

GC Column Cutting Mini Guide

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Key Words

Column cutting, metal columns

Abstract

Knowing how to cut a GC column is an essential skill that all GC operators must acquire. This guide describes the procedure of how to cut both fused silica and metal GC columns.

Introduction

The column in a GC instrument may require regular cutting, both prior to installation and during maintenance. The routine maintenance of a GC instrument includes removing short sections from the inlet end of the column to remove contaminants that are permanently retained on the column. This improves peak shape, resolution, and column lifetime, allowing the best performance to be achieved from both the instrument and the column.

While removing sections of the column can improve performance, a poorly cut column can cause as many problems as it solves. A successful cut enables smooth sample transfer onto and off the column, whereas a poor cut will disrupt sample transfer and can be a significant factor in peak tailing.

The easiest and most common method of column cutting is using a ceramic wafer such as that shown in Figure 1. Thermo Scientific™ wafers have four smooth and four serrated edges. The smooth edges are situated on the rear edges of the tile (with no writing) and the serrated edges are on the front (with writing). If you are unsure which edge is which, gently run the edge over your finger tip, the serrated edge will feel rough compared to the smooth edge.



Figure 1: Thermo Scientific Ceramic Column Cutter (P/N 60201-318)



When cutting a GC column the aim is to produce a clean, square end that is free of column material and support coating fragments. Described here is a protocol for cutting both fused silica and metal GC columns. While individual users may choose to perform this cutting slightly differently, the basic principles remain the same.

Cutting a Fused-Silica GC Column

To cut a fused-silica column, follow the procedure outlined below using the smooth edge of the wafer:

1. Pinch the column between the finger and thumb of one hand. Use a ceramic wafer in the other hand to score across the column, applying light pressure. While scoring, the column should be supported on the uncut side against your finger. The wafer should be held at approximately 45° to the column as shown in Figure 2. The aim is to cut the polyimide coating evenly without breaking the column.
2. To break the column, flick it just above the cut with the wafer while supporting the column by pinching it between your finger and thumb below the cut. If step 1 was successful, the column should break cleanly without leaving any fragments behind. If necessary, examine the cut with a magnifying glass.

After cutting the cut end should be wiped with methanol to remove any skin oils and polyimide fragments that are attached to the column. This is especially important if the column is to be inserted into a column union such as a “press-fit”, as it will allow a better seal to be created ensuring a more secure, leak-free union.

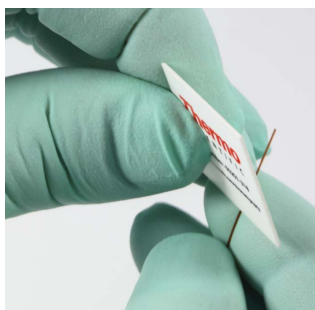


Figure 2: Step 1 of cutting a fused silica column

Cutting a Metal Column

Many users assume that metal columns are more difficult to cut than their fused silica equivalents. However, with a little practice, column cutting is no more difficult than with a fused-silica column and requires no additional tools. To cut a metal column some users prefer to use the serrated edge of the wafer. Either edge can be used successfully and it is personal preference which edge to use. To cut a metal column follow the procedure below:

1. As when cutting a fused-silica column, the column should be supported on the finger of one hand while scoring across the column with a ceramic wafer with the other. Slightly more pressure should be applied

than with a fused-silica column, and the cut should be repeated several times in a sawing motion.

The aim is to cut through the wall of the column on one side until it is approximately one third of the way through.

2. Place the wafer behind the cut, supporting it as shown in Figure 3, and bend the column over the wafer (away from the cut side). The column should snap, making a clicking sound. The column is unlikely to break all the way through and will be attached on the uncut side.

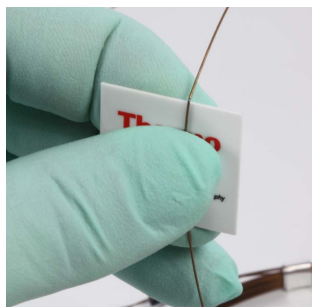


Figure 3: Completing step 2 of the metal column cutting procedure

3. Support the column on the cut side with the wafer, and bend the column back the other way (towards the cut side) as shown in Figure 4. This should snap the column on the other side and leave a clean break. If necessary, examine the cut with a magnifying glass.

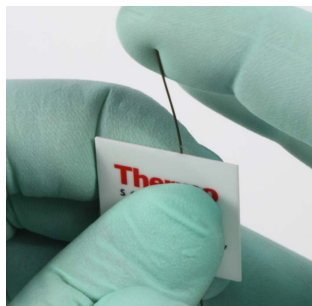


Figure 4: Completing step 3 of the metal column cutting process

Please note that step 1 can create some steel filings that need to be removed as they may block the column.

No special ferrules need to be used with a metal column, either on the inlet or detector ends. It is recommended that you disconnect the power to the system when installing a metal column into the detector, as metal columns may conduct electricity.

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