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VS-1000/3000 Sensor Materials and Process Connections – Meet: 3-A® Dairy Sanitary Standards – Number 46-03 Meet: EHECDG Guidelines 10, 16, 37

- **Sapphire Crystal: is used as the material for the VS-1000/3000 Sensor Optics**

Sapphire is an ultra hard inert, nonporous, nontoxic, nonabsorbent, and insoluble, resistant to scratching, scoring and distortion material. Sapphire is characterized by its high hardness (next to diamond on the Mohs scale), chemical and thermal stability, high application temperature, and transparency in the IR range. It is widely used as windows for instruments, high temperature parts, and wear resistance.

Meets Standard Number 46-03, *3A Sanitary Standards for Refractometers and Energy Absorbing Optical Sensors for Milk and Milk Products, Section: C2.7.1*

EHECDG Guideline 37 Section: 4.1.2.5 Ceramics, glass and other materials

- **PEEK (PolyEtherEtherKetone): is a high performance plastic that is used to seal the Sapphire Crystal to the sensor stainless steel body.**

Victrex 450G PEEK offers exceptional chemical resistance combined with heat resistance to 480°F. It does not degrade with exposure to water or steam, and is flame- and radiation-resistant. Unfilled ("virgin") PEEK received FDA approval in 1998 and may be used in food contact and in processing equipment without danger of contamination or degradation.

Victrex 450G PEEK is FDA, USDA and 3A Dairy approved. The sensor Peek seal is tested to 200 PSI during the manufacturing process.

Meets Standard Number 20-20, *3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment* has been developed to

"_cover the material requirements of plastics for multiple-use as product contact and/or cleaning solution contact surfaces in equipment for production, processing and handling of milk and milk product(s)." Test criteria for approval of plastic materials include cleanability, bacterial treatment, repeat use conditions, and FDA compliance. Samples are subjected to chemicals representative of dairy clearing compounds and measured for weight change and changes in surface appearance.

EHECDG Guideline 37 Section: 4.1.2.3 Polymeric materials

- **Sensor Body and Surface Finishes**

The VS-1000/3000 Sensor body and sensor face is 316L stainless steel. The material in contact with the concentration is finished to the following standards.

	<u>Specified</u>	<u>Measured</u>
Metal Face Plate	16uIN/.4uMM	11.9uIN Ra
PEEK Seal	16uIN/.4uMM	11.4uIN Ra
Sapphire Window	2uIN/.05uMM	0.5 uIN Ra

Meets Standard Number 46-03, *3A Sanitary Standards for Refractometers and Energy Absorbing Optical Sensors for Milk and Milk Products, Section C1.1*

EHECDG Guideline 37 Section: 4.1.3 Design, geometry and surface finish

- **Product Contacted O-Ring is FDA Grade EPDM**

FDA “White List” Grade EPDM, 3A Sanitary Approved. Busak and Shamban GmbH E7502 (E70B243E) rubber compound is used.

Meets Standard Number 20-20, *3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment* has been developed to "_cover the material requirements of plastics for multiple-use as product contact and/or cleaning solution contact surfaces in equipment for production, processing and handling of milk and milk product(s)." Test criteria for approval of plastic materials include cleanability, bacterial treatment, repeat use conditions, and FDA compliance. Samples are subjected to chemicals representative of dairy clearing compounds and measured for weight change and changes in surface appearance.

EHECDG Guideline 37 Section: 4.1.2.4 Elastomers

Other VS-1000/3000 Sensor System Materials Not in Contact with Concentration and Fluids

- **VS-300 Sensor Management Station Enclosure**

The VS-300 Sensor Management Station enclosure is rated to IP66, enclosures are capable of withstanding continuous temperatures from -58°F (-50°C) up to 302° F (150° C). VS-300 enclosures provide protection for equipment and operators from indirect electrical contact. All enclosures are UL listed per UL Standard 508 for NEMA 3, 3R, 4, 4X, 12 and 13; CSA Certified per Standard C22.2-0, 0.4, 0.7, 0.6, 94 Type 3, 3R, 4, 4X, 12 and 13.

- **VS-1000/3000 Sensor Cable Connector**

The connector on the VS-1000 Sensor is a Lemo connector, hermetic seal, water tight to IP68. Lemo connectors have a brass outer shell that is chrome nickel plated coated/finish providing very good protection against industrial atmospheres and most corrosive agents

Other VS-1000/3000 Sensor System Information Pertaining to 3-A® Sanitary Standards, EHECDG Guidelines and for Refractometers and Energy Absorbing Optical Sensors for Milk and Milk Products, Number 46-03

- **Sterilizability/Cleanability**

Materials used in contact surfaces in the construction of the sensor are sterilizable by heat or steam to at least 15.3 psig or 106 kPa, the sensor can be cleaned in place and does not have to be removed

- **Fabrication No Welds**

The surface texture is finished and polished and free of imperfections, there are no welds on the sensor, it is machined from a single piece of 316L stainless steel.

- **Fittings, Valves and Process Connection**

The sensor is designed to fit into a Tuchenhagen Varinline Process Connection that meets 3-A Sanitary Standards and EHECDG Guidelines. The sensor can be easily installed or

removed from the Process Connection fitting in less than 30 seconds. There are no dead areas, no restrictions to process flow, no screws or threads.

Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

VS-1000 and VS-3000 Sensor Systems contain no banned substances.