ENGINEERING REPORT

REPORT NUMBER
CE22-1116

REPORT DATE: November 16, 2022 | **PAGE** 1 of 5

Amphenol Corporation **Aerospace Operations** **Sidney, NY 13838**

Evaluation of RVPX Connectors per ASTM E1559, Outgassing

REPORT TYPE
Mitigation Testing

PROJECT NUMBER
NONE

Distribution:

Prepared by:_____

Approved by:_____

REVISION RECORD

Rev. Letter	Description of Change	Date	Approval Signature
A	Initial Release	11-16-2021	KMT

TABLE OF CONTENTS

1.0 PURPOSE

The test described in this report was performed to observe the Total Mass Loss (TML) of RVPX connectors per ASTM E1559.

2.0 BACKGROUND

Connectors were tested to ASTM E1559 to prove the viability of RVPX connectors in space.

3.0 CONCLUSIONS

The following test concludes that the RVPX connectors are within acceptable outgassing parameters per ASTM E1559 and ASTM E595.

4.0 SAMPLES

Connectors subject to the following testing were RVPX-P08VM2 and RVPX-J08EM1. (**FIGURE 1**)

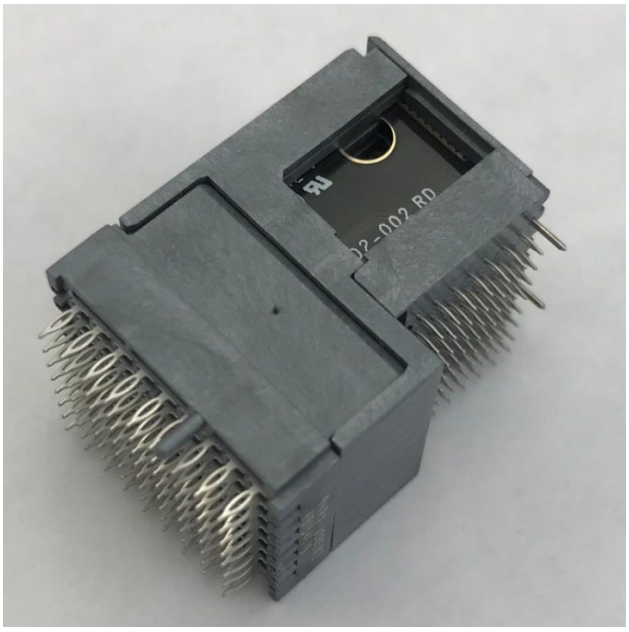

FIGURE 1

5.0 Test Procedure

The isothermal outgassing rate test was performed per ASTM E1559 (Test Method A) through the use of quartz crystal microbalances (QCMs). The QCMs were maintained at ≤98K, 160K, and 298K. the material samples were kept at 398K for test durations of up to 24 hours.

The total mass loss (TML) and outgassing rate (OGR from the samples were determined as functions of time from the mass deposited on a 90K QCM and the same-to-QCM view factor and normalized with respect to the initial mass of the sample. The QCM at ≤90K is for the purpose of collecting all impinging species. The percent of outgassing species which are condensable at higher temperature surfaces is referred to as volatile condensable material (VCM) and is measured as a function of time from the mass collected on the warmer QCMs.

6.0 Test Results

The outgassing kinetics for the sample are presented in **Figures 2 through 6**. A summery of the outgassing/deposition test data is presented in **Table 1**.

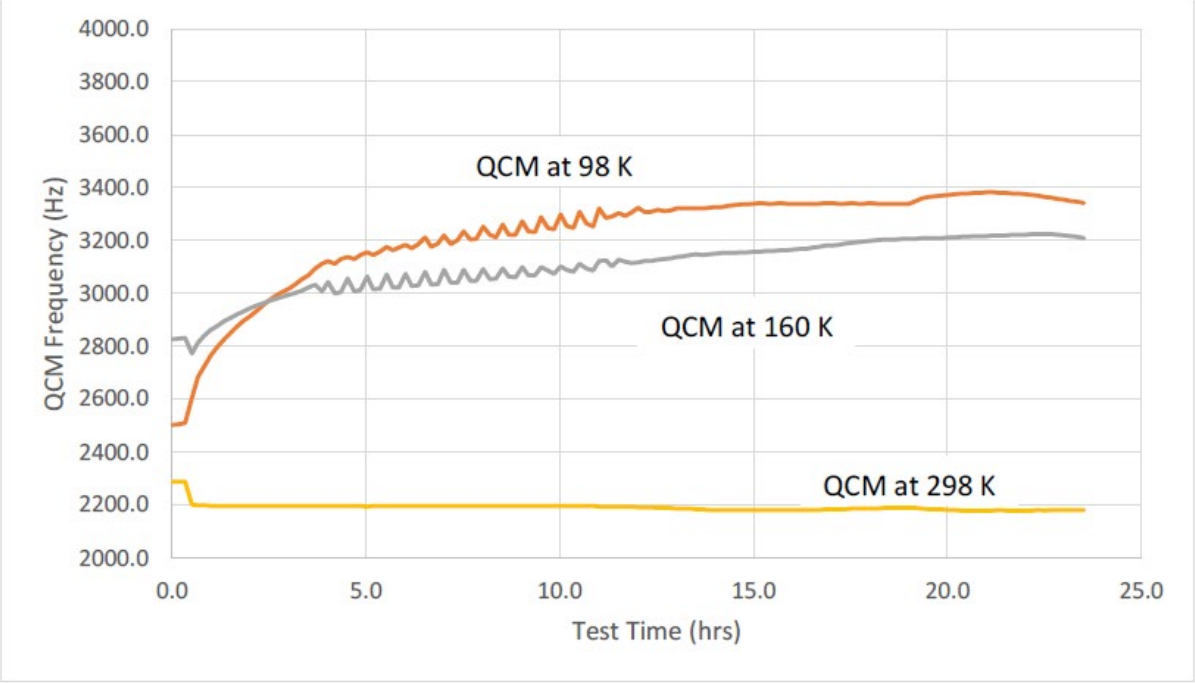

Figure 2. QCMs frequency as a function of time during the isothermal outgassing test on the sample at 398K.

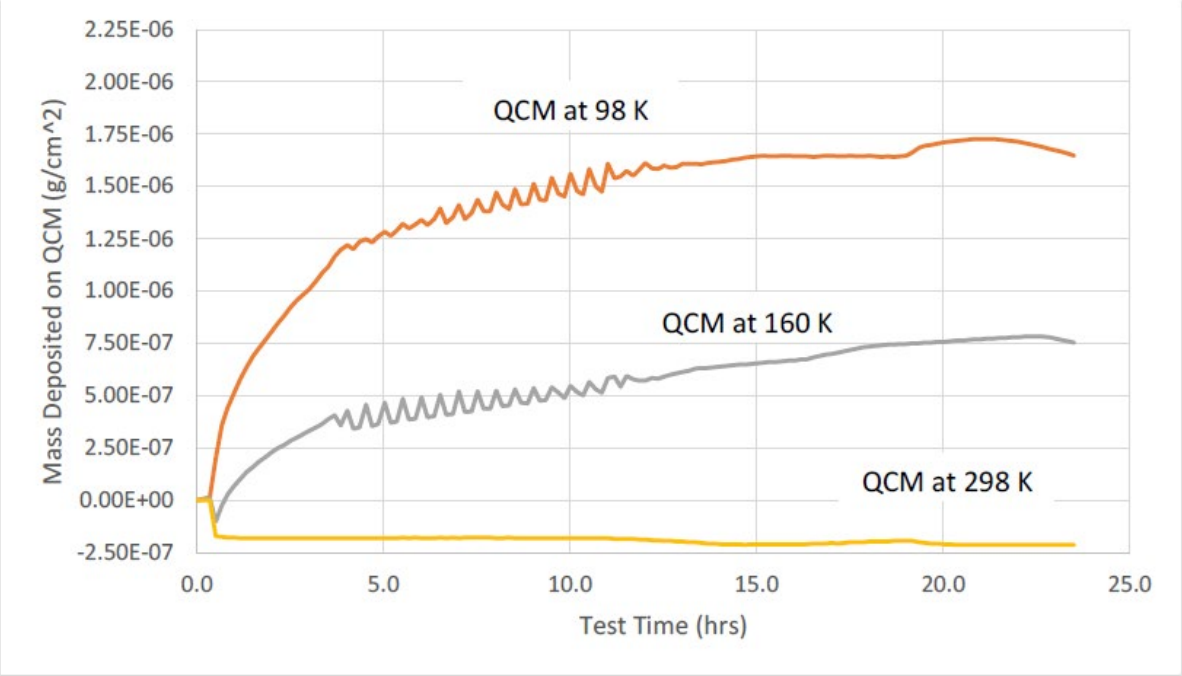

Figure 3. Mass deposited on QCMs as a function of time during the isothermal outgassing test the sample at 398K.

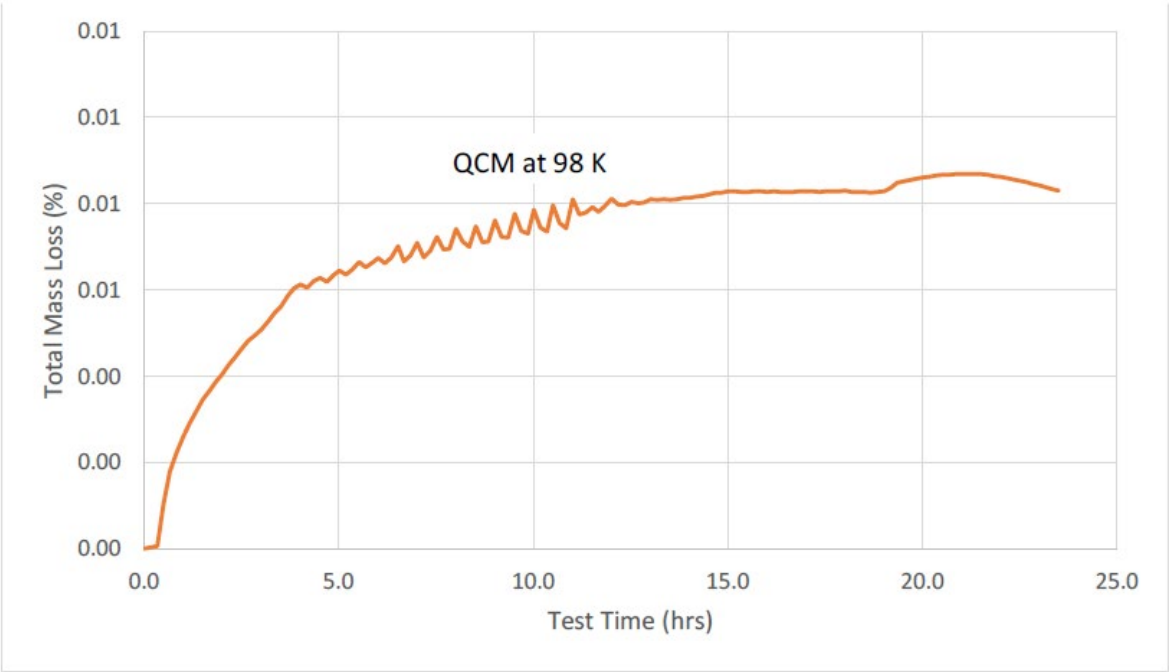

Figure 4. Total mass loss from the sample as a function of time during the isothermal outgassing test on the connector at 398K.

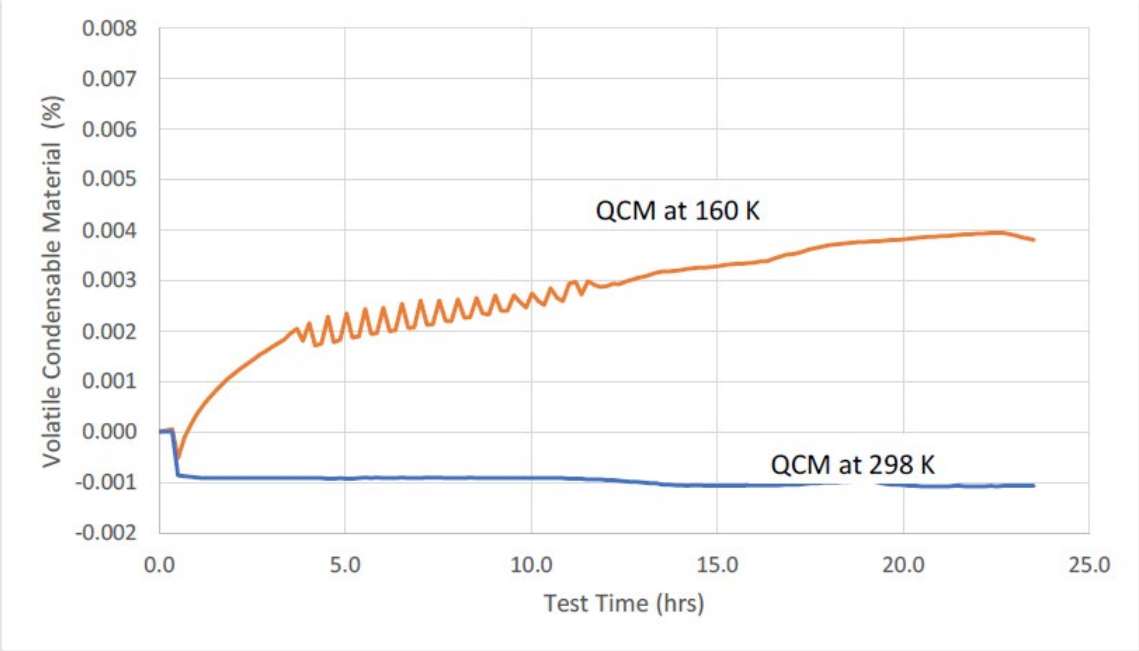

Figure 5. Volatile Condensable Material for QCMs at 160K and 298K as a function of time during the isothermal outgassing test on the sample at 398K.

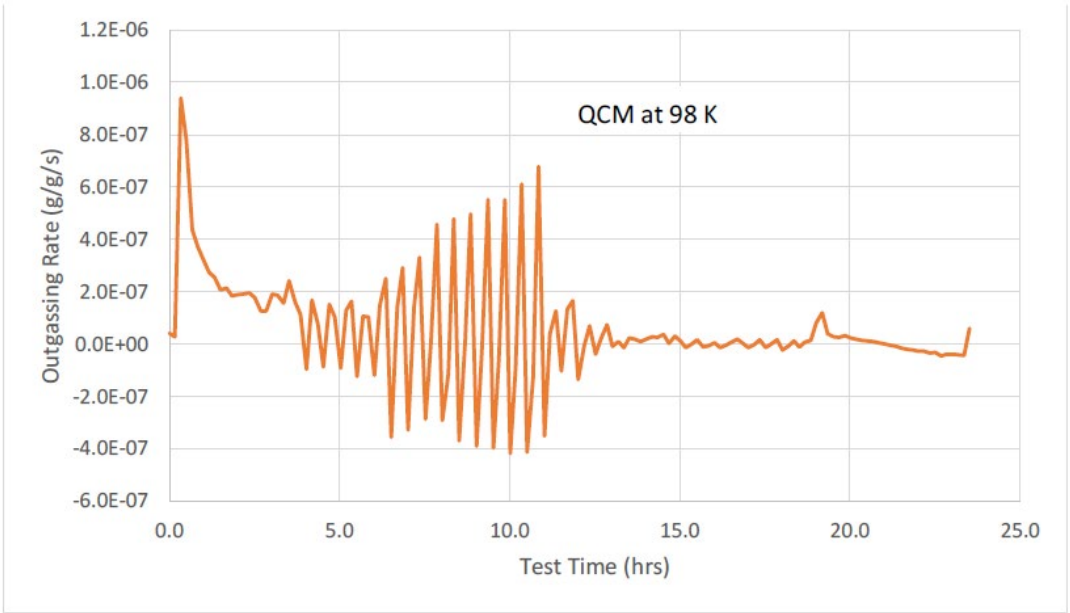

Figure 6. Outgassing rate from the sample as a function of time during the isothermal outgassing test on the sample at 398K.

Table 1. Summary of test data for the sample tested per ASTM E1559.

Initial Frequency (Hz)	Final Frequency (Hz)	Weight before test (g)	Weight after test (g)	TML_{ex} (%)
QCM1: 2502.281 QCM2: 2825.485 QCM3: 2287.694	QCM1: 3341.181 QCM2: 3209.888 QCM3: 2179.639	8.245043	8.240668	0.05