**INSECT 2011**

Dear Ladies and Gentlemen!

My name is **Richard Zemann**; I am an employee of the Institute for Production Engineering and Laser Technology (IFT) of the Vienna University of Technology. One of the major areas of my work is **Electrochemical Micromachining**, for which you will find the abstract for INSECT 2011 below.

**Abstract:**

In regard to the increasing demand within different branches of industries, the Institute for Production Engineering and Laser Technology, of the Vienna University of Technology, is working in the field of **electrochemical micromachining with ultra short pulses**. With the theoretical resolution of 10 nm, this technology enables high precision manufacturing due to the fact that **extremely small working gaps** are achievable through ultra short voltage pulses. This describes the main difference to common electrochemical technologies.

The ECM process is an electrochemical manufacturing method where an opposing electric voltage for the work piece and the tool is used. At the phase boundaries between the tool and the electrolyte and also between the work piece and the electrolyte, an **electrochemical double layer** is formed; whose functionality can be understood principally as a kind of double capacitor. In addition to the proper choice of the electrical process parameters, like the amplitude of the pulses, the pulse width, the voltages at the tool, the work piece, and the backing electrode, the right choice of the electrolyte is probably the most important aspect for this process. If the voltage pulse width is very short, erosion takes place very close to the tool, since the **ohmic resistance of the electrolyte prevents ablation at areas further away from the tool**. This leads to small working gaps between the tool and the work piece of less than 1 µm produced with pulse widths of less than 100 nanoseconds. Even more accurate machining can be achieved with pulse widths of less than 1 nanosecond and by separating the processing pulse into a pre-pulse and a main pulse.

**Word count: 268**

Best Regards,

Richard Zemann