Schmid & Partner Engineering AG

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PHANTOM MATERIAL COMPATIBILTIY WITH SPEAG LIQUIDS

INTRODUCTION

SPEAG offers a wide range of tissue simulating liquids. These liquids are based on various ingredients depending on their frequency range. The below table shows compatibility of these tissue simulating liquids and various phantom materials.

COMPATIBILITY TABLE

Y= **fully compatible** with the tissue simulating liquid. Long time exposure is not critical.

P= **partially compatible**. It is essential to keep the exposure time to a minimum and to rinse and clean the item after exposure to the respective tissue simulating liquid. Liquids can have a softening effect on the material. Fiber reinforced material may reduce this effect. Continuous exposure will reduce the item life-time considerably.

R= **restricted** compatibility with the respective tissue simulating liquid. Liquids can enter and damage the material structure. Short time exposure (e.g. few hours) is possible given that the item is thoroughly rinsed and dried after each exposure.

N= **not compatible** with the respective tissue simulating liquid. Short time exposure can cause irreparable damage to the item exposed.

SPEAG MSDS	772-SLAAx0yy			772-SLAAx1yy		772-SLAAx4yy		772-SLAAx6yy		772-SLAAx6yy	
Phantom Material \ Liquid Type	B 900	HSL175V2 to HSL900V2	MSL300V2 to MSL900V2	HSL1450V2 to HSL2450V2	MSL1450V2 to MSL2450V2	HBBL3500-5800V5	MBBL3500-5800V5	HBBL1350-1850V3 to HBBL1900-3800V3	MBBL1350-1850V3 to MBBL1900-3800V3	HBBL30-250V3	MBBL125-250V3
PEEK	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
POM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PTFE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Glass	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Phenol resin plates	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Silicone *	Y	Y	Y	Y*	Y*	Y	Y	Y	Y	Y	Y
Acrylic resin *	Y	Y	Y	Y*	Y*	Y	Y	Y	Y	Y	Y
Polyethylene	Y	Y	Y	P	P	Y	Y	Y	Y	Y	Y
Vinylester, glass fiber (VE-GF)	Y	Y	Y	P	P	Y	Y	Y	Y	Y	Y
Polypropylene, glass fiber (PP-GF)	Y	Y	Y	P	P	Y	Y	Y	Y	Y	Y
Epoxy resin, glass fiber reinforced	Y	Y	Y	R	R	Y	Y	Y	Y	Y	Y
PMMA (Acrylic glass, Plexiglass) **	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y

NOTES:
* Liquids may cause damage by entering adhesive joints or bonding surfaces.
** Damage of material macro structure possible.

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Certificate of Conformity / First Article Inspection

Item	Oval Flat Phantom ELI v6.0
Type No	QD OVA 003 A
Series No	2000 and higher
Manufacturer	Untersee Composites Knebelstrasse 8, CH-8268 Mannenbach, Switzerland

Tests

Complete tests were made on the prototype units QD OVA 001 A, pre-series units QD OVA 001 B as well as on some series units QD OVA 001 B. Some tests are made on all series units QD OVA 003 A.

Test	Requirement	Details	Units tested
Shape	Internal dimensions, depth and sagging are compatible with standards	Bottom elliptical 600 x 400 mm, Depth 190 mm, dimension compliant with [1] for f > 375 MHz	Prototypes
Material thickness	Bottom: 2.0mm +/- 0.2mm	dimension compliant with [3] for f > 800 MHz	all
Material parameters	rel. permittivity 2 – 5, loss tangent ≤ 0.05, at f ≤ 6 GHz	rel. permittivity 3.5 +/- 0.5 loss tangent ≤ 0.05	Material samples
Material resistivity	Compatibility with tissue simulating liquids .	Compatible with SPEAG liquids. **	Phantoms, Material sample
Sagging	Sagging of the flat section in tolerance when filled with tissue simulating liquid.	within tolerance for filling height up to 155 mm	Prototypes, samples

** Note: Compatibility restrictions apply certain liquid components mentioned in the standard, containing e.g. DGBE, DGMHE or Triton X-100. Observe technical note on material compatibility.

Standards

[1] KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
[2] IEEE 1528-2013, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques, June 2013
[3] IEC 62209–1 ed1.0, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
[4] IEC 62209–2 ed1.0, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of **body-worn** SAR measurements and system performance checks as specified in [1 – 4] and further standards.

Date 02.09.2014

Signature / Stamp

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