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**Additively manufactured styli**

Global engineering technologies company Renishaw is introducing additively manufactured styli to its comprehensive styli range.

By using additive manufacturing (AM), also known as metal 3D printing, Renishaw can offer complex turn-key styli solutions which cannot be produced using traditional manufacturing techniques. P**roduced in-house by Renishaw,** AM styli can access features of parts that other styli cannot reach, providing a flexible, high-performance solution to complex inspection challenges.

## A key advantage of AM is that custom products can be printed rapidly with no need for tooling. In many cases, AM styli are available with shorter lead-times than a conventional custom stylus assembly. The metal powder bed fusion process used in the manufacture of special custom styli presents new opportunities to create complex shapes and structures. The lightweight and robust titanium-structured styli enable the inspection of previously inaccessible features across a wide range of metrology devices.

## **Accessing internal features**

### AM is renowned for its ability to produce customised, stiff, light-weight and intricate structures.

### Instead of constructing complex stems from a cumbersome assembly of joints and straight sections, it is now possible to produce an application-specific stylus stem that is made entirely using hollow lattice structures. These light-weight structures can provide the necessary reach and stiffness without exceeding the weight-carrying capacity of measurement probes.

## Titanium is the preferred material for AM styli; it provides a high stiffness-to-weight ratio, good thermal stability, and is readily built into thin-walled and lattice structures. Female threads (M2/M3/M4/M5) can be included to allow the fitment of any additional stylus from Renishaw’s extensive range of standard styli.

## **5-axis inspection of internal features for coordinate measuring machines**

# Renishaw's REVO® 5-axis inspection system provides class leading flexibility when accessing component features, and this can be further enhanced with the addition of a custom AM stylus.

### When accessing an internal feature of a component is impossible with a conventional stylus, parts are often manufactured in two halves to provide inspection access which adds significant manufacturing cost to the product.

### A custom curved stylus, designed specifically for a given application and fitted to the REVO-2 head, can be inserted into components to reach critical features. This cost-effective solution enables components to be manufactured in one piece.

**Large discs**

Components with large features require a correspondingly large stylus tip, the weight of which could exceed the carrying capacity of a measuring probe. AM styli provide a solution with stiff and light-weight structures. The mass of a 200mm AM disc stylus, manufactured from titanium with a ground outer surface and nitride coating for wear resistance can be reduced by 80% compared with a conventional disc of this size.

### For precision metrology, there is no substitute for touching the critical features of a component to gather precise surface data. Complex parts often demand custom styli to inspect difficult-to-access features. AM styli can access features of parts that other styli cannot reach, providing a flexible, high-performance solution to complex inspection challenges.

For further information on AM styli, visit www.renishaw.com/styli

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