

APPLICATION NOTE

Digestion of Trace Metals in Paint Chips, Cadmium & Lead in Paint, and Lead in Powdered Paint

SUMMARY

The application note summarizes the digestion of 3 Paint Reference Materials, Trace Metals in Paint Chips, Cadmium & Lead in Paint and Lead in Powdered Paint using ColdBlock™ Digestion CB15S Technology.

Instrument: ColdBlock CB15S sample digester technology, chiller, ICP-OES, ICP-MS

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Digestion Time: 20 Minutes

Acid Used: HNO₃ & HCl

Average ColdBlock Recovery vs. CRM:

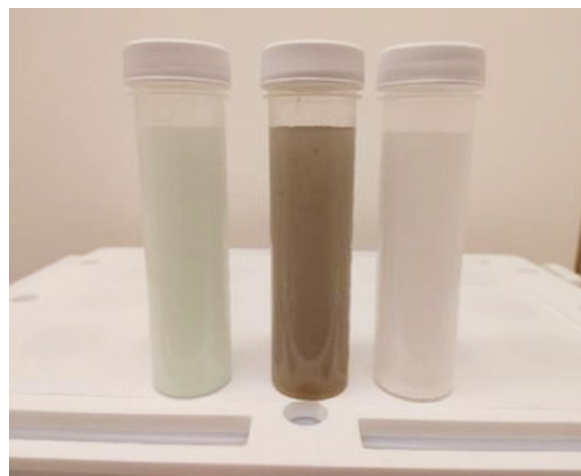
- 93% Cadmium
- 97% Chromium
- 102% Lead

METHODOLOGY

1. Chiller temperature was set to -5 °C
2. 0.5g of each sample was weighed and placed into a ColdBlock™ Digestion vessel
3. 12ml HNO₃ was added, and mixed with sample
4. Sample was digested at 80% power for 10 minutes
5. 4mL HCl was added, and sample was digested again at 80% power for 10 minutes
6. Sample was cooled and bulked to 50mL using 2% HNO₃ v/v

DISCUSSION

- During the digestion, the samples started climbing up the test tube but fell back down once they hit the cooling zone
- After 20 minutes the samples turned the same color corresponding to the original paint color and some solid material remains



From left to right : Cd & Pb in Paint, Trace Metals in Paint Chips & Lead in Powdered Paint after 20 minute digestion

Cd & Pb in Paint is a matrix reference material intended for QC verification and method development of contaminated surface coated painted items such as toys, furniture etc. Lead in Powdered Paint, SQC074 is a certified reference material intended for method development purposes. Trace Metals in Paint Chips is a certified material of contaminated paint chips sourced from an industrial blasting process.

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Results

Trace Metals in Paint Chips – CRM013								
Method:	0.5g	12mL HNO ₃ - Digest at 80% for 600 seconds - Add 4mL HCl and digest again for 600 seconds. Bulk to 50mL with 2% HNO ₃						
Element	Certified Value mg/kg	ColdBlock A mg/kg	ColdBlock B mg/kg	ColdBlock C mg/kg	ColdBlock Average (mg/kg)	Stdev	%RSD	% Recovery
Cd	37.8	32	34.5	38.4	35.0	1.3	3.6%	93%
Cr	618	623	586	593	601	19	3.1%	97%
Pb	643	631	687	643	654	28	4.3%	102%

Cadmium & Lead in Paint								
Method:	0.5g	12mL HNO ₃ - Digest at 80% for 600 seconds - Add 4mL HCl and digest again for 600 seconds. Bulk to 50mL with 2% HNO ₃						
Element	Certified Value mg/kg	ColdBlock A mg/kg	ColdBlock B mg/kg	ColdBlock C mg/kg	ColdBlock Average (mg/kg)	Stdev	% RSD	% Recovery
Cd	219.4	213.8	222.6	226.1	220.8	4.4	2.0%	101%
Pb	224.2	230.1	238.7	234.6	234.5	4.3	1.8%	105%

Lead in Powdered Paint – SQC074								
Method:	0.5g	12mL HNO ₃ - Digest at 80% for 600 seconds - Add 4mL HCl and digest again for 600 seconds. Bulk to 50mL with 2% HNO ₃						
Element	Certified Value mg/kg	ColdBlock A mg/kg	ColdBlock B mg/kg	ColdBlock C mg/kg	ColdBlock Average (mg/kg)	Stdev	% RSD	% Recovery
Pb	1125	1119	1134	1075	1109	7.5	0.7%	99%