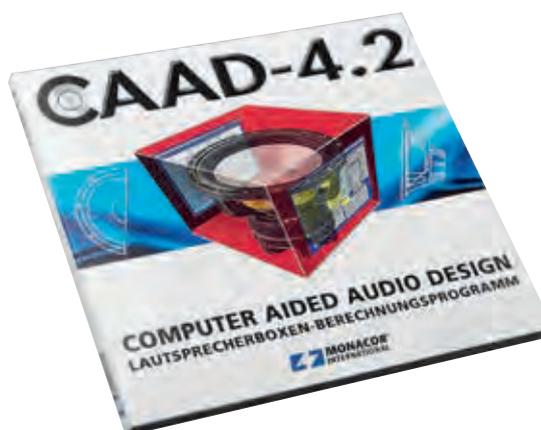
Order No. 37.0920

### CAAD-4.2, 32-bit version for Windows\* (version 98 or higher), with all the advantages from Windows:

- User screen with menu-controlled MDI (multi-window method)
- Any desired distance measurements with mouse cursor in the cabinet graphics
- Simultaneous display possible of up to 6 curves (for comparison)
- Online selection of 7 languages
- Database update at the push of a button

#### Speaker cabinet calculation

- Closed, bass-reflex, band-pass, compound, transmission line and horn, also while using several speakers
- Search function for suitable speakers for an existing cabinet (replacement speakers!)
- Automatic creation of parts lists for construction of a calculated speaker cabinet



#### Crossover network calc. 1st to 4th order (6-24 dB)

##### Speaker database

Extendable as desired and easy download of the latest speakers  
Additionally with CAAD-3.0 for Windows\* 3.0-3.11

#### System requirements

IBM-compatible PC (Pentium or higher), VGA, 16 MB RAM, 10 MB free hard disk space, CD-ROM, Windows\* 9x/ME/2000/NT/XP/VISTA/7, MS Service Pack 3 is required for Windows NT4