C-7

RC

RECORD COPY
Do Not Remove From Library

UNCLASSIFIED

MM-109

Contract Number AT-33-1-GEN-53

RECEIVED
OCT 11 1995
OSTI

MONSANTO CHEMICAL COMPANY - UNIT III

DAYTON, OHIO

M. M. Haring
Laboratory Director

A STUDY OF THE QUARTZ FIBER BALANCE NO. II

(Information Report)

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Date: April 11, 1946

Prepared by: G. A. Nelson

Distributed: JUL 14 1948

MASTER

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DISTRIBUTION

1. - M. M. Haring
2. - J. J. Burbage
3. - R. A. Staniforth
4. - E. G. Olt
5. - Area Manager
6. - Area Manager
7. - Area Manager
8. - E. A. Rembold
9. - Central Files
10. - Central Files
11. - Central Files
12. - Central Files

PURPOSE

1. To Determine the Extent of Drift in the Weight of a Set of Standard Platinum Foils

- a. Drift due to actual weight changes.
- b. Apparent drift due to changing balance equilibrium.

2. To Determine the Cause of Drift in the Weight of a Set of Standard Platinum Foils

- a. Contamination of balance.
 - 1. Dust
 - 2. Activity
- b. Atmospheric changes.
 - 1. Temperature
 - 2. Humidity
- c. Chemical reaction or damage in handling of foils causing real weight changes.
- d. Slippage in balance or torsion mechanism causing apparent weight changes.

3. To Eliminate or Compensate for Such Drift as May Regularly Occur

- a. "Zero shift" compensation.
 - 1. Change in tare weight.
 - 2. Change in basket weights.
 - 3. Change in beam system.
- b. Standard weight changes.
- c. Other factors causing drift.

METHOD

- 1. Weigh a set of four platinum foils daily over a period of several weeks.

2. Plot the daily apparent weights against time to determine the magnitude and direction of weight change.
3. Observe rest point with and without tares before and after all weighings and plot for correlation with average changes in standard weights (see #2).
4. Note direction of weight change with respect to position of standard weights in relation to tare standard (i.e., C.C.W. torsion = weight lighter; C. W. torsion = weight heavier than standard).
5. Lay out vernier scale and indicate weights as distances (+ or -) in cases where such procedure will clarify visualization of observed weight changes.
6. Note any observations as to dust, balance conditions, temperature changes, humidity, vibration or any other factors so that they may be evaluated in relation to any observed weight changes.
7. Inspect all weights before weighing to discover any visible contaminants. Blow with air to remove all loose dust.

RESULTS

Standard Tares

S-101
T-102

Standard Weights

E-141
E-142
E-143

Weights in the following notes are based on balance scale divisions. Conversion factors are as follows:

0.151×10^{-6} g./div. - .151 μ /div.
 0.67×10^{-3} c./div.

Table I (Part 1)

TABLE OF APPARENT WEIGHTS AND WEIGHT CHANGES

<u>Date</u>	<u>Weight No.</u>	<u>Weight</u>	<u>Δ Weight</u>	<u>*</u>	<u>Special Observations</u>
3/26/46	E-141	470.99		-	The weights recorded in this table are those made only after the balance lights have been on at least four hours.
	E-142	781.97		+	
	E-143	159.82		+	
	E-144	625.71		-	
3/27/46	E-141	478.38	+ 7.39	-	
	E-142	770.04	-11.93	+	
	E-143	152.31	- 7.51	+	
	E-144	639.17	+13.46	-	
3/28/46	E-141	480.30	+ 1.92	-	
	E-142	766.50	- 3.45	+	
	E-143	147.85	- 4.46	+	
	E-144	639.05	- 0.12	-	
4/1/46	E-141	488.4	+ 8.10	-	
	E-142	755.28	-11.22	+	
	E-143	136.41	-11.44	+	
	E-144	645.96	+ 6.91	-	

Standard tares cleaned
in NaOH, HNO₃, and
vaporized.

See Figure 1 for day by day plot of weight changes.

* Those weights indicated + are heavier than tare standard.

Those weights indicated - are lighter than tare standard.

Table I (Part 2)TABLE OF APPARENT WEIGHTS AND WEIGHT CHANGES
(AFTER CLEANING TARES)

<u>Date</u>	<u>Weight No.</u>	<u>Weight</u>	<u>Δ Weight</u>	<u>*</u>	<u>Special Observations</u>
4/4/46	E-141	447.98	-40.42	-	These Δ weights were incurred with the cleaning of the standard tares.
	E-142	799.15	+43.87	+	
	E-143	176.12	+39.71	+	
	E-144	605.54	-40.42	-	
4/5/46	E-141	452.10	+ 4.12	-	
	E-142	795.70	- 4.45	+	
	E-143	172.30	- 3.82	+	
	E-144	610.10	+ 4.56	-	
4/8/46	E-141	461.0	+ 8.90	-	
	E-142	786.77	- 8.93	+	
	E-143	169.29	- 3.01	+	
	E-144	617.24	+ 7.14	-	
4/10/46	E-141	460.59	- 0.41	-	Weight left off pans from 4/8 to 4/10.
	E-142	788.97	+ 2.20	+	
	E-143	169.38	+ 0.09	+	
	E-144	617.06	- 0.18	-	
4/11/46	E-141	463.99	+ 3.40	-	
	E-142	784.92	- 4.05	+	
	E-143	166.48	- 2.90	+	
	E-144	618.65	+ 1.59	-	
4/12/46	E-141	466.11	+ 2.12	-	
	E-142	780.85	- 4.07		
	E-143	165.93	- .55		
	E-144	620.13	+ 1.48		

* See note Table I (Part 1)

Average Increase Per Day
Equals 1.92.

See Figure 2 for day by day plot of weight changes.

GAN/rcc

— **FIGURE 1** —

APPARENT WEIGHT CHANGE OF GLEAN FOILS QUARTZ FIBER BALANCE BEFORE CLEANING OF TARES

← **FIGURE 2** →

**APPARENT WEIGHT CHANGE OF CLEAN FOILS
QUARTZ-FIBER BALANCE AFTER CLEANING OF TARES**

-FIGURE 2 A-

KRUPP & BROS. CO., N. Y. NO. 595-11
 10 X 10 to the 1/2 inch, 5th lines accepted.
 ENGRAVING, 7 X 10 in.
 MADE IN U.S.A.

FIGURE 3

SCALE LAYOUT
 AND
 PLACEMENT OF WEIGHTS

STANDARD
 A = E 141
 B = E 142
 C = E 143
 D = E 144

CONDITION 1

3-25-46

SA = 467.88
 SD = 630.87
 SB = 783.59
 SC = 155.30

CONDITION 2

4-1-46

SA = 488.40
 SD = 645.96
 SB = 755.28
 SC = 136.41