

STERILIZATION ASSEMBLY DEVELOPMENT LABORATORY

3000 CU. FT. DECONTAMINATION CHAMBER

PHYSICAL PARAMETERS - MEASUREMENT PLAN

Task 1.0

15 August 1967

JPL CONTRACT 951624 - PHASE II

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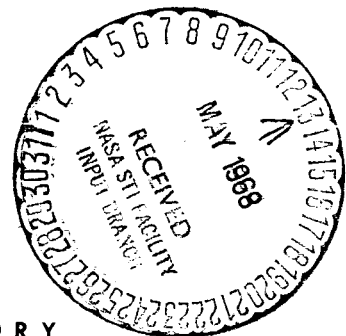
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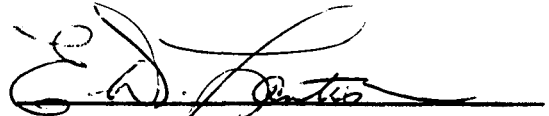
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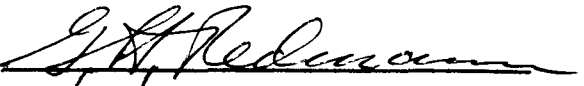
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CHANGES

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1.0 SCOPE

1.1 The purpose of this test plan is to outline the test procedure for establishing the uniformity of physical parameters throughout the large ETO chamber over a 24 hour cycle of continuous operation. Parameters which will be recorded shall include:

1. Temperature
2. Humidity
3. Ethylene Oxide Concentration
4. Time

1.2 This test plan shall be in addition to, and shall be conducted after, the completion and approval of all acceptance and certification testing.

2.0 APPLICABLE DOCUMENTS

2.1 JPL Spec. V01-50503-ETS, 12 January 1966

2.2 ETO Chamber - Test Plan

JPL Acceptance Tests, 13 April 1967

2.3 SADL Certification Test Plan, Section 6.5.1, 15 August 1967

2.4 JPL Specification 7094, ETO Decontamination Chamber,
SADL, Building 233, July 1966

3.0 GENERAL PROVISIONS

3.1 Conflicting Requirements

In the event of conflict between the requirements of this plan and other documents, the requirements of this plan shall govern.

3.2 Request for Deviation

Requests for deviation from this plan may be submitted to the facility manager, adequately justified in writing, for approval. The written approval of the facility manager shall be obtained prior to acting on the deviation.

3.2.1 Requests for deviation shall be initiated by Quality Assurance upon the written request from other disciplines involved in the operation of the chamber.

4.0 EQUIPMENT REQUIRED

4.1 Multi-point scanning, single channel, potentiometric recorder and timer, e.g., L & N 24 point recorder. (Recorder shall be used for monitoring all parameters and shall have a variable scanning device capable of a complete scan at least every 60 seconds.)

4.2 Humidity Indicator & Sensing Elements, e.g., El-Tronics Humidity Indicator, model #301 with El-Tronics adsorption-type sensing elements and leads, accuracy $\pm 5\%$ R.H.

4.3 Infra-red Optical Analyzer, e.g., BECKMAN, model #315
L.P., Non-dispersive, Infra-red Analyzer, w/variable
intermittent sampling system, accuracy ± 50 mg. of ETO/
liter of chamber atmosphere.

4.4 Iron-constantan thermocouples, leads reference junction
ice-bath and required leads - accuracy $\pm 0.5^{\circ}$ C.

Note: Electric resistance type instrumentation may be used.

4.5 Timer or stopwatch, accuracy $\pm 5\%$ or ± 15 minutes, which-
ever is less.

5.0 QUALITY ASSURANCE PROVISION

5.1 All testing shall be witnessed by Quality Assurance.

5.2 All deviations from the detailed procedures of this plan
shall be recorded by the Quality Assurance representative
and corrective action taken.

5.2.1 Deviations may require that the test be discontinued,
or it may be desirable to complete the test in order
to review a complete run of test data. This shall
be the decision of the facility engineer.

5.3 All test equipment shall be calibrated prior to individual
test cycles.

6.0 PREPARATION FOR TESTING

6.1 Prior to closing the chamber doors, instrumentation shall be located for monitoring performance of the empty chamber. Parameters to be monitored shall be temperature, time humidity, and ETO concentration. The sensing equipment shall be located on the basis of an imaginary volume which will enclose the CMTM when centered in the chamber. Volume dimensions shall be 14'-6" X 14'-6" X 10'-6" with the bottom plane of the cube located 1'-0" above the chamber floor. Sensing elements or probes may be suspended or stand mounted as long as they are fixed in position, thermally isolated from the chamber and do not appreciably disrupt the normal air flow patterns.

6.1.1 Temperature Sensing Elements

A minimum of nine (9) thermocouples shall be located at the 8 corners of the imaginary volume with one(1) reference element located at the geometric center of the volume. (Additional points may be required if certification testing has indicated a widely varying temperature gradient throughout the chamber.)

6.1.2 Humidity Sensing Elements

A minimum of nine (9) sensing elements shall be located at the 8 corners of the imaginary volume

with one (1) reference element located at the geometric center of the volume.

Note: The humidity and temperature sensing elements shall be located as close as is feasible to each other without introducing error to the thermocouple.

6.1.3 ETO Sampling Probes

A minimum of seven (7) gas sampling probes for monitoring of ETO concentration shall be located at the six (6) centers of the exterior planes of the imaginary volume with one (1) reference probe located at the geometric center of the imaginary volume (as close as is practical without interfering with temperature and humidity elements).

7.0 24 HOUR UNIFORM DISTRIBUTION QUALIFICATION TEST SEQUENCE

7.1 Close the chamber doors and inflate door seals per operating instructions.

7.2 Heat the chamber to 55° C and stabilize the temperature using the circulating water systems and the system fans.

7.3 Evacuate the chamber to 70 Torr. using system instrumentation.

Note: Turn off fans prior to evacuation. Check operating instructions.

7.4 Fill the chamber to 6 psig using the ETO mixture. Activate fans, humidity and temperature control systems. Set controls to maintain the following readout on monitoring instrumentation:

- a. Temperature - $50^{\circ} \text{C} \pm 1^{\circ} \text{C}$
- b. Humidity - $50\% \text{ RH} \pm \begin{matrix} 10 \\ 0 \end{matrix}$
- c. ETO concentration - $600 \text{ mg/liter} \begin{matrix} + 0 \\ - 50 \end{matrix} \text{ mg./liter}$

Allow system to stabilize and then trim controls to obtain the conditions required at the test reference point, (center of imaginary volume).

7.5 Check recording equipment to assure that all points are recording properly when initiating a manual sequence of readings.

7.6 Set the timing mechanism of the sampling systems and recorder and continuously record the reference points and sequence at least one series, (reading at each distribution check point) per hour. More may be recorded if deemed desirable.

(Note: Humidity readings shall initially be recorded continuously at each point. This shall continue if any are recording values out of specification requirements after one (1) hour.)

7.7 Increase the pressure to 8 psig and start the test with recording instrumentation set per paragraph 7.6.

7.8 Record data for a minimum of 24 hours. Stop recorder upon completion of test.

7.9 Vent and evacuate chamber to 70 torr.

Note: Check final operating procedures .

7.10 Fill chamber with atmospheric air through absolute filter system.

7.11 Repeat steps 7.9 and 7.10 at least 3 times.

7.12 When ETO concentration and oxygen levels are found to be at the recommended levels chamber may be opened for removal of instrumentation.