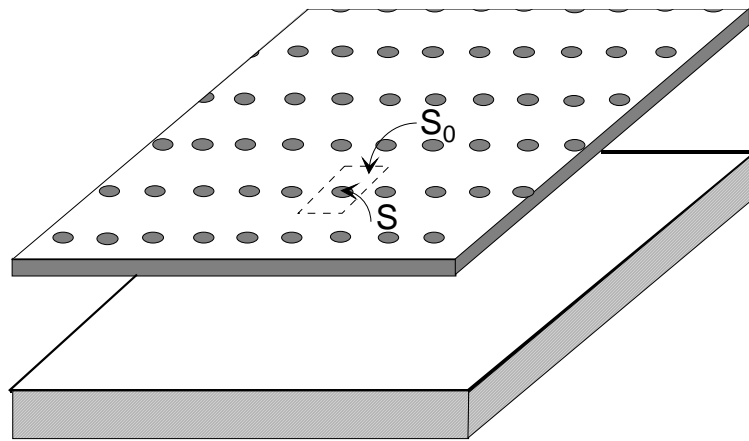




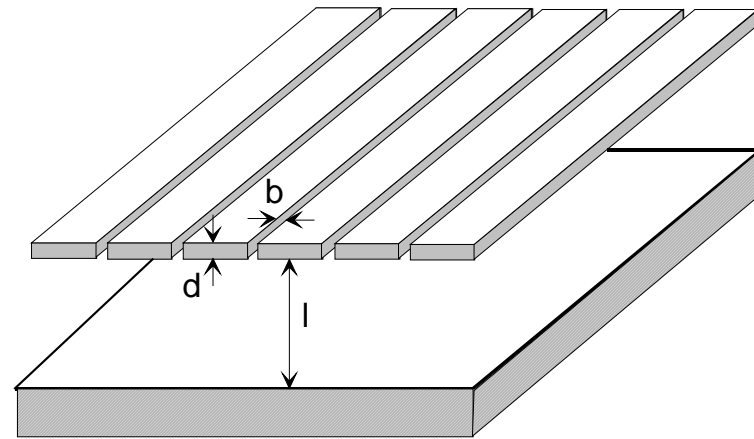
Absorbenter med mikroperforering; typer og anvendelser.

T.E. Vigran

Fordelt Helmholtzresonator

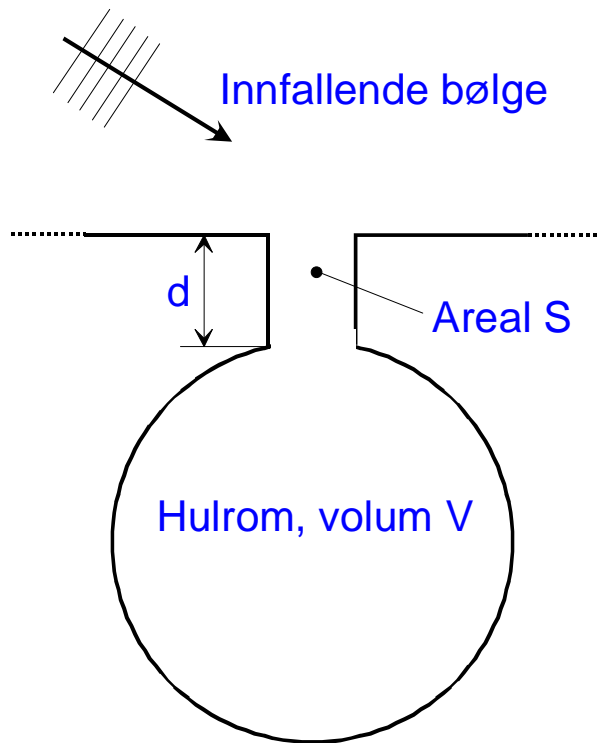


a)



b)

Helmholtzresonator



Hvordan beregne på en "mikrotrang" hals?

$$Z_{\text{ak}} = \frac{\Delta p}{\langle v_x \rangle S} = j \frac{\omega \rho_0 d}{\pi a^2} \left(1 - \frac{2}{s \sqrt{-j}} \frac{J_1(s \sqrt{-j})}{J_0(s \sqrt{-j})} \right)^{-1}$$

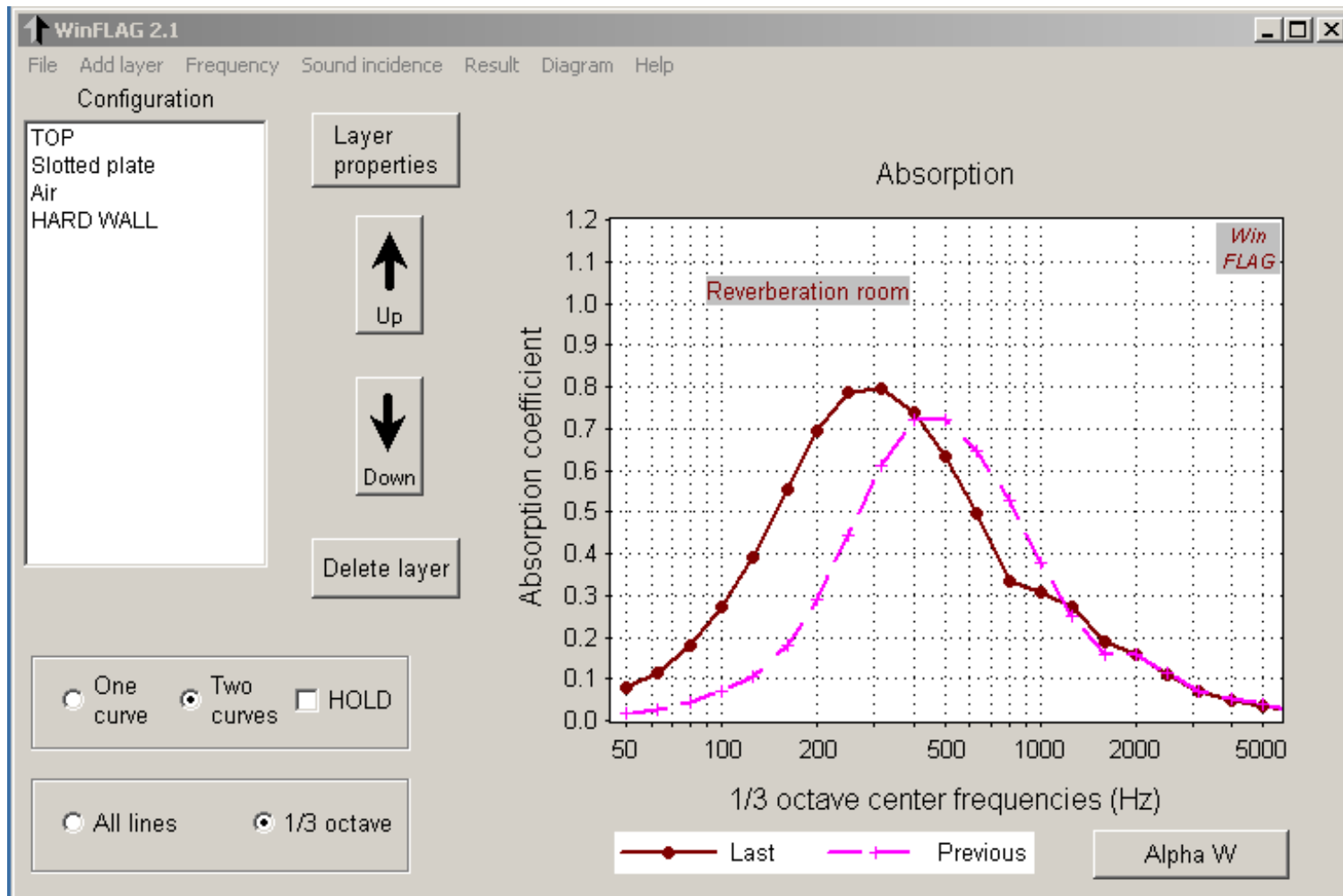
$$s = a \sqrt{\frac{\omega \rho_0}{\mu}} \quad \text{hvor } a \text{ er radius}$$

Mikrohull. Lavfrekvens tilnærmeelse

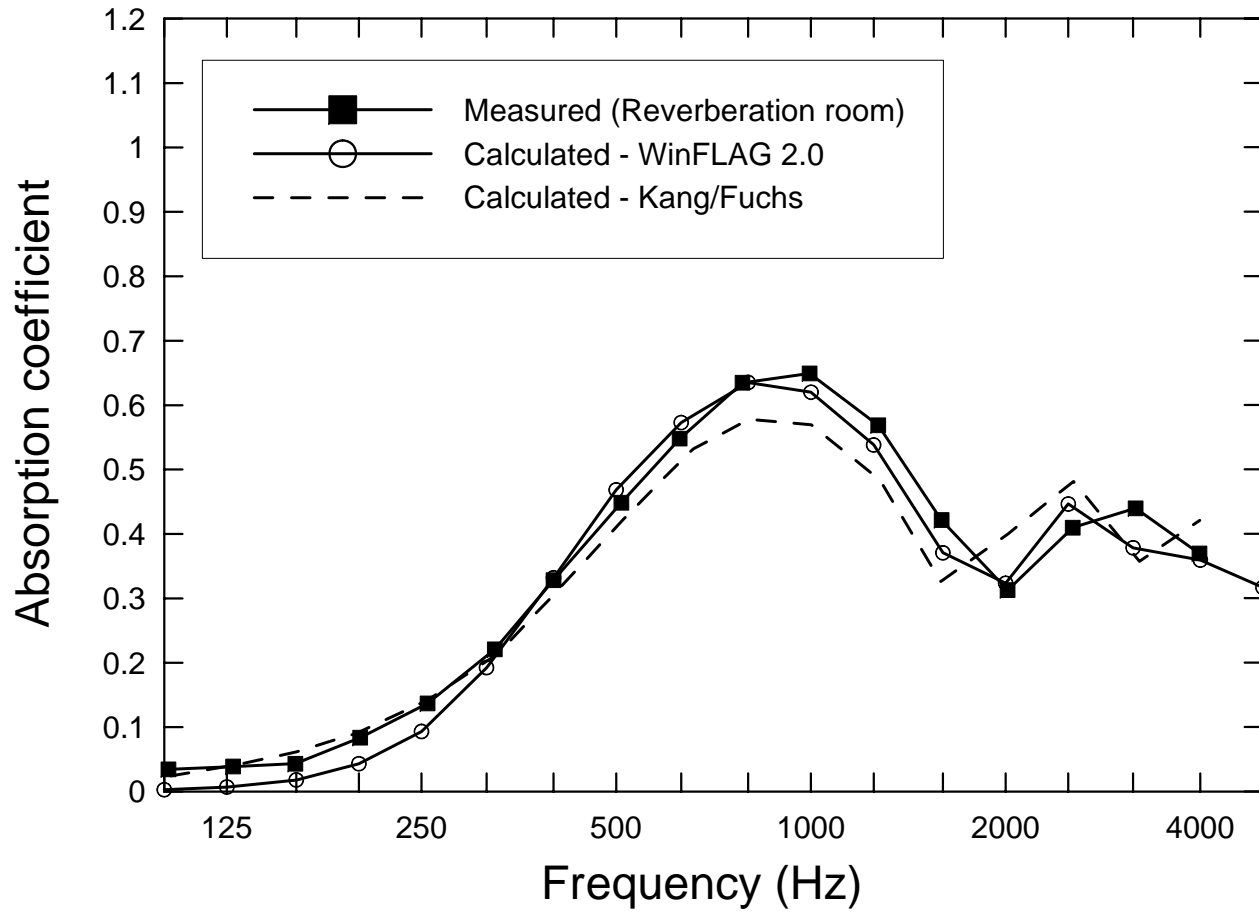
$$Z_{\text{ak}} \approx \frac{8\mu d}{\pi a^4} + j \frac{4}{3} \frac{\omega \rho_0 d}{\pi a^2}$$

Maa Dah-You (INTERNOISE 1984)
Presenterte meget gode tilnærmelser
for de generelle formlene.

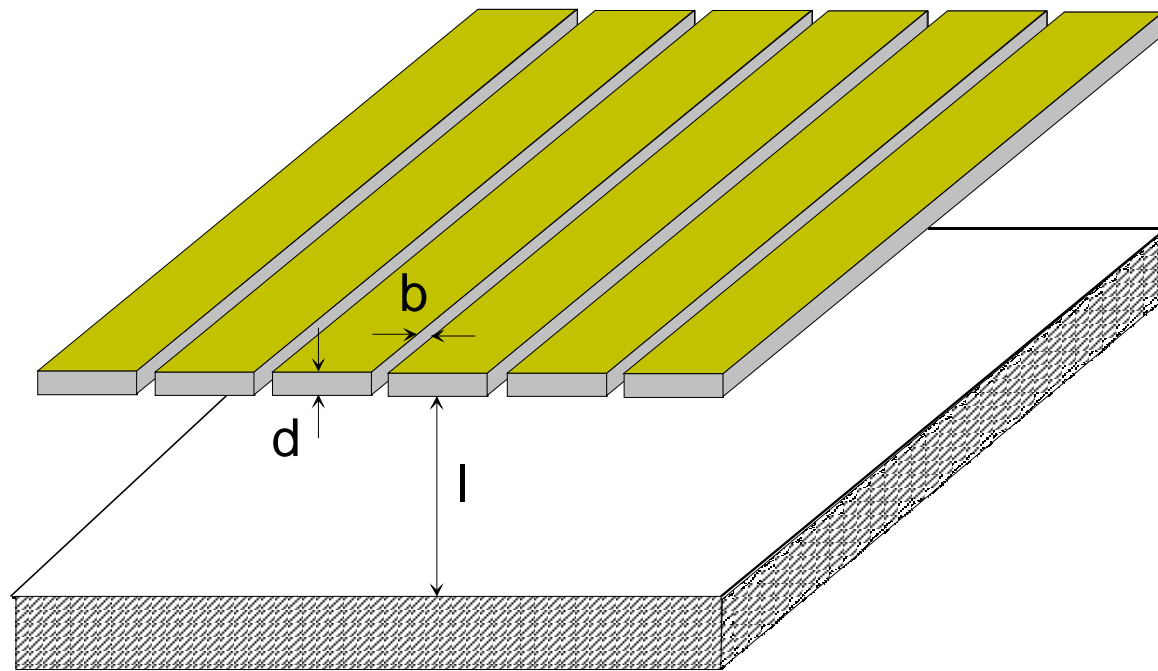
WinFLAG, main window



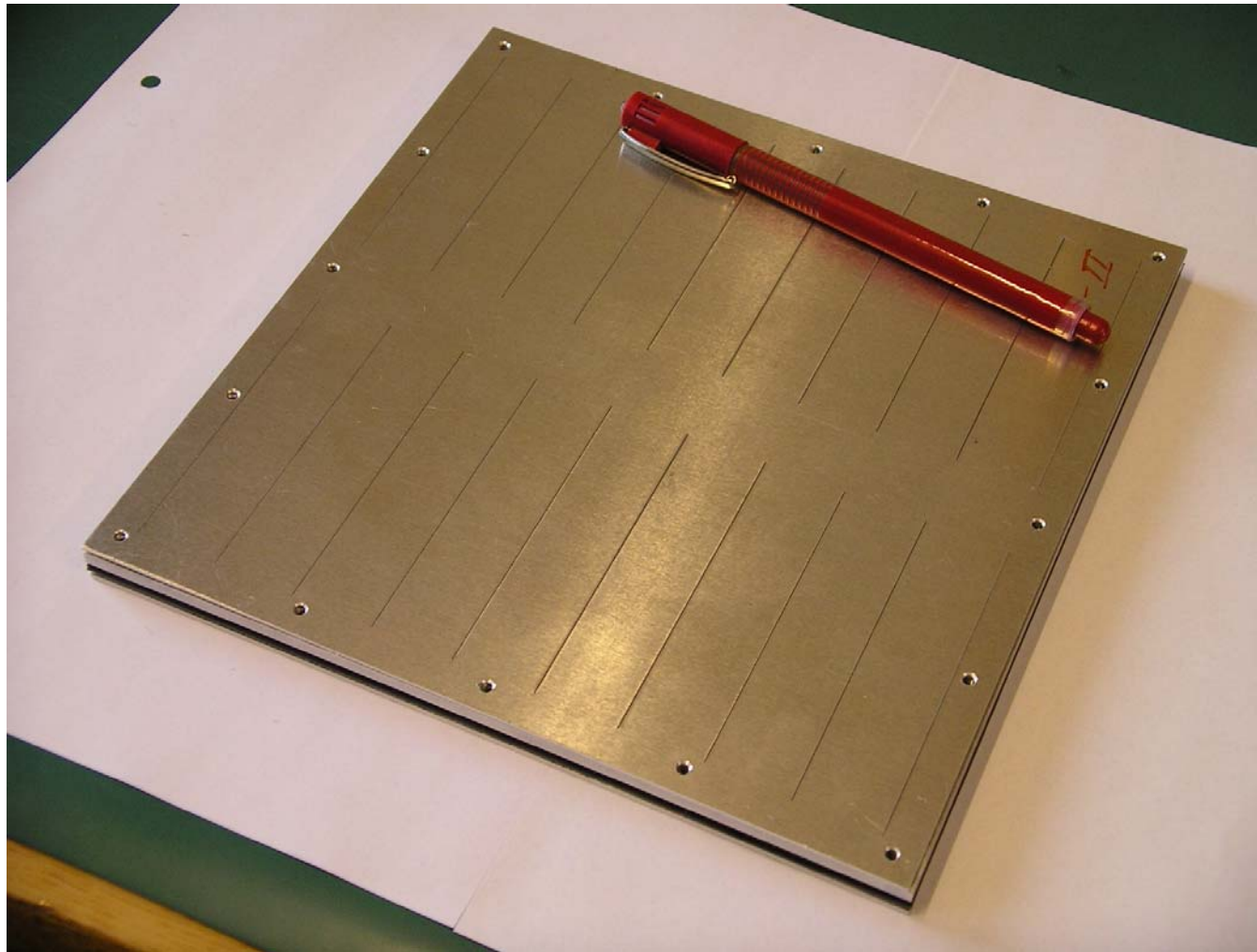
Mikroperforeert folie



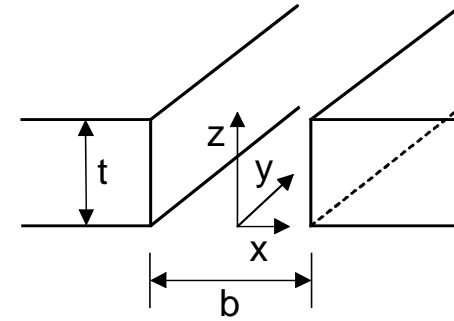
Slotted (slatted) panel



Laser-made slits



Theory



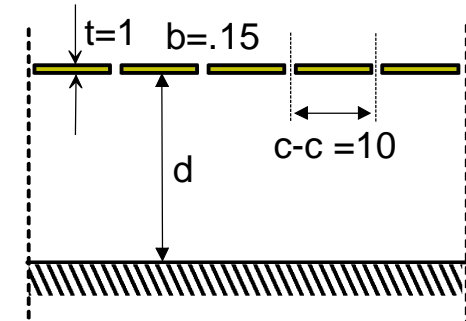
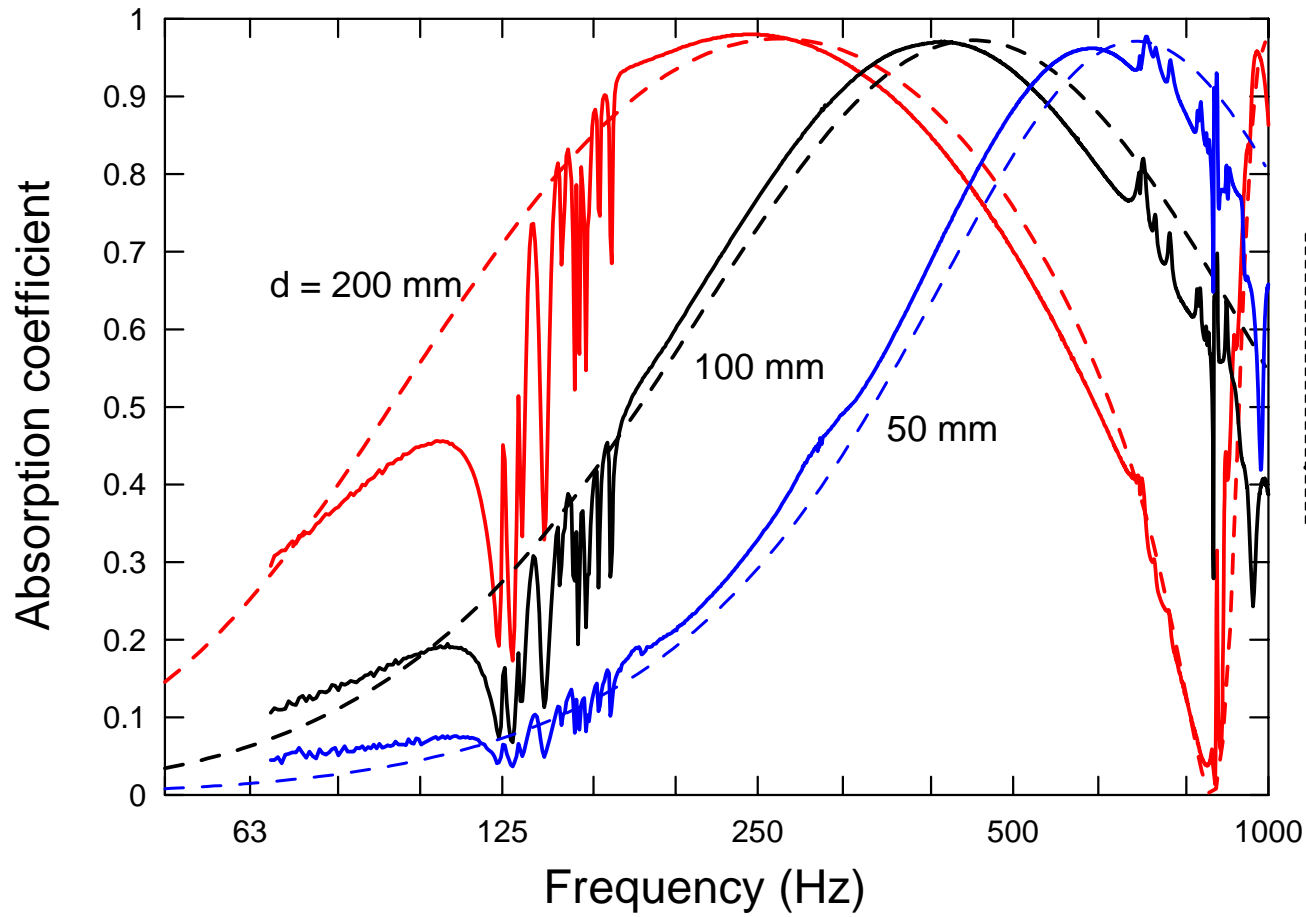
For an infinitely long slit:

$$Z' = j\rho\omega t = j \frac{\rho_0 \omega t}{1 - \frac{2}{\frac{k'b}{2}}} \quad \text{where} \quad k' = \sqrt{\frac{\omega\rho_0}{j\mu}}$$

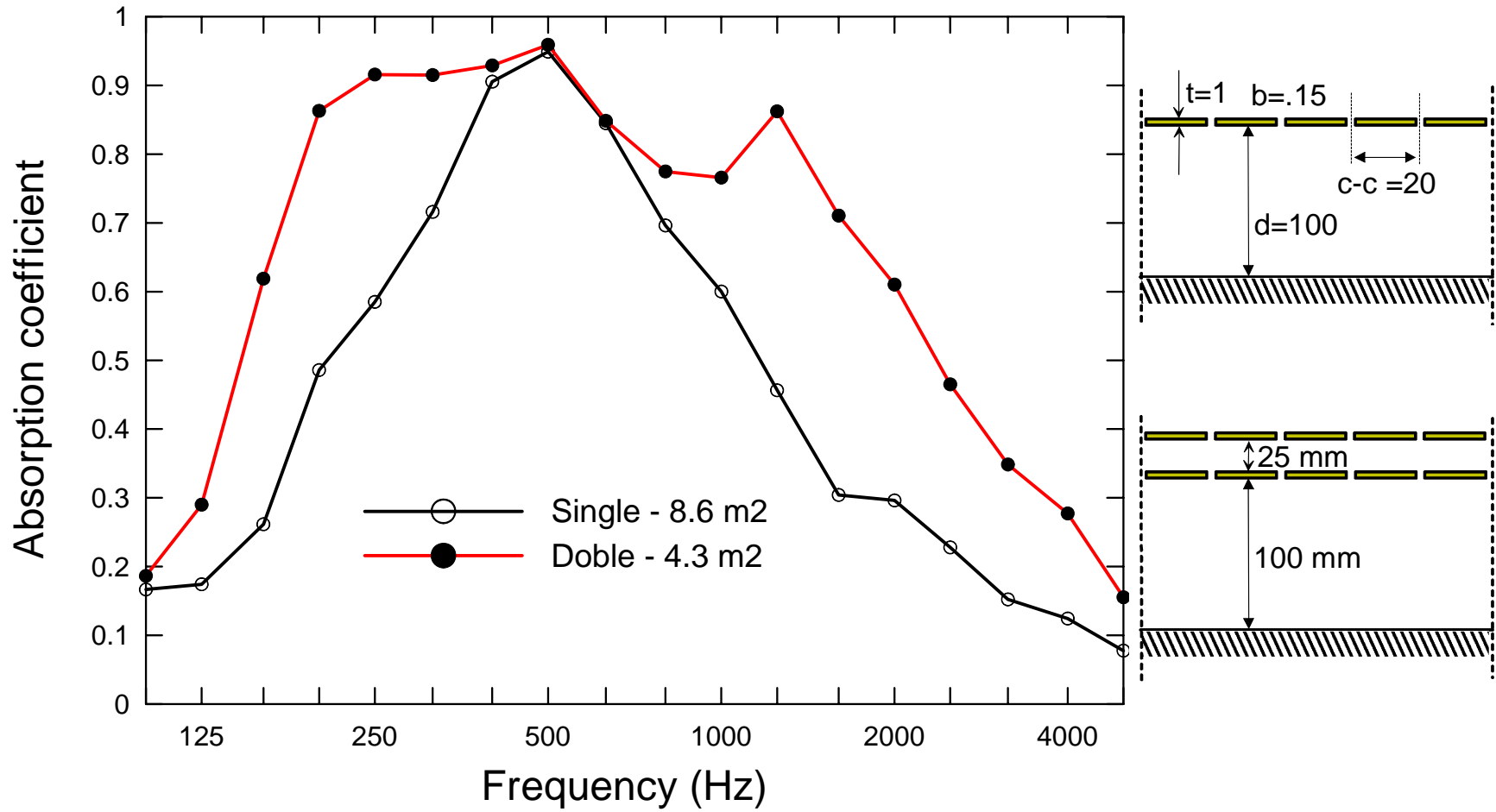
Low frequency approximation:

$$Z' \approx \frac{12\mu t}{b^2} + \frac{1}{700} \frac{t b^2 \rho_0^2 \omega^2}{\mu} + j \frac{6}{5} \omega \rho_0 t$$

Measured and calculated results Standing wave tube



Reverberation room test





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Med kunstnerisk uttrykk



Konklusjon

Skal vi være på linje med Ke Liu et.al.?
(151st Meeting:Acoust.Soc.Am. 2006)

”This review shows that the MPA has potentials be be an ideal absorbing material in architectural acoustics in the 21st century”