

ULTRASONIC MATERIALS

Transducers

Overview

Poco Graphite, a part of Entegris' Critical Materials Handling business unit, develops graphite grades for several high-technology industries. For Ultrasound, POCO has created several new materials that are used as Matching Layers for today's highest-performance transducers and backing blocks.

Matching Layers

Matching impedance between the piezoelectric generator and the human body is critical to delivering the highest power ultrasound waveforms with the lowest interference. By impregnating different materials into the inherent porosity of graphite, POCO has been able to create a family of materials with impedances that step down from 30 Mrayls to 3 Mrayls, allowing for minimal internal reflection and interference, and maximum delivery of energy to the test subject. This in turn enables increased resolution of internal features. Images that were once fuzzy and nondescript become crisp and detailed, providing greater diagnostic value.

Where some suppliers have offered matching materials with impregnations and unknown properties, POCO has focused in on supplying materials with tightly controlled ultrasonic transmission. By offering a narrower band of impedance, POCO provides manufacturers certainty in the yields they will achieve as test heads make their way through value adding assembly processes. Higher yields ensure minimum manufacturing disruption and optimal product flow.

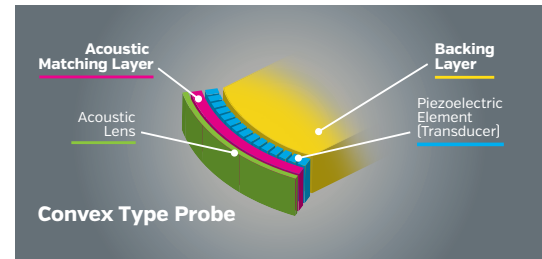
For More Information

Please call your Regional Customer Service Center today to learn what POCO can do for you. Visit www.poco.com and select the Contact Us link for the center nearest you.

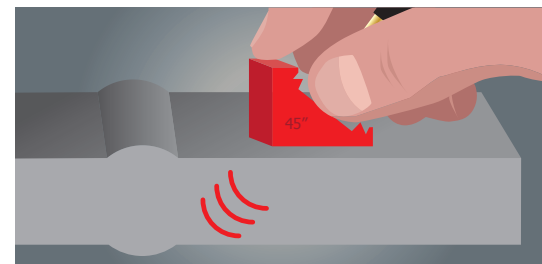
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Medical Ultrasound transducer with a single matching layer and backing block



Ultrasound transducer for flaw detection uses graphite for matching and wear resistance

Backing Blocks

In addition to Matching Layers, POCO offers unique, lightweight, thermally conductive, sonic dampening Backing Blocks. Transducer manufacturers are using POCO HTC™ materials to dissipate heat from the head, protecting sensitive embedded electronics and extending the life of the head. The low density of the material keeps the weight of the transducer down, making procedures more comfortable for operators and patients.

POCO, with its family of Ultrasound materials, is providing a Material Advantage to manufacturers and operators of Ultrasound Transducers.

Impedance Values

October 2015

Graphite Test Data – Measured before and after resin impregantaion

Initial Graphite Z Axis Velocity			CF Z Axis Velocity				Initial Graphite Z Axis Velocity			Resinol Z axis velocity		
Graphite in/millisecc	Graphite g/cc	Mrayl 10 ⁶ Kg /m ² sec	Graphite Impreg in/millisecc	Graphite g/cc	Mrayl 10 ⁶ Kg /m ² sec	Material	Graphite in/millisecc	Graphite g/cc	Mrayl 10 ⁶ Kg /m ² sec	Graphite Impreg in/millisecc	Graphite g/cc	Mrayl 10 ⁶ Kg /m ² sec
n/a	0.865	n/a	164.4	1.306	5.45	HTC (Foam)	n/a	0.863	n/a	94.0	1.459	3.48
86.1	1.370	3.00	108.0	1.683	4.62	AXD-5Q	85.7	1.371	2.98	101.5	1.730	4.46
111.0	1.705	4.80	120.9	1.913	5.87	TM	109.8	1.710	4.77	114.7	1.901	5.54
115.1	1.791	5.24	122.9	1.922	6.00	ZXF-5Q	115.5	1.786	5.24	122.0	1.910	5.92
112.3	1.700	4.85	122.9	1.919	5.99	AXM-5Q	112.2	1.709	4.87	121.6	1.924	5.94
115.0	1.732	5.06	129.1	1.919	6.29	ACF-10Q	115.0	1.754	5.12	121.0	1.936	5.95
116.5	1.790	5.29	130.4	1.975	6.54	AXF-5Q	119.3	1.781	5.40	124.7	1.959	6.20
119.5	1.773	5.38	129.3	1.915	6.29	AXF-3Q	119.5	1.769	5.37	130.9	1.920	6.38
127.1	1.777	5.74	135.2	1.942	6.67	FM	128.3	1.788	5.83	132.0	1.913	6.41
121.1	1.749	5.38	133.0	1.949	6.58	ZEE	122.0	1.765	5.47	130.5	1.954	6.48

Copper Impregnated Test Data

Material	Copper in/millisecc	Copper g/cc	Mrayl 10 ⁶ Kg/m ² sec
ZXF- 5Q	133.9	2.817	9.58
AXF- 5QC	126.5	3.240	10.41
AXF- 5QC	130.7	3.422	11.36
AXF- 5QC	132.7	3.218	10.85
AXD- 5QC	119.6	3.447	10.47
AXD- 5QC	124.5	3.563	11.27
AXD- 5QC	126.2	3.587	11.50

Nickel Impregnated Test Data

Material	Nickel in/millisecc	Nickel g/cc	Mrayl 10 ⁶ Kg/m ² sec
AXF- 5QN	130.8	3.073	10.21
AXF- 5QN	127.6	3.104	10.06
AXF- 5QN	128.7	3.126	10.22

Rayl = kg/m² * sec

The product of velocity (in/millisecc) & density (g/cc) can be converted to Rayl by multiplying by 25400

MRayl = 106 kg/m² * sec

The product of velocity (in/millisecc) & density (g/cc) can be converted to MRayl by multiplying by 0.0254