MILESTONE
HELPING CHEMISTS

**Application Note: HG/EN-02** **Field: Environmental**

# Paint Chips


## Summary

Precise and rapid determination of total mercury in Paint Chips can be performed using Direct Mercury Analyzer. Such an instrument requires no sample wet chemistry or pre-treatment.

Once a weighed sample portion is introduced into the instrument, analysis is completed in six minutes. Direct analysis of mercury, using the integrated sequence of Thermal Decomposition, Catalyst Conversion, Amalgamation, and Atomic Absorption Spectrophotometer, is described in EPA 7473 and is validated for laboratory as well as field analysis.


## Instrumentation

*Direct Mercury Analyzer apparatus and supplies*

Milestone DMA-80, 640-1640 terminal with DMA-80 software or DMA-80 PC software, metal boats.

Analytical balance, spatula, pipette, or appropriate mechanical pipette and volumetric flask (Class A), 50 or 100 ml.

## Sample weight :

Up to 100 mg (max)

The sample has been chipped to approx. 0.5 cm and due to the organic content of the sample, the largest sample size should be analyzed by this instrument is 100 mg

## Procedure

1. Place a boat on the balance plate, tare it and weigh the sample.
2. Introduce the boat into sample tray.
3. Run the DMA-80 program to completion.

## DMA-80 program

| N° step | Time | Temperature |
|---|---|---|
| 1 | 00:01:00 | 200°C |
| 2 | 00:02:00 | 650°C |
| 3 | 00:01:00 | 650°C |
| Max start temp: 200°C<br>Purge: 60 sec | | |

## Results

| Sample ID | DMA-80 EPA Method 7473 | EPA Method 7471 |
|---|---|---|
| 98-3898 | 4.5 ± 1ppm | 0.19 |
| 98-3902 | 0.41 ± 0.06 ppm | 0.17 |
| 98-3912 | 0.19 ± 0.03 ppm | <0.08 |
| 98-3924 | 10 ± 3 ppm | 7.00 |
| 98-3954 | 0.21 ± 0.05 ppm | <0.085 |
| 98-3956 | 0.23 ± 0.04 ppm | <0.086 |

## Conclusion

The DMA-80 Mercury Analyzer successfully processed the Paint Chips samples using oxygen as the carrier gas. Since this method does not require sample preparation, the total analysis time per sample was less than 10 minutes, including the time taken to weigh each sample into the boat. The scatter in the reported data is due to inhomogeneity of the original site samples. Even gross visual examination revealed that each site sample represented a distribution of material thickness and number of layers of paint and, therefore, the potential mercury content.



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The results obtained with the DMA-80 are consistently higher than that obtained following EPA Method 7471. This significant disparity can be partially attributed to inhomogeneity of the original site samples, partially to incomplete digestion of the samples, or to loss of mercury through volatilization during sample preparation. It should be pointed out that periodically running selected standards, in sequence with the unknown samples, satisfied QC/QA and showed high stability of the DMA-80 Mercury Analyzer.