

**Project Note**

# Design review for a miniature photometer

Zühlke experts conducted a design review on the completion of important development phases. This review helped to assure the medical products manufacturer that its mass-produced products would function properly.

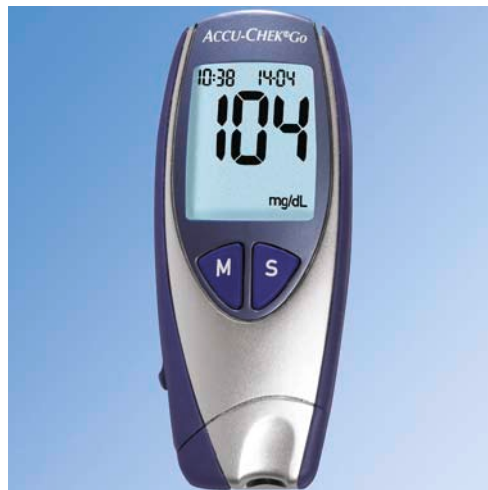
**Task**

The number of people suffering from diabetes mellitus is rising dramatically. It is important for the patient's quality of life that they regularly check their blood-sugar levels, sometimes several times a day. With the constant improvements in the measuring methods, the devices require less and less blood for these measurements.

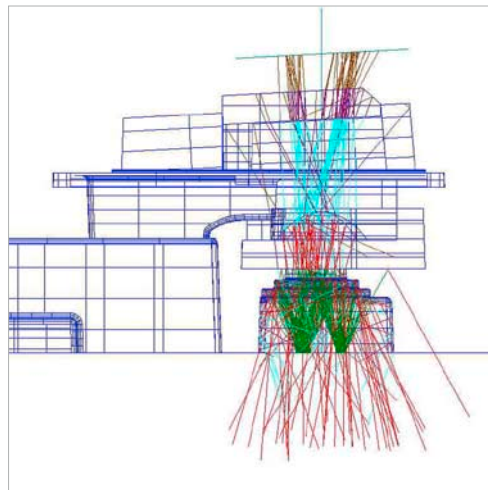
This project involved a customer that develops and produces these types of devices in large quantities. Before the final construction of the means of production, the company had Zühlke assess the design of the mechanics, optics and electronics as regards design and assembly. One part of these checks involved an integrated optical photometer.

**Implementation**

Zühlke conducted two tests on the integrated optical photometer. The geometry of the entire ray path was modelled in the raytracing tool "Opticad" and the parameters were set so that the individual members could be varied easily in accordance with the mechanical and optical tolerances. The engineers modelled the component surface with optical parameters such as transmission, absorption, reflection and scattering. In the course of several cycles, they simulated the light output impinging on the test strips, changing the parameters according to the design tolerances. In a second test, disruptive reflections on the light-sensitive surface of the measuring photo diodes were simulated as a function of tolerance and aperture size. Reflections falsify the measured result. Zühlke determined that the customer had selected a nearly ideal design. The developers received confirmation of their professional work and the device went into production as planned.



Diagnostics



**Technical Data**

Optics simulation:  
OptiCad

**Customer benefits**

- The manufacturer gained addition assurance from Zühlke's review and launched a product with ideal characteristics.
- The optical design was already tested during the development stage. This approach eliminated scheduling delays and incorrect investments in the means of production that might have otherwise occurred if the design errors had been detected too late.
- The customer's developers benefited from the expertise they gained from the knowledge the Zühlke team shared with them.

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