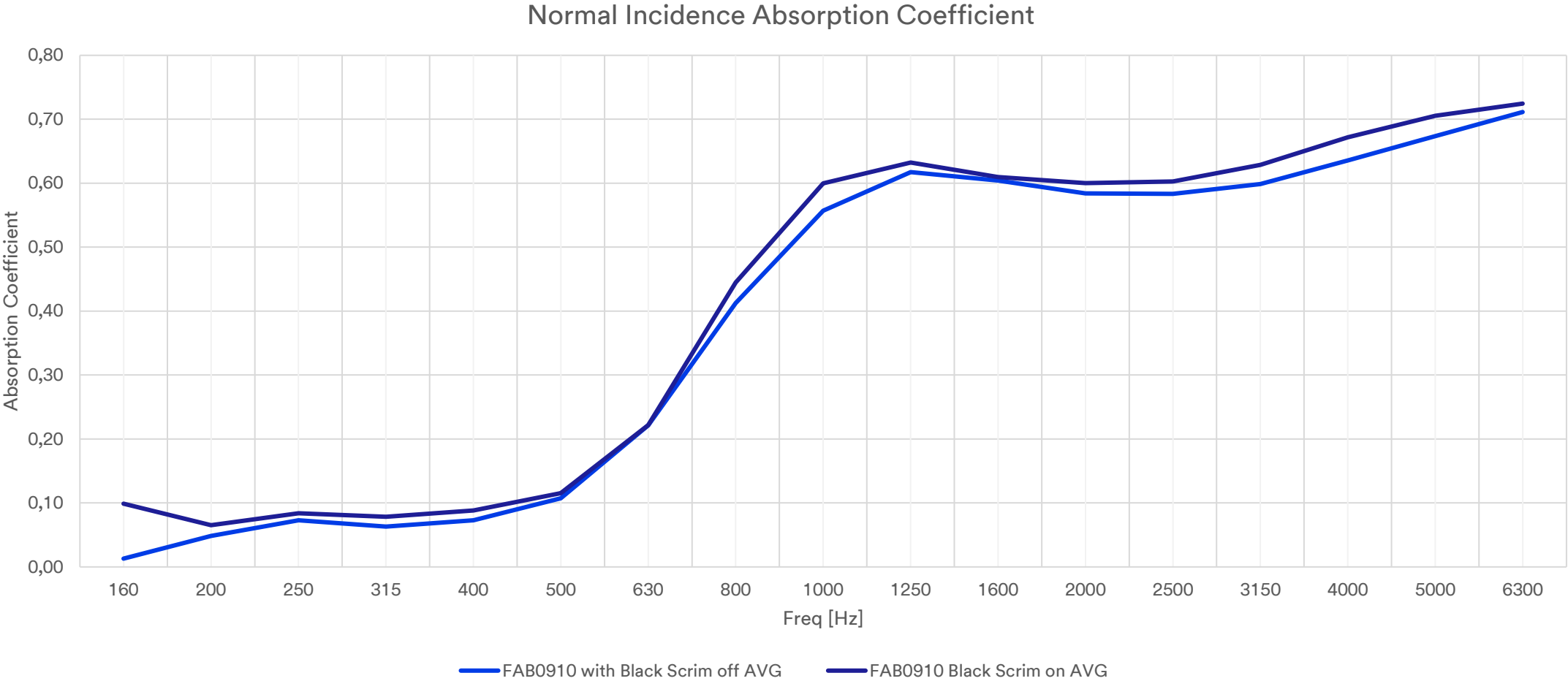


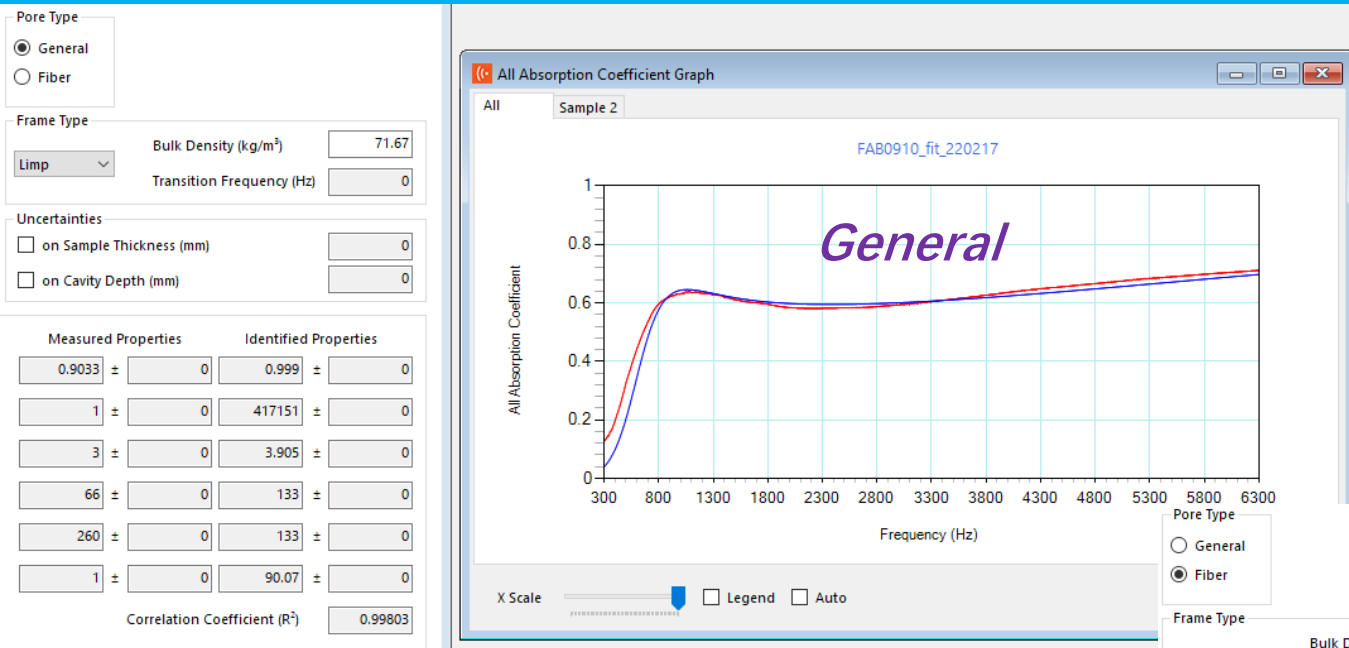
3M™ Flexile Acoustic Material

Modelling parameters fitting study
May 2022

E-1050 slide with and without the black scrim



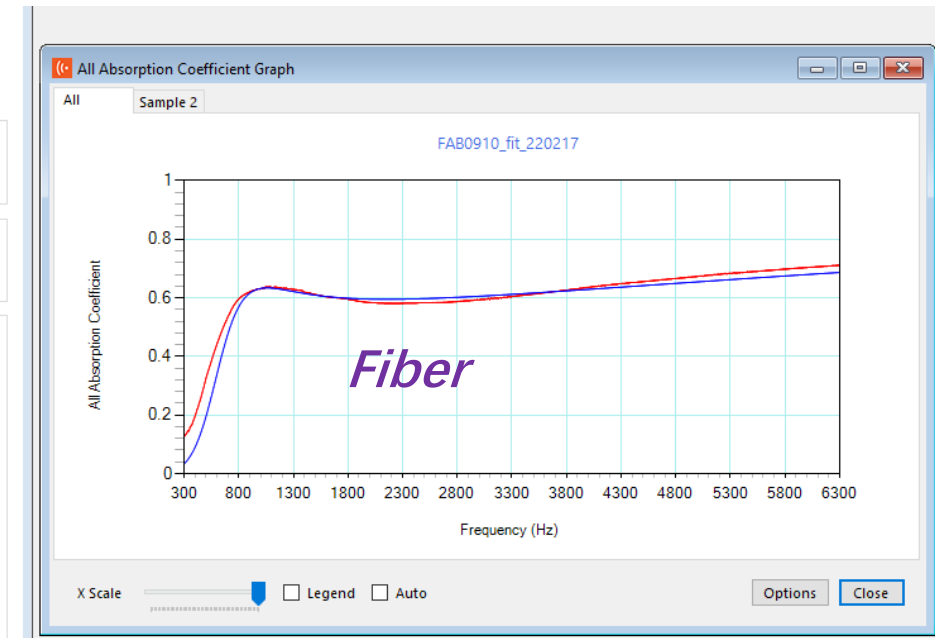
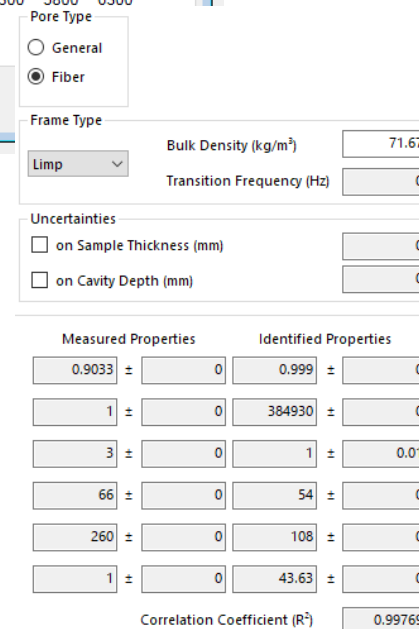
Foam-X Fitting Options



Equivalent fits with very different parameter values

Average absorption coefficient for combined measurements in small and large tube with scrim off; fit conducted for 300–6300 Hz using Foam-X.

Biot parameters generated for JCA limp model with 2 different Foam-X settings.



Parameter Fitting

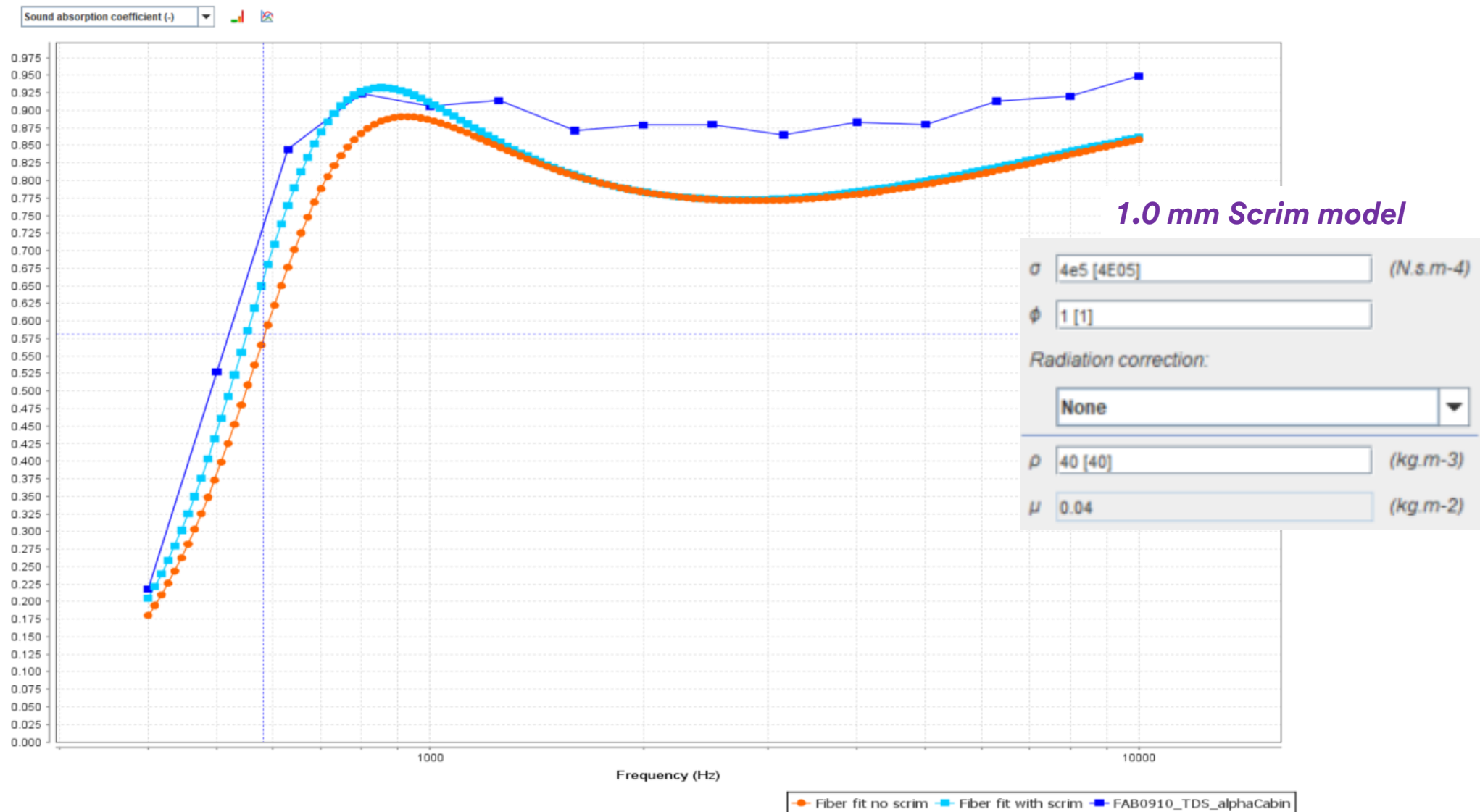
– 3M fitting with no black scrim

Parameters	<i>General</i> fitting no black scrim	<i>Fiber</i> fitting no black scrim
σ [rayls/m]	417,151	384,930
Λ [μm]	133.0	54.0
Λ' [μm]	133.0	108.0
Tortuosity	3.905	1.0
Porosity ϕ	0.999	0.999
ρ_b [kg/m^3]	71.67 *	71.67 *

* Values were assigned and not fit.

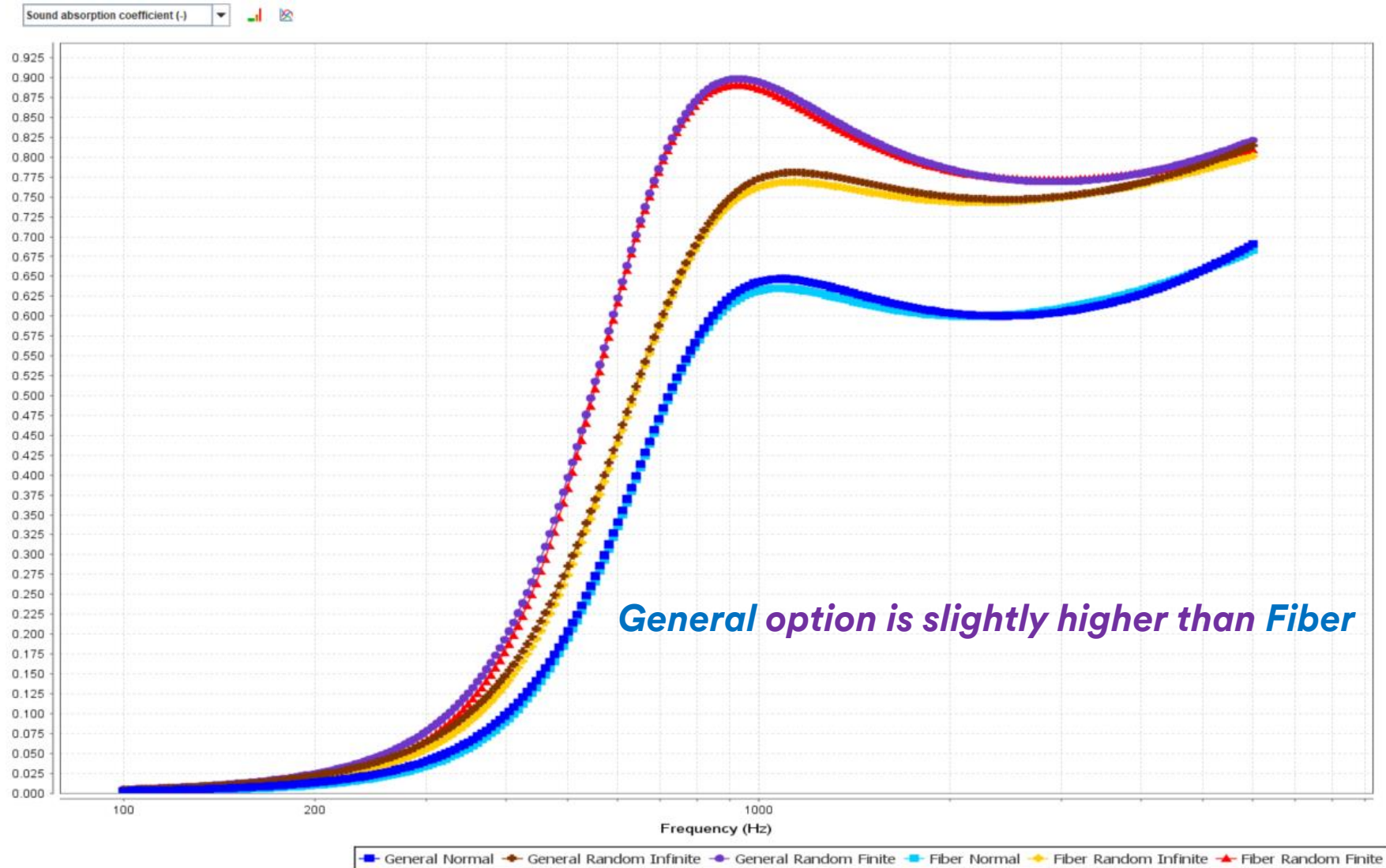
Calculation comparison

– Alpha Cabin random absorption Black scrim added



Effect of random incidence finite size correction

– without scrim



Parameter Fitting using FoamX Limp Fiber model

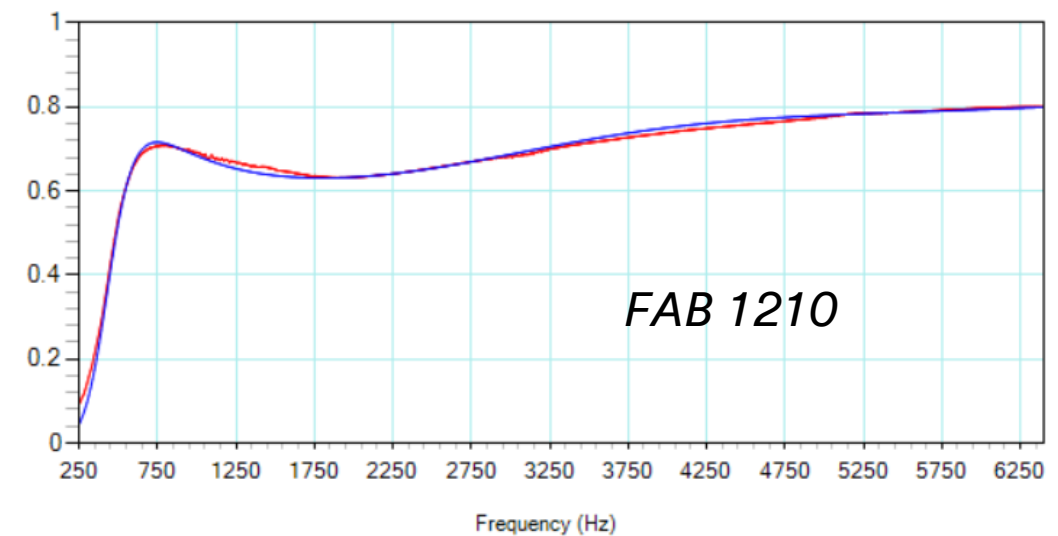
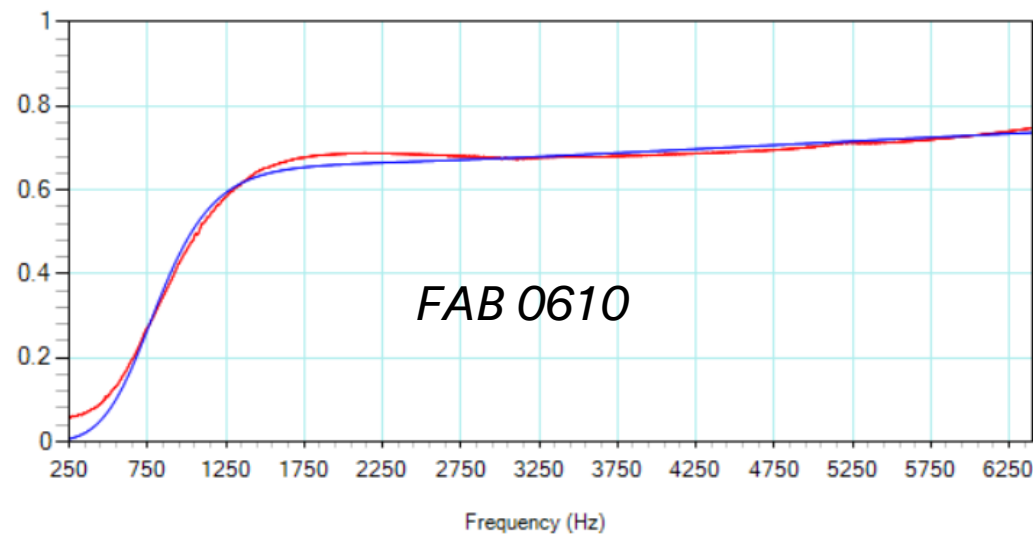
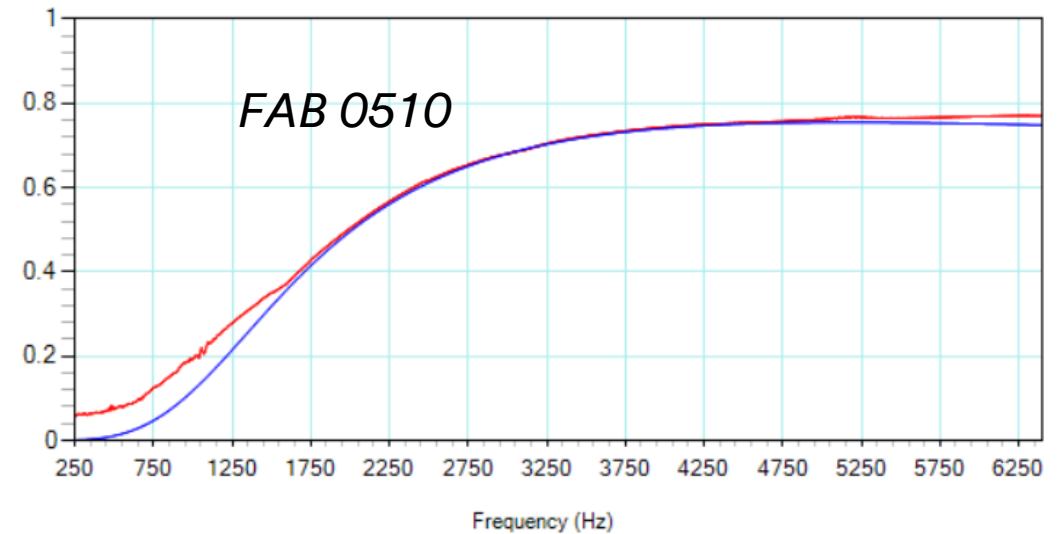
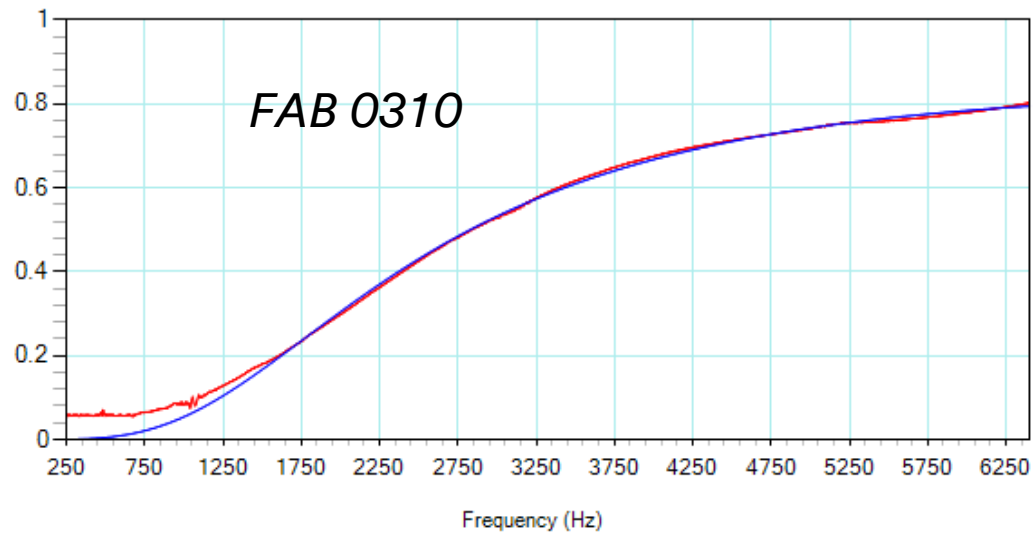
– black scrim removed

FAB Material	FAB 0910	FAB 0310	FAB 0510	FAB 0610	FAB 1210
σ [rayl/m]	380,519	478,066	496,470	334,336	224,869
Λ [μm]	56.5	6.3	4.3	34.2	6.6
Λ' [μm]	113.0	12.6	8.5	68.3	13.2
Tortuosity	1.0	1.0	1.0	1.0	1.0
Porosity ϕ	0.999	0.999	0.999	0.959	0.938
ρ_b [kg/m^3]	71.67 *	73.33 *	83.64 *	63.00 *	63.08 *
Thick. [mm]	12.0 *	4.5 *	5.5 *	10.0 *	19.5 *
B.W. [gsm]	860. *	330. *	460. *	630. *	1,230. *

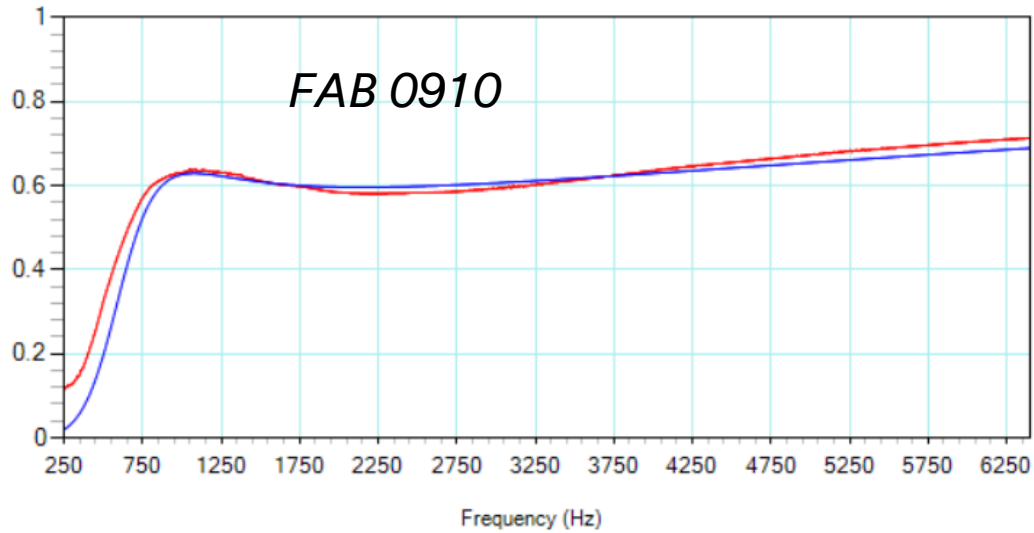
* Values were assigned and not fit.

FoamX settings: 22°C, 1000 mbar, 50% RH, Data Fit 250-6,400 Hz

Comparison of Data and FoamX Fits for additional datasets

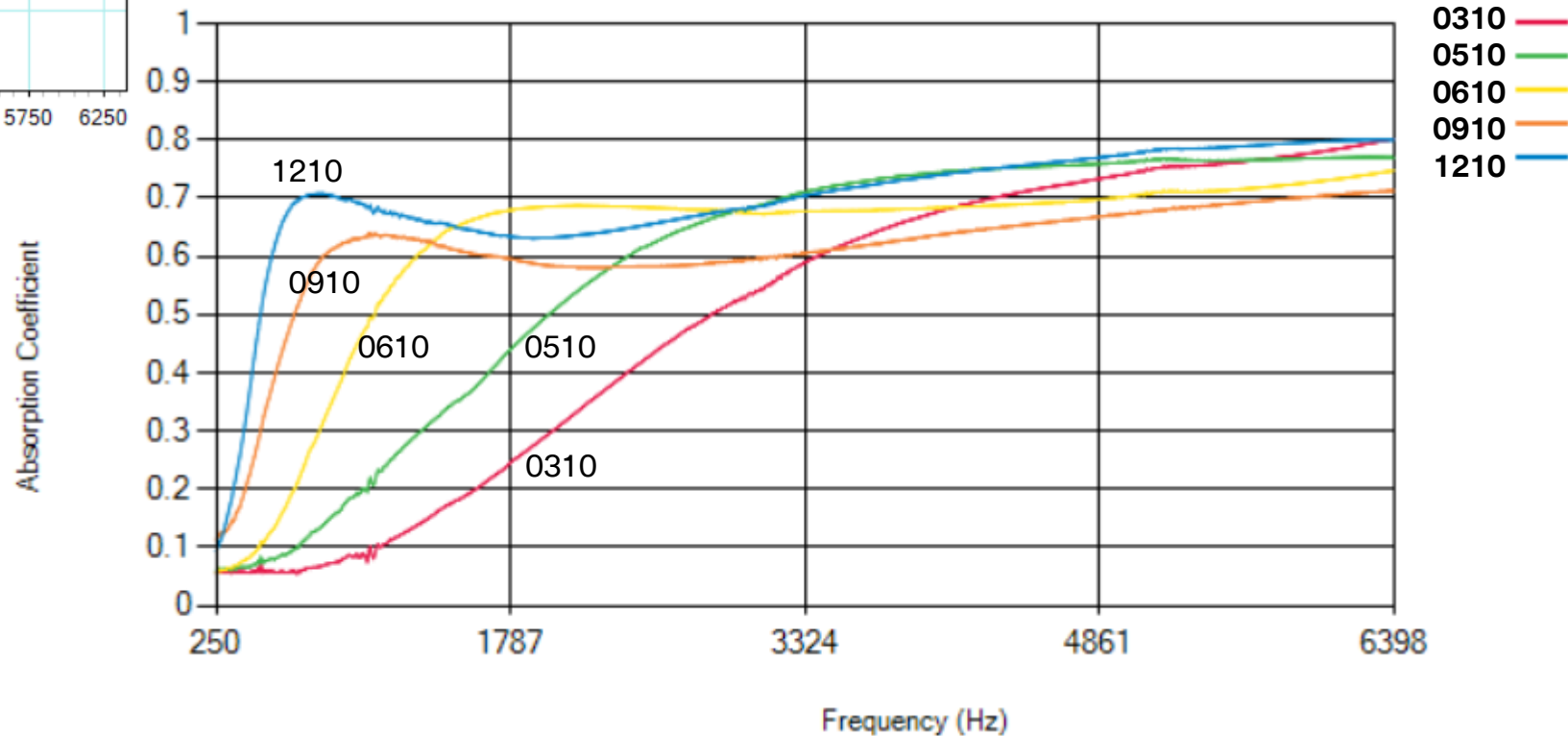


Summary of all 5 FAB datasets



FAB Material	FAB 0910	FAB 0310	FAB 0510	FAB 0610	FAB 1210
Thick. [mm]	12.0	4.5	5.5	10.0	19.5
B.W. [gsm]	860	330	460	630	1,230

*FAB Data Comparison
Normal Incidence*



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