

# ZORBA

sound absorption prediction software

MARSHALL DAY  
ACOUSTICS

## About ZORBA

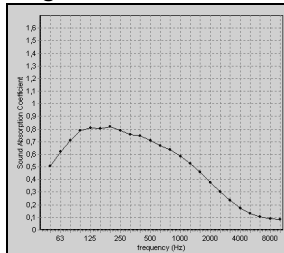
The new software ZORBA developed by Marshall Day Acoustics is a quick tool for predicting the absorption performance of porous systems with perforated facings. This tool is ideal for the investigation of acoustically critical rooms such as studios, concerts halls, class room, lecture theatres and others.

ZORBA has been developed in collaboration with acoustic consultants to ensure user friendly features (Report Generators, data export etc). This makes the software convenient and practical.

## Result presentation

All the results are given in third octave band. Access to these results is also made through other Tabs, which let the user choose between a graphical representation of the absorption coefficient (normal or random incidence), an image in the complex plane of the specific impedance of the system, or a table presenting the values of the absorption of the system, and the specific impedance, propagation coefficient and Transmission Loss of the first Layer of porous material.

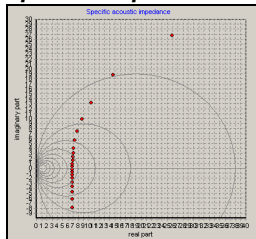
Diagram



Table

| freq | Ac   | Ac <sub>r</sub> | ReZ | ImZ   | TL    |
|------|------|-----------------|-----|-------|-------|
| 50   | 0.22 | 0.51            | 0   | 5.033 | 5.085 |
| 63   | 0.27 | 0.62            | 0   | 5.640 | 5.714 |
| 80   | 0.32 | 0.71            | 0   | 6.341 | 6.448 |
| 100  | 0.36 | 0.78            | 0   | 7.070 | 7.220 |
| 125  | 0.39 | 0.81            | 0   | 7.874 | 8.089 |
| 160  | 0.42 | 0.80            | 0   | 8.955 | 9.174 |
| 200  | 0.43 | 0.82            | 0   | 9.826 | 10.28 |
| 250  | 0.44 | 0.79            | 0   | 10.87 | 11.54 |
| 315  | 0.44 | 0.76            | 0   | 12.01 | 13.04 |
| 400  | 0.44 | 0.75            | 0   | 13.24 | 14.83 |
| 500  | 0.44 | 0.71            | 0   | 14.38 | 16.82 |
| 630  | 0.43 | 0.67            | 0   | 15.54 | 18.31 |
| 800  | 0.41 | 0.64            | 0   | 16.66 | 20.00 |
| 1000 | 0.38 | 0.59            | 0   | 17.83 | 22.29 |
| 1250 | 0.34 | 0.53            | 0   | 18.50 | 24.57 |
| 1600 | 0.29 | 0.46            | 0   | 19.38 | 27.85 |
| 2000 | 0.24 | 0.39            | 0   | 20.13 | 31.13 |
| 2500 | 0.18 | 0.30            | 0   | 20.88 | 35.69 |
| 3150 | 0.14 | 0.23            | 0   | 21.71 | 40.74 |
| 4000 | 0.10 | 0.17            | 0   | 22.72 | 46.68 |
| 5000 | 0.07 | 0.13            | 0   | 23.85 | 53.61 |

Specific impedance

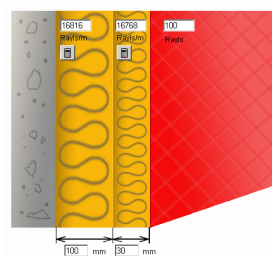


ZORBA also provides the two main standard single number absorption coefficients NRC and Alpha Weighted for every calculation.

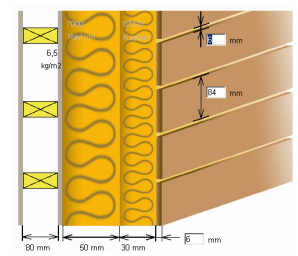
## Main features

The model is built by choosing different Tabs. The first Tab allows the user to define the characteristics of the porous absorbent (thickness, flow resistivity.), and the other Tabs correspond to different types of facings.

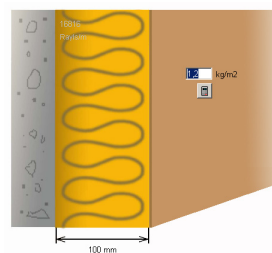
Porous Absorber



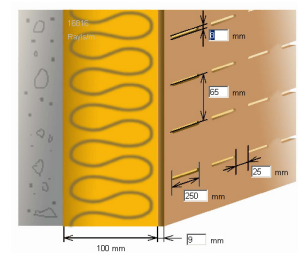
Panel Absorbers



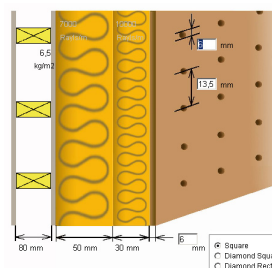
Slat Absorber



Slot Absorber



Perforated Absorber



## Technical information

The calculation of the absorption coefficient is made in several steps that are described below:

- Determination of the specific impedance and propagation coefficient of the porous materials.
- Calculation of the specific impedance of the system.
- Conversion of the specific impedance into the absorption coefficients, for normal and random incidence, and calculation of the transmission loss.

Further information: [www.rahe-kraft.de](http://www.rahe-kraft.de)



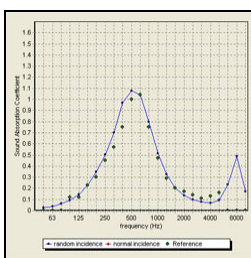
## Examples Comparison with measurements

### Porous Layer:

Width: 25mm  
Flow Resistivity: 7000  
Rayls/m

### Facing:

Width: 17mm  
Perforation Diameter:  
8mm  
Perforation Pitch: 27mm  
Open Area: 6.9%

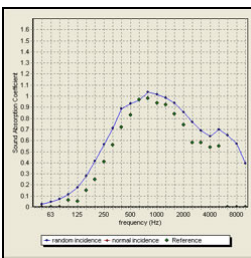


### Porous Layer:

Width: 30mm  
Flow Resistivity: 16768  
Rayls/m

### Facing:

Width: 13mm  
Slot width: 49mm  
Slot width: 70mm  
Open Area: 41%

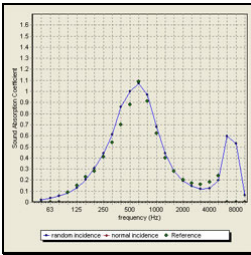


### Porous Layer:

Width: 25mm  
Flow Resistivity: 7000  
Rayls/m

### Facing:

Width: 17mm  
Slot width: 8mm  
Slot vertical pitch: 65mm  
Slot length: 250mm  
Slot horizontal pitch:  
25mm  
Open Area: 11%



## Prices

### Single user licenses:

Base price (Licence 1): € 440,-  
Discount for additional  
licenses on request

### Network licences:

#### LAN-Network

Base price (1<sup>st</sup> Licence) € 660,-  
further licences € 132,-

#### WAN-Network

Base price (1<sup>st</sup> Licence) € 1012,-  
further licences € 132,-

Please contact us for more information:

# Rahe • Kraft

Akustikbüro Rahe-Kraft GmbH  
Monumentenstr. 33/34  
D-10829 Berlin  
Germany  
[www.rahe-kraft.de](http://www.rahe-kraft.de)

Your contact person:

Tobias Kirchner

[t.kirchner@rahe-kraft.de](mailto:t.kirchner@rahe-kraft.de)

Fon: +49.30.263 93 69-21

Fax: +49.30.263 93 69-20