HORIBA Scientific

Application Note

ASTM D7536 Comparison Application Study

REF: **ASTM D7536 Comparison Application Study**
MODEL: **MESA-7220V2**
S/N: **H99TPKK7**

Introduction

The MESA-7220V2 is based on the latest advances in Energy Dispersive X-ray Fluorescence (EDXRF) technology. It utilizes a proprietary X-ray optical technology and produces a polarized, monochromatic X-ray source. This approach is critical for a user to achieve an ultra-low noise background for the best limits of detection for S and Cl.

This application study compares the ability of EDXRF to determine chlorine concentrations at low levels in aromatic compounds and related to ASTM method D7536. To accomplish this, a set of calibration standards described in ASTM D7536 were purchased from ASI standards. The calibration set included a blank, 0.50ppm, 1.00ppm, 5.00ppm, 10.00ppm, and 50.00ppm Cl in Xylene. The curve was built on a HORIBA MESA-7220V2 and exhibited an R2 value of 0.999911, with a sulfur correction applied.

Samples were prepared and tested by the following procedure:

1. Calibration

A. Create a calibration curve using Blank, 0.5, 1.0, 5.0, 10.0, 50.0 PPM Chlorine in Xylene, with a sulfur correction applied.

B. Fill each HORIBA 2-piece cup to the 7ml line with the standards.

C. Measure standards at 180 seconds and 3 repeats.

D. Verify that the standards' values in the calibration curve are within ±1.5% of the standard's ppm or within bottle tolerance values.

E. Remove outliers if needed.

2. Sample Preparation

A. Gently invert the sample bottles back and forth for 5 seconds before transferring 7ml into the HORIBA 2-piece cups.

B. Finish preparing the HORIBA 2-piece cups with a cell window.

C. Ensure there are no leaks in the sample cell by turning it on its side and visually confirm.

3. Sample Measurements

A. Load sample cup to the instrument.

B. Measure samples for 180 seconds and 3 repeats.

C. 3 samples were created for each submitted sample for analysis.

Summary of Data

Chlorine Check Standards in ppm	Results in ppm
0.00	0.17
0.20	0.65
0.50	0.74
0.90	1.53
2.00	2.57
3.00	3.23
10.00	10.27
20.00	20.71

Figure 1: Data of Chlorine Measurement in reference standards

MESA-7220V2 H99TPKK7 Ver.1.3.0.1
Jun 10, 2021 12:56
HORIBA-Service-bEBqMAYyZOK90o0U, HORIBA-Service-bEBqMAYyZOK90o0U

Calibration curve ID	D7536 Cl Xylene 0-50ppm 060821
Saved date and time	Jun 08, 2021 09:21
Type	S+Cl
Creation method	Measurement
Calibration formula 1	Conc = - 2.22293e+1 K + 2.22406e-2
R 1	0.118942
Calibration formula 2	Conc = 9.08158e+3 K - 1.45017e+1
R 2	0.999911
Measurer login name	HORIBA-Service-bEBqMAYyZOK90o0U
Measurer full name	HORIBA-Service-bEBqMAYyZOK90o0U
Measurement time	180 [s]
Set repeat times	3 [-]
S: 0.00 [ppm]	0.0009310 [-]
S: 0.00 [ppm]	0.0009229 [-]
S: 0.00 [ppm]	0.0009765 [-]
S: 0.00 [ppm]	0.0008884 [-]
S: 0.00 [ppm]	0.0009315 [-]
S: 0.00 [ppm]	0.0009151 [-]
S: 0.00 [ppm]	0.0009285 [-]
S: 0.00 [ppm]	0.0008915 [-]
S: 0.00 [ppm]	0.0009586 [-]
S: 0.00 [ppm]	0.0009287 [-]
S: 0.00 [ppm]	0.0009332 [-]
S: 0.00 [ppm]	0.0009127 [-]
S: 0.00 [ppm]	0.0009126 [-]
S: 0.00 [ppm]	0.0009317 [-]
S: 0.00 [ppm]	0.0009360 [-]
S: 0.01 [ppm]	0.0009213 [-]
S: 0.01 [ppm]	0.0009270 [-]
S: 0.01 [ppm]	0.0009124 [-]
Cl: 0.00 [ppm]	0.0016066 [-]
Cl: 0.00 [ppm]	0.0016094 [-]
Cl: 0.00 [ppm]	0.0015849 [-]
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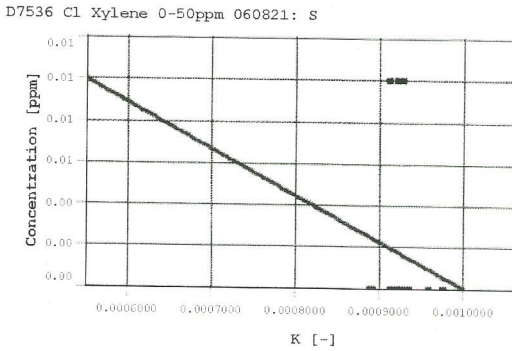
Cl: 0.50 [ppm]	0.0016688 [-]
Cl: 1.00 [ppm]	0.0017399 [-]
Cl: 1.00 [ppm]	0.0017269 [-]
Cl: 1.00 [ppm]	0.0017097 [-]
Cl: 5.00 [ppm]	0.0021731 [-]
Cl: 5.00 [ppm]	0.0021472 [-]
Cl: 5.00 [ppm]	0.0020894 [-]
Cl: 10.00 [ppm]	0.0026487 [-]
Cl: 10.00 [ppm]	0.0027200 [-]
Cl: 10.00 [ppm]	0.0026727 [-]
Cl: 50.00 [ppm]	0.0070701 [-]
Cl: 50.00 [ppm]	0.0071168 [-]
Cl: 50.00 [ppm]	0.0071309 [-]



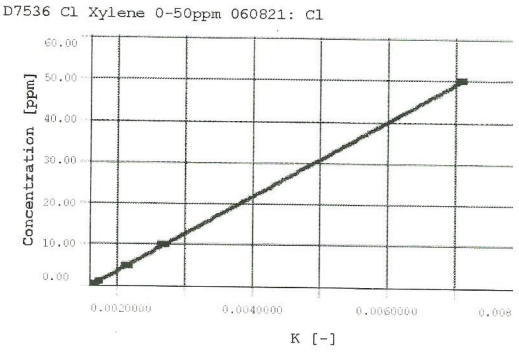


Figure 2: Chlorine in Xylene Calibration Curve