

ELECTROLUMINESCENT FOILS AS ILLUMINATION SOURCE FOR PRESSURE SENSITIVE PAINT

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Pressure sensitive paint (PSP) technology is progressively reaching sufficient accuracy to become a standard technique in wind tunnel measurements. A major drawback of the established procedures is the complexity of the hardware setup. The model has to be sprayed with PSP in the wind tunnel and the illumination sources, usually LED lamps, have to be positioned very carefully to avoid shadows or illumination inhomogeneities.

A variation of the standard technique is presented. Instead of using LED lamps as illumination source a blue electroluminescent (EL) foil has been applied to the model surface. The PSP coating was sprayed beforehand directly onto the EL foil.

The main advantages of this technique are a simplified hardware setup and the reduction of errors implicit in the intensity ratio analysis (the wind on/off technique). For example, any illumination inhomogeneities move with the model.

The EL foils emission dependence on temperature furthermore enables the measurement of the temperature on the model surface. Preliminary results of laboratory tests are presented. A test cell with the capability of independently controlling pressure and temperature on a PSP coupon has been used. The emission spectrum of the EL-Foil / PSP sandwich was analyzed using an imaging spectrometer. The pressure and temperature dependencies of this novel PSP sensor design are presented.