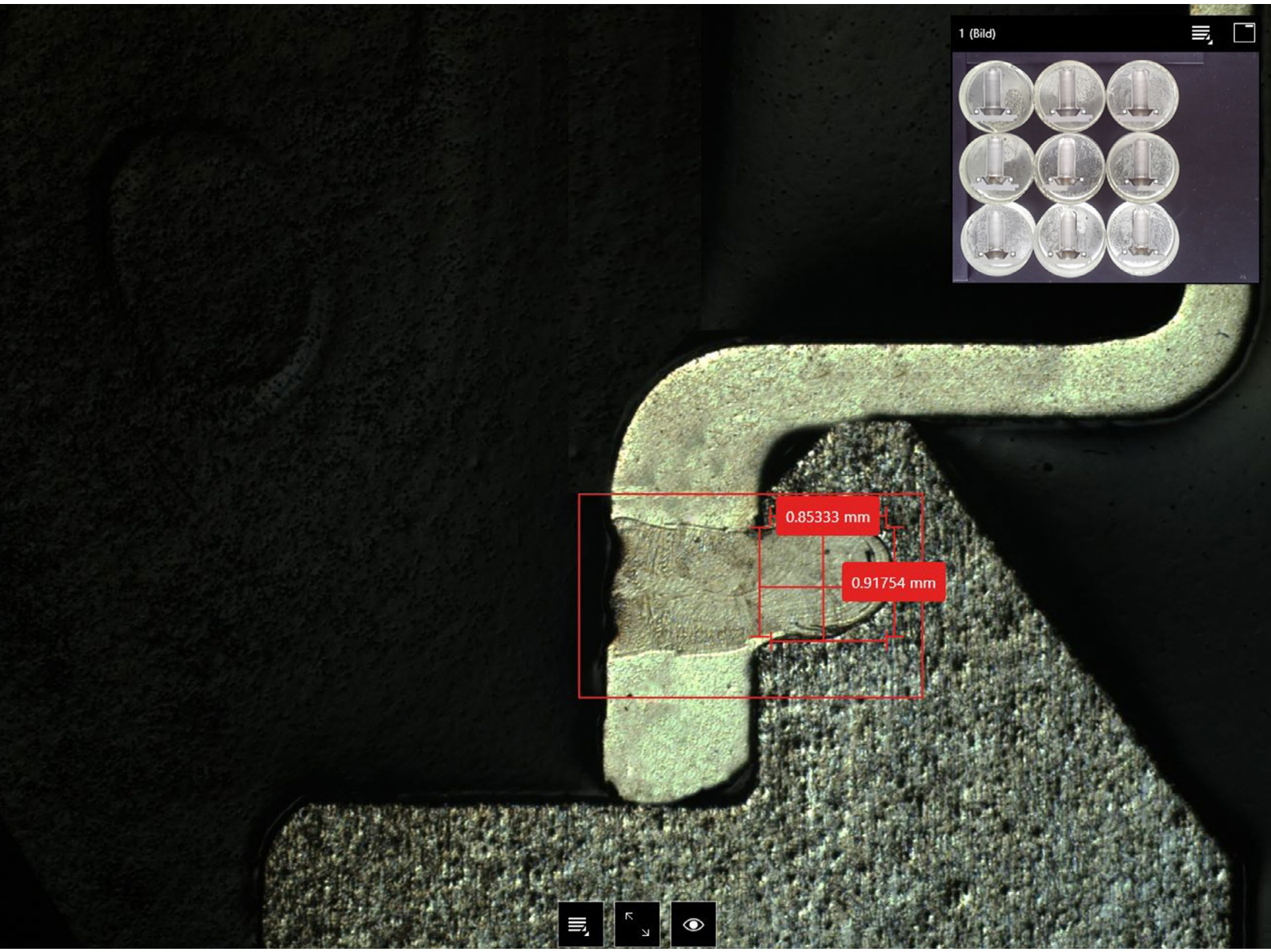
Application Note




# Smart Weld Analysis

## Up to Five Times Faster Measuring of Welds with ZEISS Smartzoom 5

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# Smart Weld Analysis

## Up to Five Times Faster Measuring of Welds with ZEISS Smartzoom 5

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**For quality assurance, the weld of a ring-welded specimen is tested with the help of light microscopy. Compared to investigations with conventional light microscopes, the digital microscope Smartzoom 5 significantly enhances the time required for such routine investigations by means of combining the template function (recognition of the same objects) with the possibility of recording macros. The recorded micrographs are of consistent quality and thereby enable the logging of the tested components.**

### Introduction

Recurring light microscopic routine investigations, as they occur in many cases in the quality assurance of components, are frequently time consuming and require staff with microscopic know-how. Investigations with the digital microscope Smartzoom 5 allow a much better workflow for sample analysis of the same type. Its easy handling enables the investigations to be done by staff after just a short introduction, without loss of quality in the micrographs.

Using the example of a ring-welded specimen, this application note points out the additional benefits of using Smartzoom 5 in contrast to conventional light microscopy. Its supervisor-operator structure permits the supervisor to establish a macro (a so-called 'job') for the routine investigation of e.g., ring welds. In doing so, the supervisor defines settings such as objective, magnification and mode of illumination. The saved job allows the operator to control the welds time efficiently in a defined way (80% time consumption) with reproducible output data and consistent quality, which is a big help for quality control/assurance.

### Generating the Job

The job-creating tool of Smartzoom 5 allows supervisors to establish a job for the recurring investigation of welds on ring-welded specimens and thereby improve the workflow significantly. Nine polished specimens can be checked and geometrically measured in one run.

During the first examination the job is recorded in the background. The first step is to take an overview image (map) of all nine samples via the built-in overview camera (Figure 1).

***Figure 1:*** *Generating the overview (map).*

By clicking the first position to be reviewed in this map, the microscope table approaches this position and the micrograph is taken with the desired settings. Via the measurement tool, distance lines for measuring the weld penetration depth are annotated (Figure 2a). This shot serves as a template and allows, after manually approaching the next position with suitable magnification, automatic recognition of the weld which is be measured.

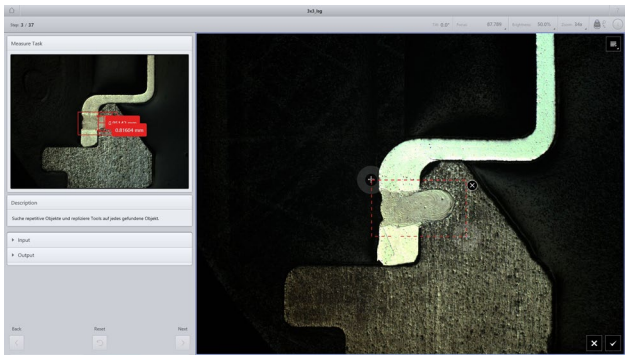

***Figure 2a:*** *Approaching the position, taking the micrograph, 34×, ringlight, followed by object recognition for facilitated measurement.*

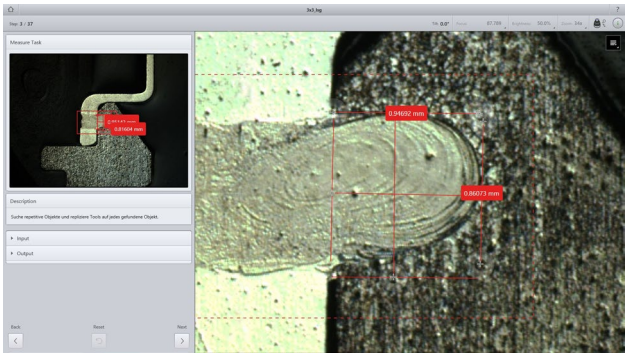


***Figure 2b:*** *Adapting the starting points of the distance lines for measuring the penetration depth.*

As shown in Figure 2b, the starting points of the distance lines have to be adapted for proper measurement results. After the measurement of all nine polished specimens, the job is finished and all measured positions are marked in the map Figure 3a. A click on each of the marked positions reveals the acquired image (Figure 3b).

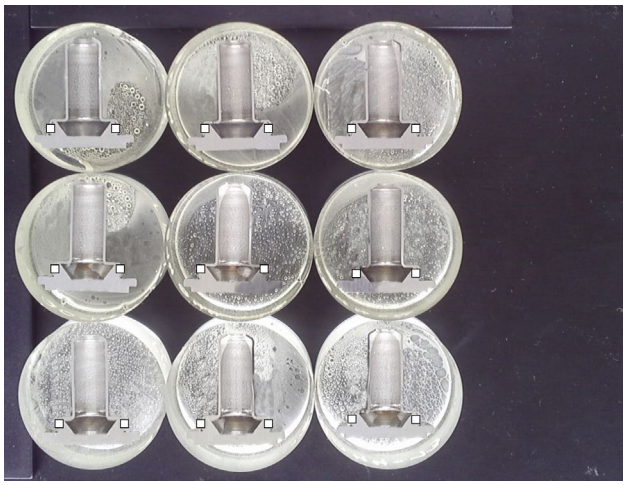

***Figure 3a:*** *Marking of all 18 measured / approached positions with flags in the map*

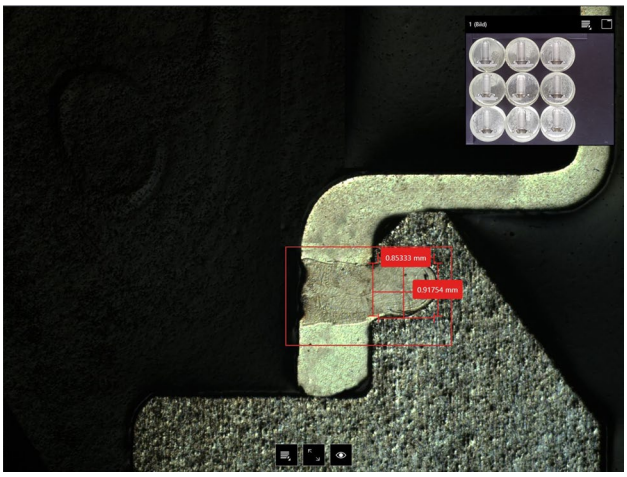


***Figure 3b:*** *Clicking on the flag shows the recorded image.*

## Operating the Job

Operating the job, the polished samples first have to be arranged in the way shown in the map (Figure 3a). The microscope automatically approaches the 18 positions that have to be investigated, one after the other, and in each case requests the operator to take the micrographs with the given settings Figure 3b. The operator has to adapt the starting points of the measurement lines. After finalizing the job, a specific report pops up, demonstrating the snapped micrographs and measurement results, and can be saved.

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