



What is CT Scanning Inspection Technology?

In medicine, physicians know that you can get more accurate imaging (and information) from a CT scan, than a traditional X-Ray. The same holds in manufacturing quality assurance, and Reuter-Stokes is taking the next step by adding this vital inspection technology to its in-house production process.

CT scans, more formally known as X-ray computerized tomography, provide a three-dimensional view of solid-state materials that can be examined in “slices” or “layers” rather than the static 2D images produced by traditional X-ray inspections.

This inspection technology delivers more information than standard X-rays with their overlaying features visible in the view through the sample, allowing you to visualize your part from any virtual section. You can look beyond a part’s external features and dive into its internal features without cutting or disassembling it as you would in a destructive test.

While destructive testing methods allow you to get inside the part, you do run the risk of destroying the defect you’re trying to find when you cut apart the product. And you have only a few mechanical cuts, while CT allows you to virtually cut in in hundreds of slices to be sure to find any defect. Another challenge is determining if the root cause of the defect occurred inherently during manufacturing or if it occurred during the destructive inspection.

CT scanning eliminates these issues, allowing you to learn more about your parts inside and out without destroying them for testing. Using industrial CT scanning with much higher detail detectability than in medical CT, you can zoom in on a part's tiniest features and get deeper into the object. You also can evaluate a part's dimensional information, something that's hard to do with X-rays or – if you need to measure internal geometries – with conventional CMM techniques. This also helps you avoid the need to perform destructive measurements to get these geometries. These measurements can be accurate down to micrometers.

What are the Benefits of CT Scanning Inspections?

3D CT scanning offers multiple benefits over traditional X-ray inspections. These include:

- Better resolution and cleaner images
- Better penetration and visualization of a part's interiors

- Easier measurement and inspection for dimensional tolerances
- Video sweeping of 2D slices across an axis of orientation
- Digital analysis of images
- Image storage

When you're able to see inside a product and its various layers, you get a full view of its internal and external geometry with accurate spatial resolution, comparing each slice against a CAD model. This provides a full picture so you can easily identify design issues and discrepancies, pinpoint flaws, and perform other quality control tests to ensure your parts are structurally and functionally sound.

How Does Reuter-Stokes Use CT Scanning Inspections?

We've done CT quality testing by using external scanning service providers, including another Baker Hughes Digital Solutions business, Waygate Technologies. Waygate Technologies is an



industrial inspection solutions provider and the world leader in nondestructive testing (NDT).

Using industrial CT technology, we can cite multiple case studies of successful CT scan inspections that helped us remedy potentially costly defects. In one scenario, CT scans successfully identified the root cause of insulation resistance failure and helped us verify corrective action. It allowed us to clear existing components for use as-is.

Another testing situation helped us trace a flaw's origin by eliminating multiple probable causes non-destructively. This contributed to continuous improvement for this part, giving us insight that will help us eliminate possible failure modes in future designs. Additionally, CT scans also can help us see details that are important when considering and qualifying vendors.

We have been using CT scanning to inspect braze quality in ceramic feedthrough inspections. In doing this, we examine both slices of a part in distinct locations and also do a 3D reconstruction of the part. This allows us to look closely at all details to see if the brazing is working as it is designed and intended. You can do it with 2D X-ray, but you would see shadows on the picture, and it wouldn't be as crisp or provide details at a micro-level.



Why is Reuter-Stokes Moving to In-House CT Scanning?

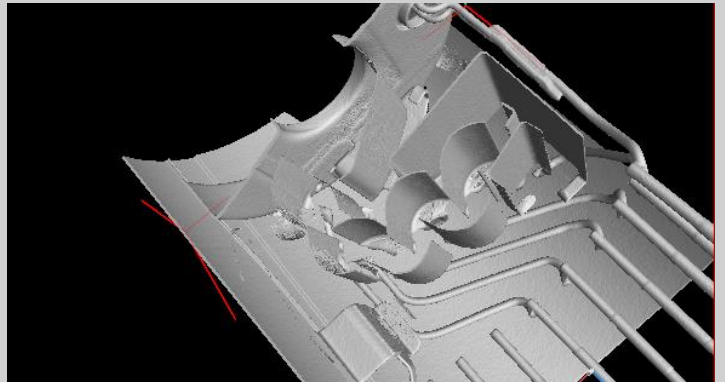
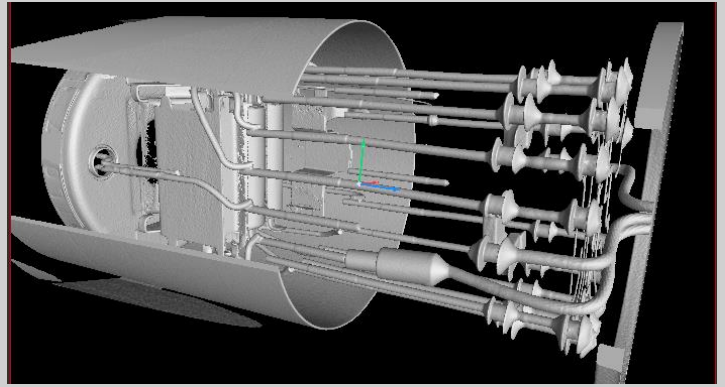
As we scanned more parts using services from Waygate Technologies, we realized investing in our own CT equipment would make sense and contribute to our quality assurance focus for such reasons as:

- Reduced scrap
- Better quality production
- Faster part delivery thanks to accelerated root-cause analysis
- Continual improvement in assembly processes
- Quicker new product development efforts

With this in mind, we have ordered a [Phoenix V|tomelx L 300 - Microfocus CT System](#) from Waygate Technologies. This versatile high-resolution dual-tube 180 kV nanofocus / 300 kV microfocus system for 3D computed tomography (microCT) and 2D non-destructive X-ray inspection handles large samples up to 50 kg and up to 900 mm in diameter with extremely high precision.

The scanner will encompass testing for all Reuter-Stokes parts of various materials and densities, ranging from gold to plastics in sizes from 0.1: to 30" in diameter and 0.5" to 20" in length. The system will ensure we can do more efficient scans of these parts with higher power on a smaller focal spot without sacrificing resolution. With its unique Scatter|correct cone beam CT technology, we will also be able to scan high scattering parts with extremely high image quality like line CT, but several hundred times faster.

Scheduled to arrive during Q4 2022, this unit will give us a flexible multi-purpose in-house inspection solution for void and flaw detection and 3D metrology of parts, ensuring the safety, quality, integrity and consistency of Reuter-Stokes products.



These images depict how a CT provides a better visual of what a product looks like from the inside.

Baker Hughes 

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