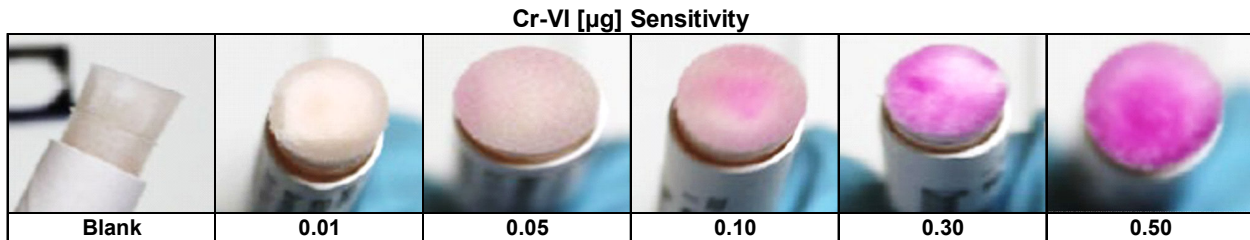




## HexChecks® Hexavalent Chromium Test Swabs Sensitivity, Specificity, and Temperature

### Sensitivity

HexChecks reliably detect levels of hexavalent chromium below 0.1 micrograms. Low levels of hexavalent chromium show as light pink. Higher levels of hexavalent chromium will show as darkening pink to purple color development.



### Temperature Range

HexChecks were tested on Mil-Spec chromate primed panels (MIL-PRF-23377 Type 1 Class C, PPG CA 7233) in a temperature range of -54C to 70C (-65F to 158F). Panels were cooled via immersion in dry ice. Panels were heated via a Lindberg BlueM convection oven. Temperatures were verified with a Fluke infrared thermometer.

A hex check was rubbed on the chromate primed surface for 20 seconds at each temperature. Results are recoded below.

The liquid in hex checks has a freezing point of approximately -7C (19F). Above its freezing point, the hex check will change color at a slower rate at cooler temperatures but will still indicate the presence of hexavalent chromium. At high temperatures, the reaction proceeds at a rapid rate with flash evaporation of the liquid the limitation at extremely high temperatures.

Temperature °C (approx. °F)	Result
-15 (5)	Frozen, no color
-10 (15)	liquid, no color
-5 (25)	liquid, light purple
0 (32)	purple
10 (50)	purple
20 (70)	purple
30 (85)	purple
40 (105)	purple
50 (120)	purple
60 (140)	purple
70 (160)	light purple, flash evaporation of liquid
70+ (160+)	flash evaporation



## HexChecks® Hexavalent Chromium Test Swabs Sensitivity, Specificity, and Temperature

### Specificity

HexChecks are highly specific to hexavalent chromium. To demonstrate specificity and understand any interferences, HexChecks were tested against a selection of metals and metal salts that may be encountered at worksites.

Atomic Absorption Spectroscopy (AAS) standards and pure metals were obtained from established suppliers such as Alfa Aesar and Millipore Sigma. 1 milliliter of each material was placed into a Teflon dish. A hex check was rubbed into each solution. Samples sat undisturbed for 5 minutes to allow any color to develop.

**Note:** Upon drying, the wick of used swabs will turn pink. This is normal and does not indicate the presence of Cr(VI). If color does not develop within 2-3min, the result is negative.

Material	Concentration	Color Change
Aluminum [as Aluminum(III) Chloride]	1mg/mL	None
Aluminum [metallic]	bar stock	None
Arsenic [as Arsenic (III) Nitrate]	1mg/mL	None
Cadmium [as Cadmium(II) Nitrate]	10mg/mL	None
Chromium [metallic]	bar stock	None
Chromium, Hexavalent [as Ammonium Dichromate(VI)]	1mg/mL	Purple
Chromium, Hexavalent [as Strontium Chromate(VI)]	1mg/mL	Purple
Chromium, Trivalent [as Chromium(III) Oxide]	10mg/mL	None
Cobalt [as Cobalt(II) Nitrate]	10mg/mL	None
Copper [as Copper(II) Sulfate]	10mg/mL	None
Copper [metallic]	bar stock	None
Iron [as Iron(III) Nitrate]	10mg/mL	None
Iron [metallic]	bar stock	None
Lead [as Lead(II) Nitrate]	1mg/mL	None
Magnesium [as Magnesium(II) Nitrate]	10mg/mL	None
Nickel [as Nickel(II) Nitrate]	1mg/mL	None
Selenium [as Selenium(IV) Oxide]	1mg/mL	None
Silver [as Silver(I) Nitrate]	10mg/mL	None
Silver [metallic]	bar stock	None
Sulfur [elemental, crystalline]	0.995	None
Thallium [as Thallium(I) Nitrate]	1mg/mL	None
Tin [as Tin(II) Chloride]	10mg/mL	None
Titanium [as Titanium (IV) Chloride]	1mg/mL	None
Titanium [metallic]	bar stock	None
Zinc [as Zinc(II) Nitrate]	10mg/mL	None