

CT Scanner Facility

MicroCT analysis applications series

Tech note **2** Additive test part inspection

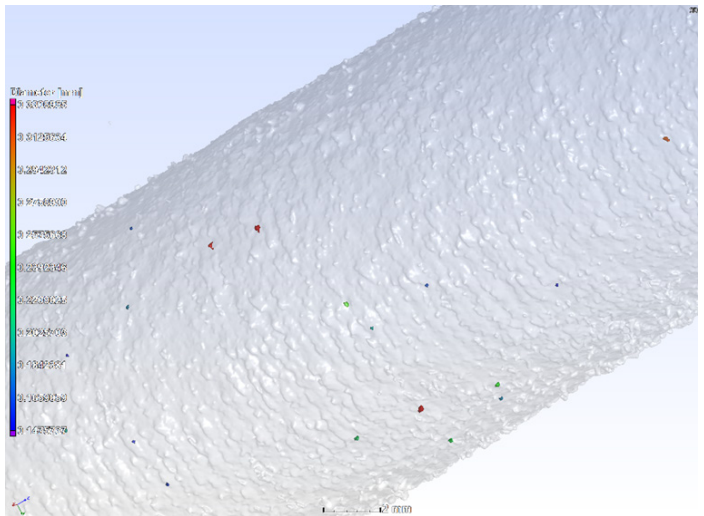
By Dr Anton du Plessis



Introduction

Additive manufacturing of metals is growing almost as fast as microCT. In this example, a test part built using recycled Ti6Al4V powder was inspected for porosity by microCT. The method is much faster than physical sectioning and metallurgical analysis which has been traditionally used up to now.

The fully 3D nature of the inspection allows a more holistic view, ensuring no major flaws are missed by sectioning; and if something major is detected by microCT, the exact location can be identified and sectioned for further analysis.



Results

This part shown in Figure 1, approx. 60 mm in length, was subjected to a microCT scan, the data reconstructed and porosity analysis performed. The largest pore was 0.33mm in its longest axis, and the volumetric average porosity over the whole part was only 0.001%.

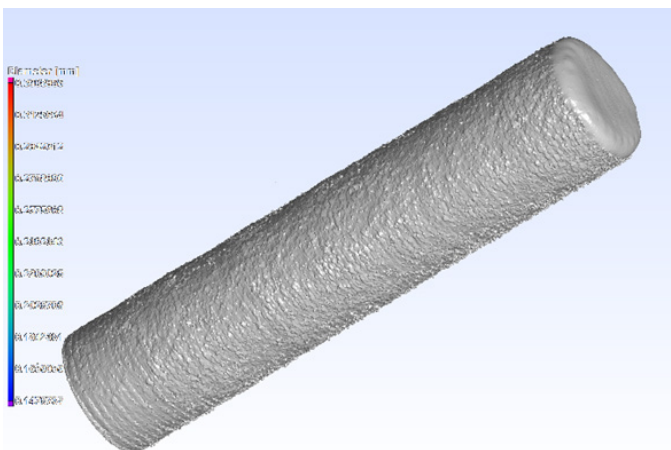


Figure 1: Porosity analysis of additive manufactured test part

The slice images can be used to manually check all pores and inspect the part for other indications such as inclusions or cracks. The slice images in Figure 2 give an idea of this, and also indicate the location of the largest found pore in this sample. Also visible is a small dense inclusion (white spot).

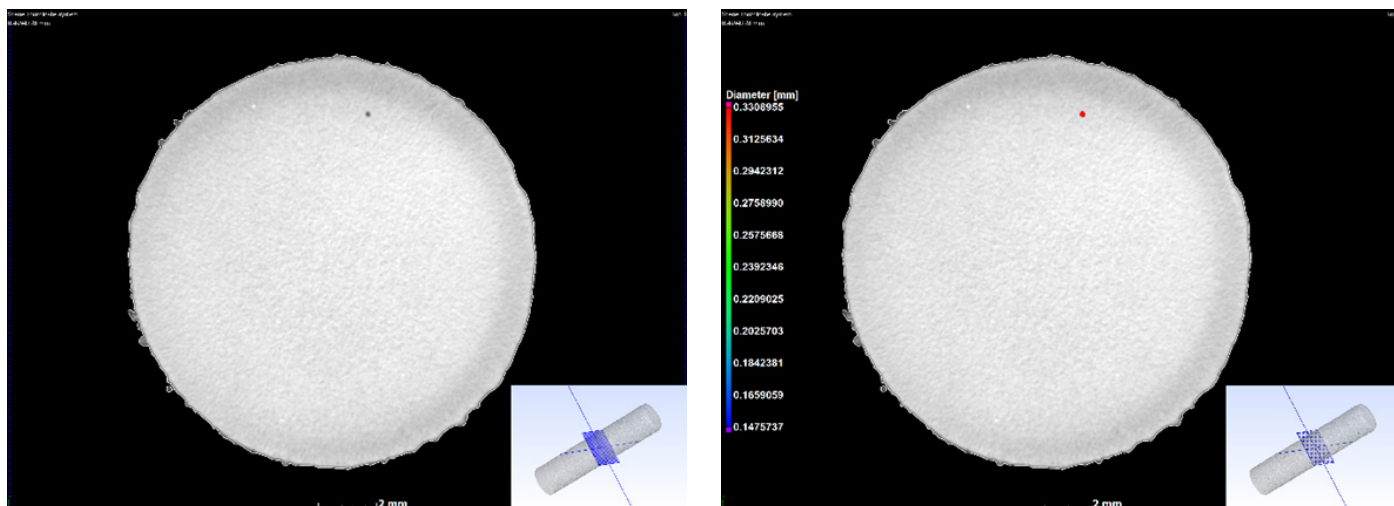


Figure 2: Slice view indicating location of largest pore in this sample

▶ Limitations?

Limitations on maximum X-ray penetration – typically samples should be smaller than 150 mm for light metals and 50 mm for steels and similar.

This is a grey area depending on part complexity and total material to be penetrated. Total material penetration limits for plastics, wood: 200 mm, titanium alloys and lighter metals: 40 mm; steel: 10 mm.

Basically a poor scan will also show problems but not as beautiful as above.

▶ How to go about it

Send your samples or bring it in. For a routine scan and basic analysis as above, we now (2017) charge R3050 per sample incl VAT. For >10 samples, 7% discount.

This includes images and a video of every sample, plus porosity/inclusion analysis automated report. Reduced rates for student research projects at South African universities. International rates US\$ 300 per sample.

Full data can also be provided at additional cost with free viewer software. We use Volume Graphics VGStudioMax 3.0, and myVGL viewer. For full processed data add R1500 per sample.

SAMPLE SHIPPING AND FORMAL QUOTES

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▶ For more info on image analysis check our youtube channel (click here)

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