

## **VA Application Note No. V - 187**

Title:	Mercury in electronic components as part of	
	electrotechnical products	

Summary:	The EU directive on «Restriction of Hazardous
-	Substances» (RoHS) requires the testing of four regulated
	heavy metals (Pb, Hg, Cd, Cr(VI)) in electrotechnical
	products. After sample preparation according to IEC
	62321 the determination of mercury in electronic
	components can be carried out by anodic stripping
	voltammetry (ASV) at a gold rotating disk electrode (Au-
	RDE).

Sample:	Electronic components	
Sample preparation:	Approx. 1 g of the ground sample is mineralized by wet digestion with nitric acid as described in IEC 62321.	

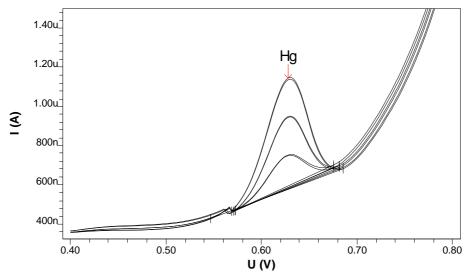
Analysis of Hg			
Electrolyte	Perchloric acid electrolyte c(HClO <sub>4</sub> ) = 0.22 mol/L c(EDTA) = 4 mmol/L c(NaCl) = 6 mmol/L		
Measuring solution	10 mL ultrapure water + 10 mL perchloric acid electrolyte + 0.05 mL digested sample solution (equals approx. 0.2 mg of ground sample)		
Working electrode (WE)	Au-RDE Gold electrode tip Driving axle		6.1204.140 6.1204.210
Auxiliary electrode (AE)	GC Glassy carbon rod Electrode holder		6.1247.000 6.1241.020
Reference electrode (RE)	Reference system: Ag/AgCl/KCl (3 mol/L) Intermediate electrolyte: c(NaCl) = 3 mol/L		
Parameters	Working electrode	RDE	
	Stirrer speed	2000 rpm	
	Mode	DP	
	Purge time	300 s	
	Cleaning potential	+1.3 V	
	Cleaning time	30 s	



	Deposition potential	+0.37 V
	Deposition time	30 s
	Equilibration time	10 s
	Pulse amplitude	0.05 V
	Start potential	+0.4 V
	End potential	+0.8 V
	Voltage step	0.002 V
	Voltage step time	0.1 s
	Sweep rate	0.02 V/s
	Peak potential Hg	+0.64 V

Results:	Hg	
	991.9 mg/kg	

## **Determination of Hg**



Hg c = 991.945 mg/kg +/- 16.391 mg/kg (1.65%)

