

Material Specification Data Sheet

Product Identification and Manufacturer

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|-----------------------|---|
| Item | Muscle Tissue Simulation Liquid MSL 5800 |
| Type No | SL AAM 580 A |
| Series No | N/A |
| Manufacturer / Origin | Schmid & Partner Engineering AG Zeughausstrasse 43 8004 Zürich Switzerland |

Appearance and use of the product

MSL 5800 is a light brown, transparent to opaque liquid used to simulate the electromagnetic characteristics of the homogeneous muscle tissue. Its parameters shall match the requirements according to OET 65 Supplement C, at 22 deg C in the frequency range of 4.9 to 6.0 GHz.

Goal parameters (linear interpolation / extrapolation for other frequencies):

5200 MHz relative permittivity = 49.0, conductivity = 5.3 S/m
 5800 MHz relative permittivity = 48.2, conductivity = 6.0 S/m

Chemical Composition

The product is composed of the following ingredients:

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|--------------------|-----|
| Water | 78% |
| Mineral Oil | 11% |
| Emulsifiers | 9% |
| Additives and Salt | 2% |

Safety relevant ingredients according to EU directives:

| | | |
|------------------|--------|--|
| CAS-No 107-41-5 | < 3% | 2-Methyl-2,4-pentandiol (Hexylene Glycol) Xi irritant R36/38 irritant for eyes and skin |
| CAS-No 770-35-4 | < 2% | 1-Phenoxy-2-propanol (Propylene Glycol Phenyl Ether) Xi irritant R36 irritant for eyes |
| CAS-No 93-83-4 | < 1% | N,N-bis(2-Hydroxyethyl)oleamide Xi irritant R36/38 irritant for eyes and skin |
| CAS-No 9004-95-9 | < 0.5% | Polyethylene glycol cetyl ether Xi irritant R22 harmful if swallowed R36/38 irritant for eyes and skin R50 Very toxic to aquatic organisms |

According to EU guidelines and Swiss rules, the product is not a dangerous mixture and therefore not required to be marked by symbols.

Emergency & First Aid Procedures

The product reacts slightly alkaline.

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| Skin contact | Wash with fresh water and mild soap. |
| Eye contact | Rinse with plenty of fresh water for several minutes. Consult physician if necessary. |
| Ingestion | After accidental ingestion, do not induce vomiting. Get medical attention. |
| Firefighting media | CO ₂ , foam, dry chemical |
| Combustion products | Carbon oxides, nitrogen and traces of oxides of chlorine and sulfur, HCl |

Ecological information

Do not allow to enter waters, waste water, or soil as for other mineral oil containing products.

Safe Handling, use and disposal

Protection measures are not generally required. For eye protection, industrial safety glasses are recommended. Personal hygiene and clean working practices are sufficient.

Use oil-binding agents. Spills may cause slippery conditions. Prevent material from getting into water! Avoid direct solar irradiation of the storage containers.

The product is not compatible with strong oxidizers or magnesium.

Disposal is possible by splitting the mineral oil from the emulsion with absorbing agents, with salt or ultra-filtration. Dispose as other mineral oil containing products according to local regulations.

Handling and Transport information

Not subject to transport regulations.

| | |
|---------------------|----------------|
| Storage temperature | >0 to 40 deg C |
| Stir after storage. | |

Health and Hazard data

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|------|-----------|
| LD50 | > 68 g/kg |
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| | |
|------|------------|
| Date | 22.07.2003 |
|------|------------|

Signature / Stamp

| f (MHz) | e' | e'' | conductivity | Date: August 7, 2003 | | |
|-------------|--------------|--------------|--------------|------------------------------------|--------------|--------------|
| 4600 | 50.59 | 17.91 | 4.58 | T=22°C | | |
| 4650 | 50.47 | 17.98 | 4.65 | M 5800 | | |
| 4700 | 50.36 | 18.08 | 4.73 | | | |
| 4750 | 50.26 | 18.19 | 4.81 | f (MHz) | e' | conductivity |
| 4800 | 50.11 | 18.28 | 4.88 | 4900 | 49.88 | 5.01 |
| 4850 | 50.01 | 18.32 | 4.94 | 5000 | 49.62 | 5.15 |
| 4900 | 49.88 | 18.38 | 5.01 | 5100 | 49.36 | 5.29 |
| 4950 | 49.75 | 18.47 | 5.09 | 5150 | 49.24 | 5.36 |
| 5000 | 49.62 | 18.53 | 5.15 | 5200 | 49.11 | 5.42 |
| 5050 | 49.50 | 18.57 | 5.22 | 5250 | 48.99 | 5.49 |
| 5100 | 49.36 | 18.66 | 5.29 | 5400 | 48.64 | 5.69 |
| 5150 | 49.24 | 18.68 | 5.35 | 5800 | 47.81 | 6.22 |
| 5200 | 49.09 | 18.76 | 5.43 | 6000 | 47.41 | 6.48 |
| 5250 | 48.97 | 18.80 | 5.49 | | | |
| 5300 | 48.88 | 18.86 | 5.56 | P/N | | |
| 5350 | 48.73 | 18.91 | 5.63 | SL AAM 580 AD | | |
| 5400 | 48.63 | 18.95 | 5.69 | | | |
| 5450 | 48.53 | 19.00 | 5.76 | Batches used | | |
| 5500 | 48.42 | 19.05 | 5.83 | 030806_1...3 | | |
| 5550 | 48.32 | 19.11 | 5.90 | | | |
| 5600 | 48.21 | 19.13 | 5.96 | Extrapolation/Interpolation | | |
| 5650 | 48.12 | 19.17 | 6.03 | 5th polynomial parameters | | |
| 5700 | 48.00 | 19.22 | 6.09 | | e' | conductivity |
| 5750 | 47.92 | 19.25 | 6.16 | x^5 | 2.757E-16 | 2.109E-17 |
| 5800 | 47.82 | 19.32 | 6.23 | x^4 | -7.931E-12 | -6.607E-13 |
| 5850 | 47.68 | 19.35 | 6.30 | x^3 | 9.074E-08 | 8.090E-09 |
| 5900 | 47.59 | 19.34 | 6.35 | x^2 | -5.159E-04 | -4.869E-05 |
| 5950 | 47.50 | 19.38 | 6.41 | x | 1.455E+00 | 1.459E-01 |
| 6000 | 47.42 | 19.42 | 6.48 | const | -1.575E+03 | -1.716E+02 |

