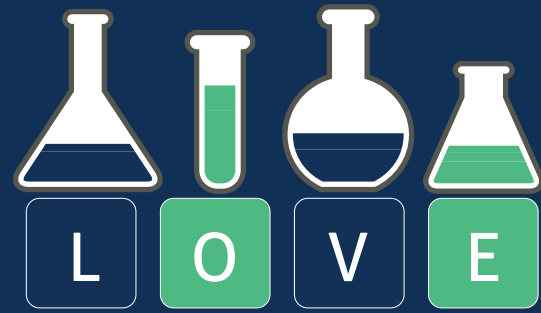


For the Love of Chemistry

Penned by Connie Hayes, CEO



This month we will discuss PVC Clean Filters

August 2019

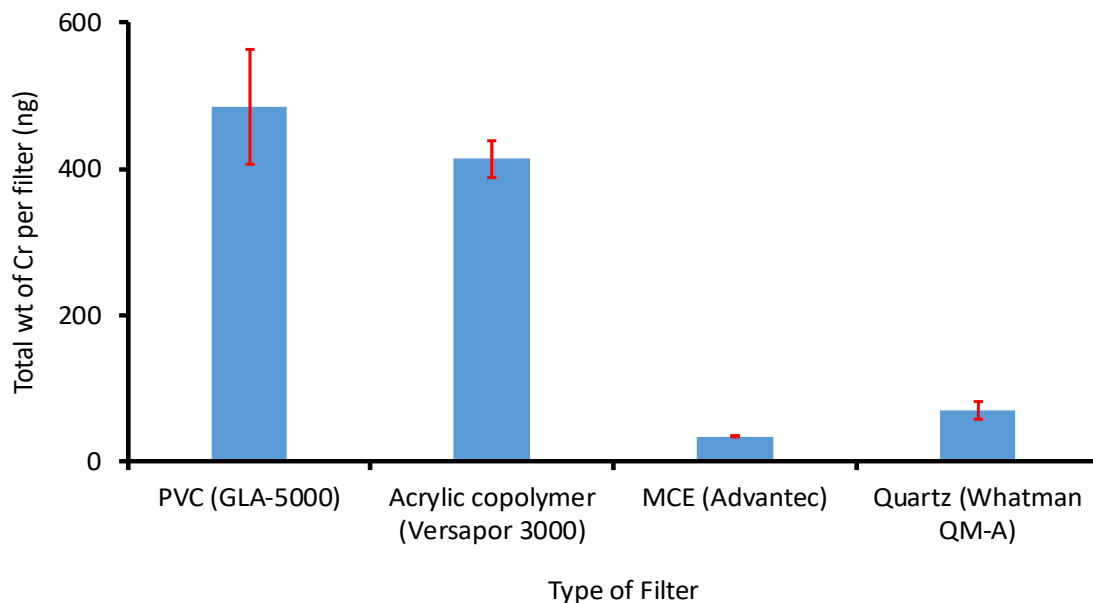
PVC Clean Filters

Hexavalent chromium is primarily produced from industrial processes employing chromium including welding, the application or removal of pigments or coatings containing chromate compounds, and chrome plating baths. To better manage human health, federal and state regulations have been put in place to protect worker health.

The current permissible exposure limit for hexavalent chromium, established by OSHA in 2006, is $5 \mu\text{g}/\text{m}^3$ over an 8 hour time weighted average (TWA) period. In 2018 the American Conference of Governmental Industrial Hygienists (ACGIH[®]) published lower Threshold Limit Values (TLVs) for chromium compounds. ACGIH defines its TLV as the threshold concentration of a particular component to which nearly every worker can be exposed to on a daily basis for a working lifetime without adverse health effects. According to this metric, the current TLV for hexavalent chromium is $0.2 \mu\text{g}/\text{m}^3$ and the Short-Term Exposure Limit (STEL) is $0.5 \mu\text{g}/\text{m}^3$.

There are several OSHA, NIOSH and ASTM methods published that address sampling and analysis of airborne hexavalent chromium. Most of these methods employ PVC filters for the collection of the hexavalent chromium. One challenge is that while hexavalent chromium limits have been lowered, the PVC filters have been found to contain high background levels of chromium, making analysis complicated and inaccurate.

During our collaborative work with the US Air Force Wright-Patterson labs beginning in 2016, HPS conducted research on the concentration of chromium on various filter media. Our studies showed that of the four selected commonly used filter media types, the PVC filters contained the highest chromium contamination levels. The data shown below was collected at HPS and presented at the EPA National Environmental Monitoring Conference (NEMC) in 2016.



To address the issue of the contamination, we tested the effect of using a USAF patented* cleaning method for removing hexavalent chromium from the PVC filters. The results showed that use of a patented reagent resulted in significantly lower chromium contamination levels than that of other filter cleaning methods. It has also been found that this process is also used to reduce trace-level vanadium, another common contaminant found on the PVC filters. HPS now offers PVC filters that have been cleaned following the verified and patented process.

An ISO 17025 Certificate of Analysis comes with each cleaned batch listing the value of the chromium remaining on the filters. The filters can be purchased by contacting High-Purity Standards at 843-767-7900, emailing info@highpuritystandards.com or online at highpuritystandards.com/precleaned-pvc-filters.

Custom filters can be ordered by contacting us at the phone or email above. Product details for custom filters are available at highpuritystandards.com/custom-cleaned-filters. You can also view our [Industrial Hygiene and Air Monitoring Standards](#) literature for details.

High-Purity Standards also offers ISO 17034 standard solutions of hexavalent chromium. These solutions at 10 µg/mL, 100 µg/mL, 1,000 µg/mL, and 10,000 µg/mL Cr⁺⁶ from potassium dichromate can be found in our online store.

* Rubenstein, M. Hexavalent chromium and total chromium removal from polyvinyl chloride (PVC) polymers. *U.S. Patent 8,415,452*, April 9, 2013.

