

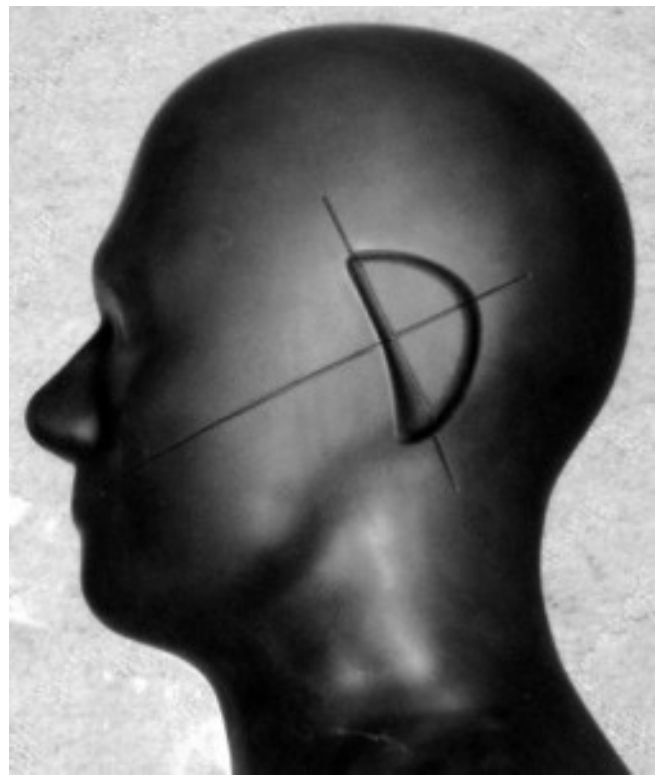
Solid SAM head phantoms

MCL-T offers solid SAM head phantoms for applications - such as radio radiation pattern testing - where a liquid-filled phantom is not necessary. The advantages of a solid head are:

- Robustness
- Indefinite shelf life
- Wide frequency range (130 MHz - 6 GHz)
- Single phantom for all frequency bands

The MCL-T solid heads are made from carbon-loaded silicone rubber with dielectric properties that match tissues over a wide range.

The solid heads can be made to the shape of either the inner or outer surfaces of the standard SAM shell phantoms. If an inner head shape is used, then a small section of SAM headshell can be supplied to provide the ear (pinna) spacing and the reference positioning lines.



Solid SAM inner head with outer SAM earpiece Solid SAM outer head

Conductive silicone material for head phantoms: material properties

Frequency (MHz)	Relative permittivity ϵ_r	Conductivity, σ (S/m)
130.0	70.5	0.27
143.8	68.3	0.29
159.0	66.3	0.30
175.9	64.4	0.32
194.5	63.0	0.34
215.1	61.5	0.37
237.9	60.1	0.40
263.1	58.5	0.42
291.0	57.0	0.45
321.8	55.5	0.48
355.9	54.2	0.51
393.6	52.8	0.54
435.4	51.4	0.57
481.5	50.1	0.61
532.5	48.9	0.65
588.9	47.7	0.70
651.3	46.5	0.74
720.4	45.3	0.79
796.7	44.3	0.83
881.1	43.4	0.88
974.5	42.6	0.94
1,077.8	41.7	1.02
1,192.0	40.6	1.10
1,318.3	39.7	1.16
1,458.0	39.0	1.23
1,612.5	38.3	1.32
1,783.3	37.6	1.43
1,972.3	36.8	1.55
2,181.3	36.1	1.67
2,412.4	35.4	1.81
2,668.1	34.6	1.97
2,950.8	33.9	2.14
3,263.5	33.1	2.33
3,609.3	32.3	2.54
3,991.7	31.5	2.77
4,414.7	30.7	3.03
4,882.5	29.8	3.30
5,399.9	28.8	3.58
5,972.1	27.9	3.87
6,605.0	26.8	4.13
7,304.9	25.9	4.35
8,078.9	25.0	4.52
8,935.0	24.2	4.61
9,881.8	23.6	4.64
10,929.0	23.3	4.64

From Gabriel C 2007, Tissue equivalent material for hand phantoms. *Phys. Med. Biol.* **52** 4205-4210