



# X-RAY VISION

*Looking under the skin of an insertion tube*

*It is without question the mechanical characteristics of the insertion tube that have the greatest impact on the speed and ease with which an endoscopist can insert a colonoscope.*

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**M**ore than 20% of the endoscopes sent to Olympus for repair have evidence of third-party modifications. The third most common modification on a flexible Olympus endoscope is the replacement of the original manufacturer's insertion tube with a third-party part.

Since the internal structure of an insertion tube is not visible, many users of Olympus equipment may not be aware when this vital part of their instrument has been modified. If you or your staff experience any changes in procedural performance of an endoscope after repair (such as increased rigidity or floppiness), the scope may have been modified by a third-party vendor.

## Advanced Architecture

To fully comprehend the impact third-party tubes can have on scope performance, it's helpful to understand the architecture of an Olympus insertion tube. As the world leader in endoscopy, Olympus has spent an enormous amount of effort developing the optimal insertion tube — one that minimizes outer diameter while providing adequate space inside for the endoscope's internal components to move freely past each other without damage during angulation. The Olympus design achieves these notable features while maintaining the mechanical characteristics so critical to good performance.

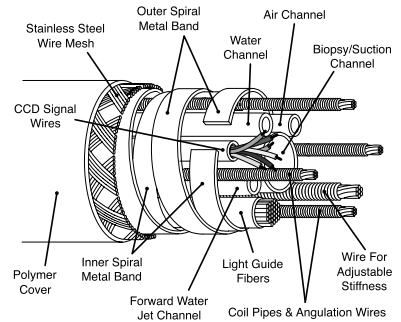
## Optimum Flexibility and Elasticity

The tube itself must be both flexible and highly elastic. Flexibility in the distal end provides easy and safe navigation through the patient's anatomy. On the other hand, the insertion tube also requires sufficient elasticity to allow intestinal loops to be removed easily when the endoscope is pulled back, and adequate column strength to prevent buckling of the insertion tube and the reformation of loops as the instrument is advanced.

The combination of flexibility and elasticity has been perfected by Olympus through two mechanisms: the internal architecture of the tube itself and the polymer layer that covers its exterior.

## Complex Structural Engineering

The skeleton or underlying structure of an Olympus insertion tube varies depending on the intended use of the endoscope. The interior design of an Olympus scope for use inside the lower G.I. tract is composed of two interlocking crisscrossed spiral bands, designed to stand up to the frequent torque the endoscopist



applies to the instrument as it is inserted. For the less tortuous upper G.I. tract, Olympus insertion tubes are designed with a single unidirectional spiral band with no crisscross pattern. Third-party repair companies may substitute a type of unidirectional band in their replacement insertion tubes for colonoscopes, which does not provide a reliable structure for these lower G.I. instruments.

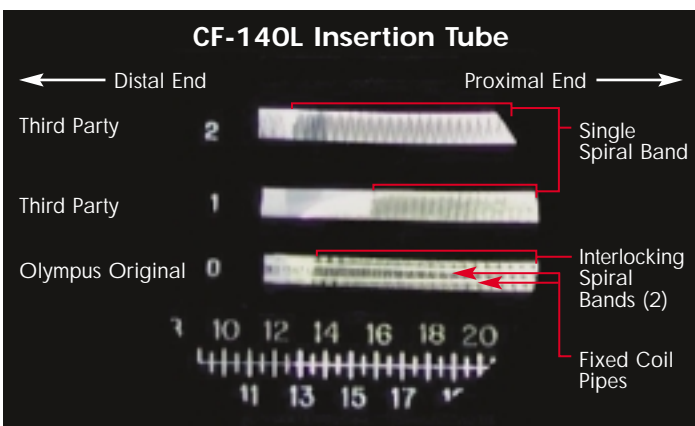
In an Olympus insertion tube, the interlocking spiral metal bands ensure the shaft can flex freely while faithfully transmitting accurate rotation of the proximal portion to the distal tip. The metal bands are covered by a stainless steel wire mesh onto which is extruded a proprietary polymer layer.

This polymer layer has a graduated rigidity along its length to deliver optimal levels of flexibility and elasticity. This flexibility is further enhanced in the Olympus Innoflex™ endoscope via a fifth control wire, which allows the physician to adjust the stiffness of the insertion tube. We have not seen a successful re-attachment of this fifth wire by a third party.

*Replacement of an Olympus insertion tube with a third-party part can have considerable impact on endoscope function as well as patient safety and comfort. Insist on keeping your Olympus equipment 100% Olympus.*

## The Difference in Black & White

While not visible from the outside, it is simple enough to see the internal structural differences between a third-party replacement insertion tube and an Olympus original by taking an x-ray of the two side by side:



## Sample Comparison

**Third Party:** Unidirectional spiral band with no crisscross pattern does not provide a reliable structure for lower G.I. instruments. Lack of fixed coil pipes increases likelihood of internal elements rubbing together.

**Olympus:** Two interlocking crisscrossed spiral bands, designed to stand up to frequent torque required in lower G.I. tract. Fixed coil pipes house the angulation wires to prevent damage caused by elements rubbing together.

The Quality inside Olympus. The Q inside the O.™

