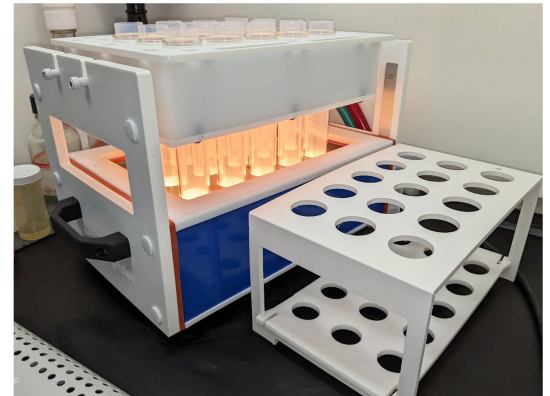




Cold Forming Technique for Reusable Digestion Tube Liner

Based in Niagara Falls, Ontario, Canada, ColdBlock Technologies has developed an innovative product that performs sample digestion for trace metals analysis with significant speed, safety, and cost improvements over existing technologies. Rather than the “traditional” method that involves heating digestion tubes in graphite blocks with conducted heat, ColdBlock employs focused short wave infrared radiation (FSWIR) to heat sample solutions. This dramatically improves efficiency and reduces digestion time.



High Temperature Hydrofluoric Acid Digestion Poses Challenges

ColdBlock’s digestion system historically used quartz or borosilicate digestion test tubes. FWSIR passes through the tube sidewalls to heat the solution inside and rapidly digest the sample. While most samples can be digested by using simple aqua regia acid mixtures, some sample types (in particular, those that contain high levels of silicates) require the use of hydrofluoric acid (HF) for complete digestion.

However, the main issue is that HF attacks both quartz and borosilicate glass. So, the standard ColdBlock digestion test tubes could not be used. A better solution was needed – namely, a test tube that could not only stand up to HF but also handle high temperatures and remain transparent to short wave infrared radiation used in ColdBlock digesters.

ColdBlock Turns to Savillex for a Digestion Tube Solution

ColdBlock’s Chief Technical Officer, Kirill Pereverzev, connected with Savillex’s engineering team and outlined the need for HF-resistant digestion tubes made from a fluoropolymer.

Although Savillex manufactures traditional digestion tubes from PFA, these products are injection molded, and the side walls are too thick (and opaque) to allow efficient FSWIR transmission. What was needed was a very thin-walled fluoropolymer tube with high FSWIR transmission, ultra-low trace metals content, and ability to withstand the high temperatures reached during the digestion.

Savillex engineers selected FEP (fluorinated ethylene propylene) due to its higher transmission of FSWIR compared to PFA. The sidewall issue, however, proved much more challenging to address. “Injection molding such a thin cross-section wall with a fluoropolymer is not possible due to the high viscosity of fluoropolymers when molten,” explains Barry Rauworth, Savillex’s director of engineering.



Cold Forming Technique for Reusable Digestion Tube Liner

“Instead, we started with thin-walled extruded FEP tubing and employed a cold forming technique to close the tube end with a rounded profile, making a classic test tube shape.”

The newly engineered solution could be used as a reusable digestion liner inside a standard ColdBlock glass tube. This offered HF resistance, high FSWIR transmission, ultra-low trace metals content, and the ability to withstand any temperature that could be generated during digestion. ColdBlock was excited to get the new digestion liners into the hands of customers, and feedback on performance has been excellent.

“It has been great working with Savillex - their team worked very quickly and came up with the ideal solution for us,” says ColdBlock CEO Craig West. “Within a month of placing an order for prototypes, Savillex delivered exactly what we were looking for.”

For customers that do need to digest silicates, or a digestion that requires the use of HF, ColdBlock now has a solution – and Savillex has a new customer in ColdBlock.

