Ceramicomb-1"™ Dielectric/Conductivity Sensor Specifications

Figure 1
Ceramicomb-1" Dielectric/Conductivity Sensor
(Side exit version shown)

DESCRIPTION

The Ceramicomb-1" is designed for use in presses, molds or harsh environments where a rugged, reusable dielectric/conductivity sensor is desired. It may be mounted so the electrodes are flush with a platen or mold surface, insuring no interference with the flow of material during processing. The sensor is constructed with silver-palladium electrodes embedded in an alumina substrate, protected by a stainless steel sheath with a nominal 1.0" (2.54 cm) diameter. A thermocouple is positioned in the ceramic just below the surface to allow measurement of process temperatures.

Dielectric and thermocouple signals are routed through a 10-foot (3 m) long stainless steel conduit to high temperature connectors. Sensor and cabling are rated for operation up to 250 °C and are suitable for R&D, QA/QC and manufacturing applications with repetitive operations.

Figure 2: Ceramicomb-1" electrodes

SPECIFICATIONS

Dimensions (available with side or rear exit conduit):

Diameter, sensor head	: 1.0" (2.54 cm) nominal
Height, sensor head	: 1.0" (2.54 cm) nominal
Length, conduit	: 10' (3 m) nominal
Diameter, active face	: 0.69" (1.75 cm)
Width, electrode	: 0.020" (0.5 mm)
Spacing, electrode	: 0.020" (0.5 mm)

Composition:

Ceramic	: Alumina
Electrodes	: Silver-palladium
Sheath/conduit	: Stainless steel
Cabling	: Teflon insulated

Operational:

Temperature, maximum	: 250 °C (480 °F)
Frequency, mid-con mode	: 0.1 Hz – 100 KHz

Sensor Parameters:

A/D ratio	: 10 cm
Base capacitance	: ~30 pF (actual value may vary)

Thermocouple : Type J standard, Type K avail. upon request

Figure 3: Ceramicomb-1" sensor in press platen

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OPERATING MODES

The Ceramicomb-1" may be used with all Lambient Technologies dielectric instruments in either mid-conductivity or high-conductivity mode. The sensor makes a surface measurement of material between the comb electrodes, shown close-up in Figure 3. The depth of measurement is approximately 0.020" (0.5 mm).

Figure 3
Close-up view of Carbon+Unitrode-1" sensor
(rear exit version shown)

FORM FACTORS

The Ceramicomb-1" may be specified with the conduit exiting from the side or the rear as shown in Figure 4. Contact Lambient Technologies for current mechanical dimensions of the sensor.

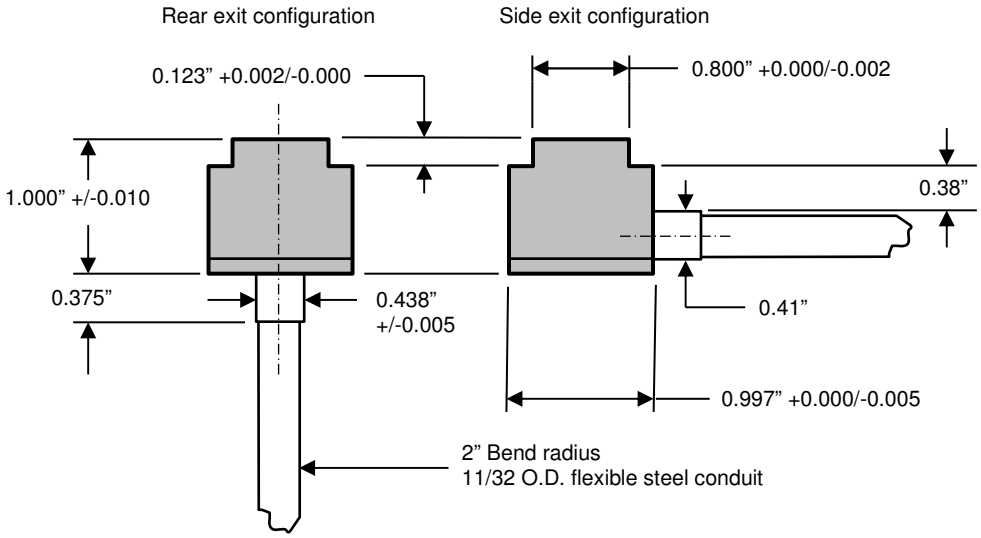

Figure 4
Nominal sensor form factors

INSTALLATION

The Ceramicomb-1" is designed for optimal mounting from the rear side of a mold or platen as shown in Figure 5.

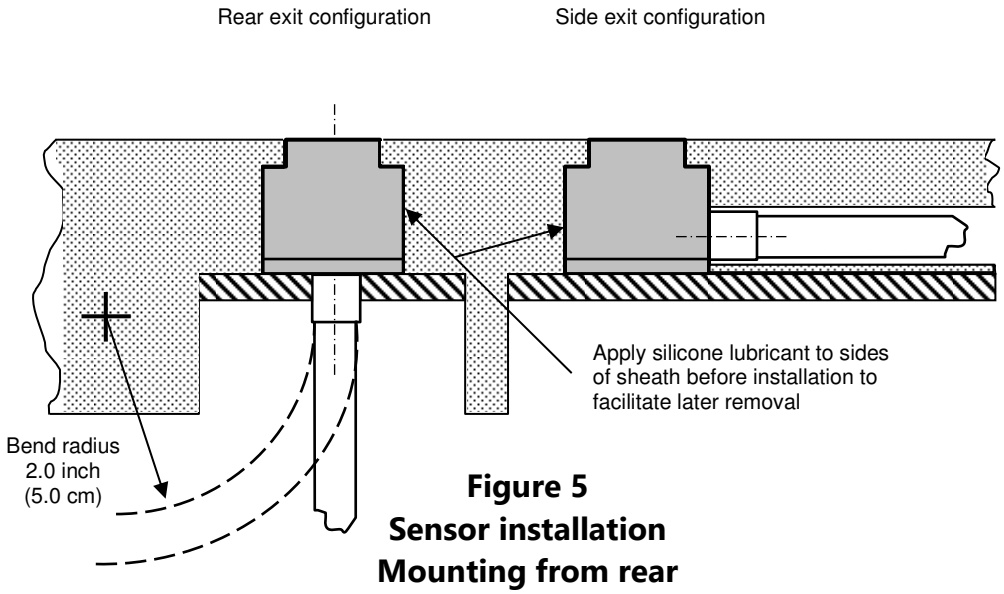

Figure 5
Sensor installation
Mounting from rear

It is important to support the bottom plate of the sensor to prevent high pressures from pushing it out of position. To facilitate removal when necessary, silicone lubricant may be applied to the side of the sheath before installation.

CARE AND HANDLING

Always apply mold release to the surface of the sensor before use with curing material. A silicone based mold-release is recommended to reduce conductive effects on the measurement. Damage to the sensor may result if mold release is not used and cured material is peeled from the surface.

Do not apply excessive tension to sensor conduit. Tugging on the conduit may damage leads to the sensor.

CLEANING

Careful use of a spatula or other scraping tool to remove samples will not damage the sensor, provided that mold release was applied to the sensor before curing.

Clean sensors with acetone, trichlorethlyene or other solvent to remove

oils and contaminants. Solvents or water adsorbed onto the surface of the ceramic normally will not interfere with cure monitoring because it is released at elevated temperature, and would not be present at typical process temperatures.

At room temperature, however, adsorbed solvent or water will appear as an additional conductive component and may dominate the measurement. In this case the gains in air may be elevated (less negative, approaching 0 dB at low frequencies) and phases may be significantly negative. Heating the sensor above 100 °C for a short time should remove adsorbed material.

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