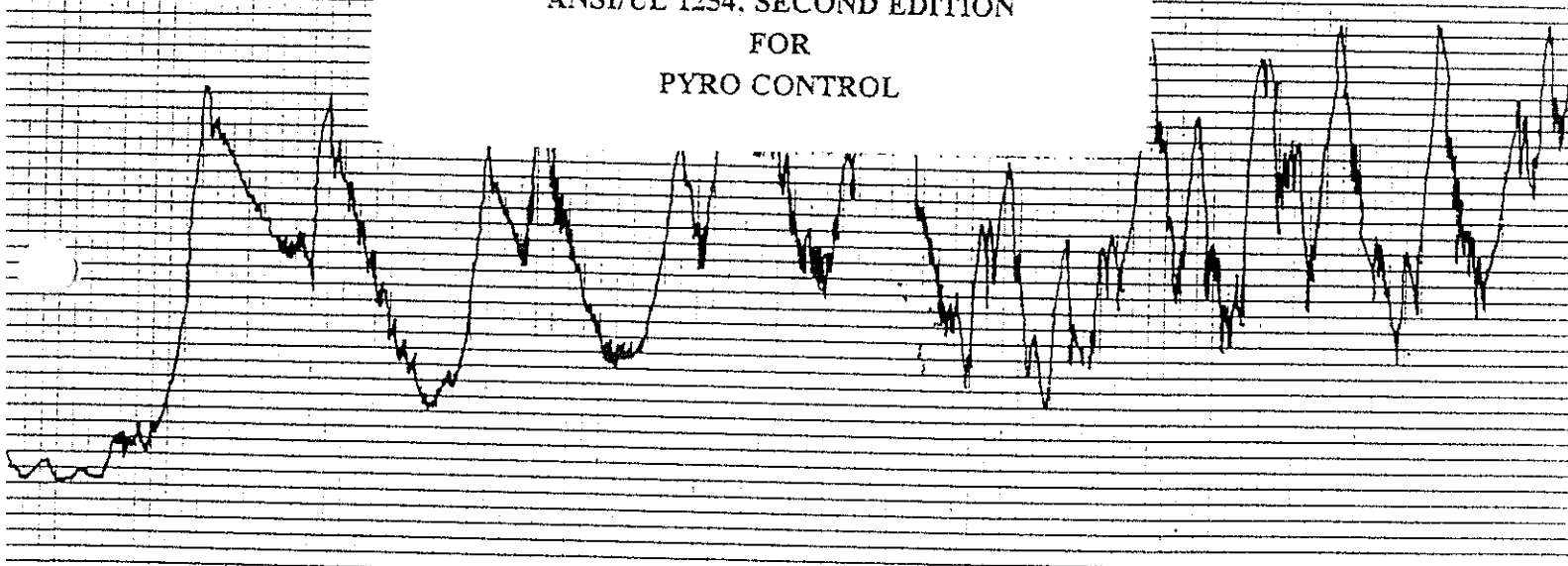


**wyle**  
laboratories  
Huntsville, Alabama

PRODUCT SAFETY EVALUATION  
OF THE  
RANGE QUEEN® UNDER HOOD  
FIRE EXTINGUISHER  
FOR CONFORMANCE TO  
ANSI/UL 1254, SECOND EDITION  
FOR  
PYRO CONTROL



test REPORT

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ANSI/UL 1254, SECOND EDITION  
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PYRO CONTROL

Pyro Control  
2721 White Settlement Road  
Fort Worth, TX 76107



Huntsville, Alabama 35807  
FAX (205) 830-2109, Phone (205) 837-4411

# CERTIFICATION TEST REPORT

Pyro Control  
2721 White Settlement Road  
Fort Worth, TX 76107

REPORT NO. 46235-01  
CUSTOMER P.O. NO. 13306-9-675  
CONTRACT N/A  
NUMBER OF PAGES 24  
DATE September 19, 1997

1.0 SPECIMEN: Range Queen® Under Hood Fire Extinguisher

2.0 PART NUMBER: 675-1

3.0 SERIAL NUMBERS: N/A

#### 4.0 REFERENCES

- Wyle Laboratories' Quotation No. 542/3872/GH
- Pyro Control Purchase Order No. 13306-9-675
- Wyle Laboratories' Quality Assurance Program Manual, Revision 1
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- MIL-STD-45662A, "Calibration System Requirements"
- ANSI/UL 1254, "Pre-Engineered Dry Chemical Extinguishing System Units," Second Edition, dated June 28, 1996, including Revisions through August 23, 1996

STATE OF ALABAMA }  
COUNTY OF MADISON } AL Prof. Eng. Reg. No. 16011

Joseph T. Hazeltine, P.E. being duly sworn,  
deposes and says: The information contained in this report is the result of  
complete and carefully conducted testing and is to the best of his knowledge true  
and correct in all respects.

Joseph T. Hazeltine  
SUBSCRIBED and sworn to before me this 23<sup>rd</sup> day of Sept. 19 97

Susan A. Bridges SEAL  
Notary Public in and for the State of Alabama at Large

My Commission expires September 5 2001

Wyle shall have no liability for damages of any kind to person or property,  
including special or consequential damages, resulting from Wyle's providing the  
services covered by this report.

PREPARED BY David R. Bailey 9/22/97  
David R. Bailey, Project Engineer Date

APPROVED BY D.P. Sandlin 9-22-97  
D.P. Sandlin, Engineering Supervisor Date

WYLE Q. A. R.G. Thomas 9-23-97  
R. G. Thomas, Q. A. Manager Date

## 5.0 SCOPE

Wyle Laboratories has evaluated the Range Queen® Under Hood Fire Extinguisher for conformance to the applicable UL Standard for Safety: ANSI/UL 1254, Second Edition. Based on our evaluation of the product sample, it was found to be in compliance with the Standard. Accordingly, the product manufacturer, Pyro Control, is authorized to display the Wyle Laboratories' Product Safety Mark on production units of the product. This authorization is valid for Residential Use Only and is not intended for product use in a commercial workplace environment.

The evaluation included testing that was performed at Wyle Laboratories' Huntsville, Alabama, Test Facility. Wyle's evaluation of the Range Queen® Under Hood Fire Extinguisher included the following tests:

### Performance Testing

- Section 26, Fire Test - Class B Local Application Protection System
- Section 33, 30-Day Elevated Temperature Test
- Section 38, Mounting Device Test (Modified)
- Section 46, Extinguishing Agent Tests
  - 46.2, Elevated Temperature Test
  - 46.3, Hygroscopicity Test
  - 46.4, Dielectric Strength Test

The Range Queen® contains no electrical components and is only used in local or household applications. In addition to these tests, the Range Queen® was found to utilize Listed or Recognized Components which require no further evaluation or testing to demonstrate compliance. Listed or Recognized Components for this product include Chemguard, Inc., Dry Chemical Type 250 BC siliconized sodium bicarbonate extinguishing agent (UL Recognized Component EX5057) and a 3M Securmark™ 7385 Label Stock (UL Recognized Component MH11410). A copy of each Listed or Recognized Component can be found in Attachment B of this Test Report.

Detailed results of each test are presented in the following sections.

## 6.0 PROCEDURES AND RESULTS

### 6.1 Fire Test

#### 6.1.1 Fire Test Procedures

The specimen shall be subjected to a Fire Extinguishing Test in the following manner. The specimen shall be mounted in its normal orientation (under hood). The hood shall be elevated to a distance specified by the manufacturer. Underneath the hood shall be a pan approximately 8 inches deep and constructed in accordance with Section 26.8 of UL 1254. The pan shall be filled to approximately two inches deep with heptane. The heptane shall be ignited and the resulting fire shall cause actuation of the extinguisher.

The extinguisher shall completely eliminate all fire activity and not splash burning fuel out of the test pan.

#### 6.1.2 Fire Test Results

The specimens were mounted in their normal orientation, utilizing a manufacturer-supplied magnetic mount, under a conventional commercially available metal range hood. Four tests were initially performed. At the direction of the manufacturer's representative, Sterno was used in place of heptane for the first four tests. The first two Sterno tests were performed with the range hood approximately 18 inches above the test pan. The remaining two Sterno tests were performed with the range hood approximately 32 inches above the test pan.

The pan was filled with 2 inches of Sterno and ignited. The resulting fire immediately actuated the extinguisher, causing the fire to be completely extinguished. No indication of splashing or reflash was noted.

Two additional tests were then performed using heptane as the fuel. These tests were performed with the range hood at 24 and 32 inches above the test pan. Test results were consistent with the Sterno tests with no indication of splashing or reflash noted.

Photographs of the test setup are presented in Attachment A.

### 6.2 30-Day Elevated Temperature Test

#### 6.2.1 30-Day Elevated Temperature Test Procedures

Two specimens shall be subjected to a 30-Day Elevated Temperature Test at a manufacturer-directed temperature of 125°F using Section 33 of ANSI/UL 1254 as a guideline. The specimens shall be positioned in their normal mounting position. After completion of the 30-day exposure, the specimens shall be immediately activated and not less than 85% discharge by weight shall be obtained.

## 6.0 PROCEDURES AND RESULTS (Continued)

### 6.2.2 30-Day Elevated Temperature Test Results

The manufacturer supplied three samples. One sample was found to be leaking media at the spindle to mounting chain interface. With concurrence of the manufacturer, it was decided to include this third unit in the test program. Each of the three samples was weighed. The three samples were then installed in their normal position and subjected to a 30-day conditioning at 125°F. Immediately upon completion of the conditioning period, the samples were individually installed in the range hood and a heptane fire was ignited. The samples each activated and extinguished their respective fire with no splashing or reflash noted. The samples were then weighed. Test media discharge weights by sample were 98%, 98%, and 99%, respectively.

Photographs of the test setup are presented in Attachment A and a listing of the instrumentation equipment used in the performance of this test is included in Attachment C. Circular charts recording the test environment are maintained on file at Wyle Laboratories

## 6.3 Mounting Device Test (Modified)

### 6.3.1 Mounting Device Test (Modified) Procedures

The specimen shall be subjected to a Mounting Device Test (Modified) using Section 38 of ANSI/UL 1254 as a guideline. The specimen shall be placed in the normal mounting position and subjected to a minimum of 5 times the fully charged weight of the specimen. The modified test procedure allows a test weight of less than the 100-pound minimum required in ANSI/UL 1254.

### 6.3.2 Mounting Device Test (Modified) Results

The test specimen is mounted underneath a range hood using a circular magnet connected by chain to the extinguisher cylinder. The combined weight of this assembly is 0.74 pound. The extinguisher was attached in its normal mounting position. A 3.7-pound weight representing a minimum of 5 times the fully-charged weight of the specimen was then attached to the specimen. This static load was maintained for a period of not less than 5 minutes. No failure was noted. The test load was then increased until the mounting failed to hold. This load was noted to be 5.0 pounds.

A photograph of the test setup is presented in Attachment A and a listing of the instrumentation equipment used in the performance of this test is presented in Attachment C.

6.0 PROCEDURES AND RESULTS (Continued)

6.4 Extinguishing Agents Test - Elevated Temperature Test

6.4.1 Extinguishing Agents Test - Elevated Temperature Test Procedures

Two samples of extinguishing media weighing 150 grams each shall be placed in two tinned steel cups as described in ANSI/UL 1254, Section 46.2. The closed cups are to be placed in a controlled oven at 140°F for a period of 7 days. At the end of the 7 days, the cups shall be removed from the chamber and allowed to cool for 3 days. The media shall then be examined for caking and any lumps found shall be dropped from a height of 4 inches to determine if they are friable.

6.4.2 Extinguishing Agents Test - Elevated Temperature Test Results

The two samples of media were exposed to the environments as described in Section 6.4.1. The samples were examined after exposure and found to have no caking or lumps.

A photograph of the test cups is presented in Attachment A and a listing of the equipment used in the performance of this test is presented in Attachment C. Circular charts recording the test environment are maintained on file at Wyle Laboratories.

6.5 Extinguishing Agents Test - Hygroscopicity Test

6.5.1 Extinguishing Agents Test - Hygroscopicity Test Procedures

A 100-gram sample of extinguishing media shall be placed in a 250 ml beaker per ANSI/UL 1254, Section 46.3. The beaker shall be placed in a humidity jar maintained at  $70 \pm 5^\circ\text{F}$  and 80% RH. After 2 days, the beaker shall be moved to a desiccator jar containing anhydrous calcium chloride. After 2 days, the beaker shall be returned to the humidity jar. This cycle shall be continued for a period of 3 weeks. The media shall be observed for caking during the test period.

6.5.2 Extinguishing Agents Test - Hygroscopicity Test Results

The test sample was subjected to the environment as described in Section 6.5.1. No caking or lumps were noted during the test period.

A photograph of the test jars is presented in Attachment A and a listing of the equipment used in the performance of this test is presented in Attachment C. Daily logs of temperature and relative humidity are maintained on file at Wyle Laboratories.

6.0 PROCEDURES AND RESULTS (Continued)

6.6 Extinguishing Agents Test - Dielectric Strength Test

6.6.1 Extinguishing Agents Test - Dielectric Strength Test Procedures

The test shall be performed in accordance with ANSI/UL 1254, Section 46.4. The test container shall be constructed as defined under ASTM D877-87 (R1995). The electrodes shall be rigidly mounted and positioned horizontally with a 0.10-inch gap between them. Prior to testing, the cup and electrodes shall be cleaned with cheesecloth and compressed air and then heated in an oven for 15 minutes at 212°F.

The cup shall then be filled to a point over the top of the electrodes and shaken for 15 minutes. Voltage shall then be applied and increased at a uniform rate until breakdown occurs. This voltage shall be reported.

6.6.2 Extinguishing Agents Test - Dielectric Strength Test Results

The test media sample was subjected to the environment as described in Section 6.6.1. The breakdown voltage occurred at 5000 volts.

A photograph of the test setup is presented in Attachment A and a listing of the equipment used in the performance of this test is presented in Attachment C.

7.0 TEST SUMMARY

The Range Queen® complied with the safety requirements of ANSI/UL 1254 as delineated in the table below.

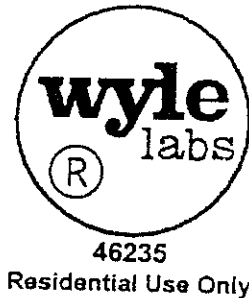
Requirements	Results
Marking and Instructions	Complied
Construction	Complied
Performance Tests	Complied



## 8.0 CERTIFICATION

### 8.1 Symbol Authorization

Based on the data presented in this report, Pyro Control is authorized to display the Wyle Product Safety Mark on production units of the Range Queen® Under Hood Fire Extinguisher as shown below:



### 8.2 Listing File Number

This product will be listed under Wyle Laboratories' File Number 46235 after successful completion of the Initial Factory Inspection scheduled for September 30, 1997, at Pyro Control's facility in Fort Worth, Texas. Furthermore, this product will be allowed to maintain this listing as long as quarterly factory follow-up inspections are satisfactorily performed at Pyro Control as agreed in the Follow-Up Services Agreement executed between Wyle Laboratories and Pyro Control.

Pyro Control shall include installation instructions, as defined in Section 60 of ANSI/UL 1254, with shipment of every Range Queen® Under Hood Fire Extinguisher.

Non-conformance items resulting from the factory inspections may require further testing on the Range Queen® Under Hood Fire Extinguisher or revocation of the above authorization.

## 9.0 QUALITY ASSURANCE

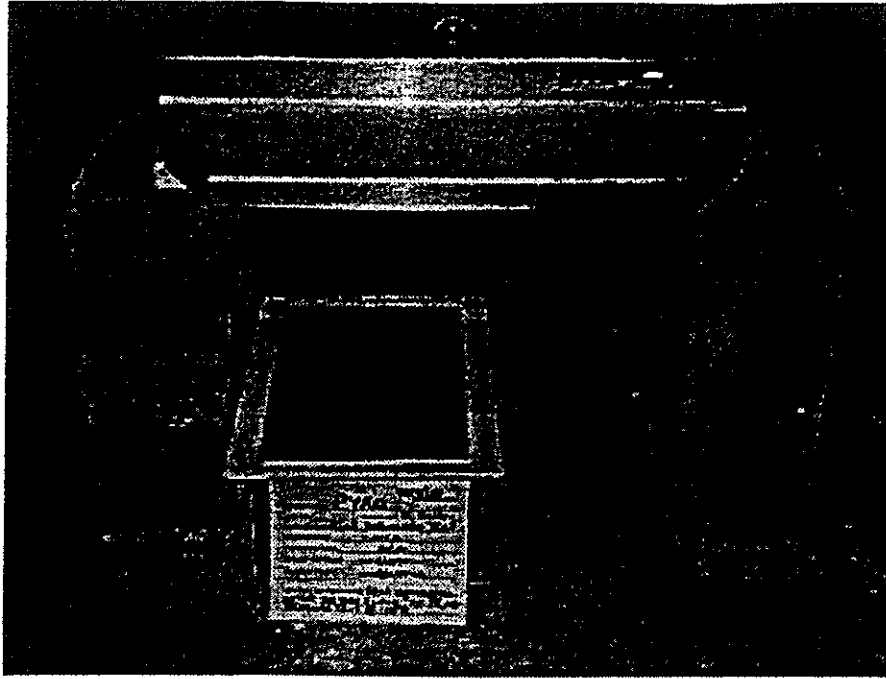
All work performed in this test program was completed in accordance with Wyle Laboratories' Quality Assurance Program.

The Wyle Laboratories, Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

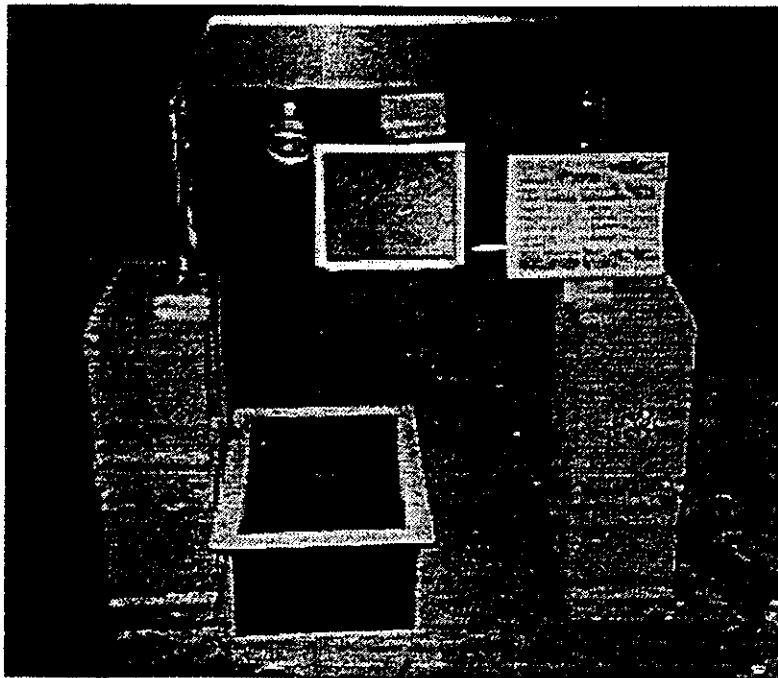
10.0 TEST EQUIPMENT AND INSTRUMENTATION

All instrumentation, measuring, and test equipment used in the performance of this test program were calibrated in accordance with Wyle Laboratories' Quality Assurance Program which complies with the requirements of ANSI/NCSL Z540-1, ISO 10012-1, and Military Specification MIL-STD-45662A. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

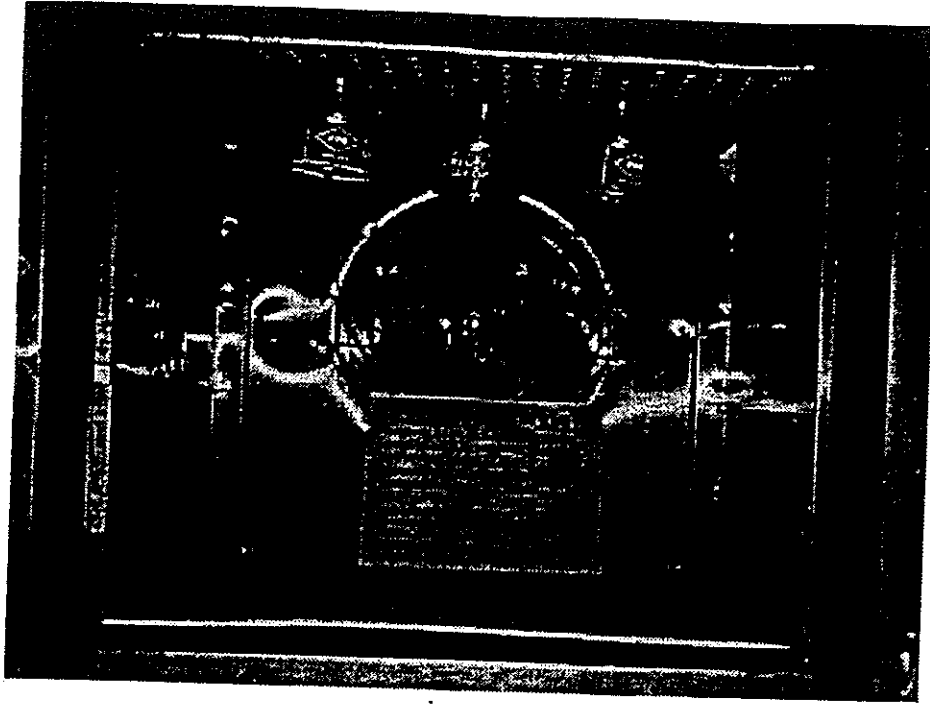
ATTACHMENT A  
PHOTOGRAPHS



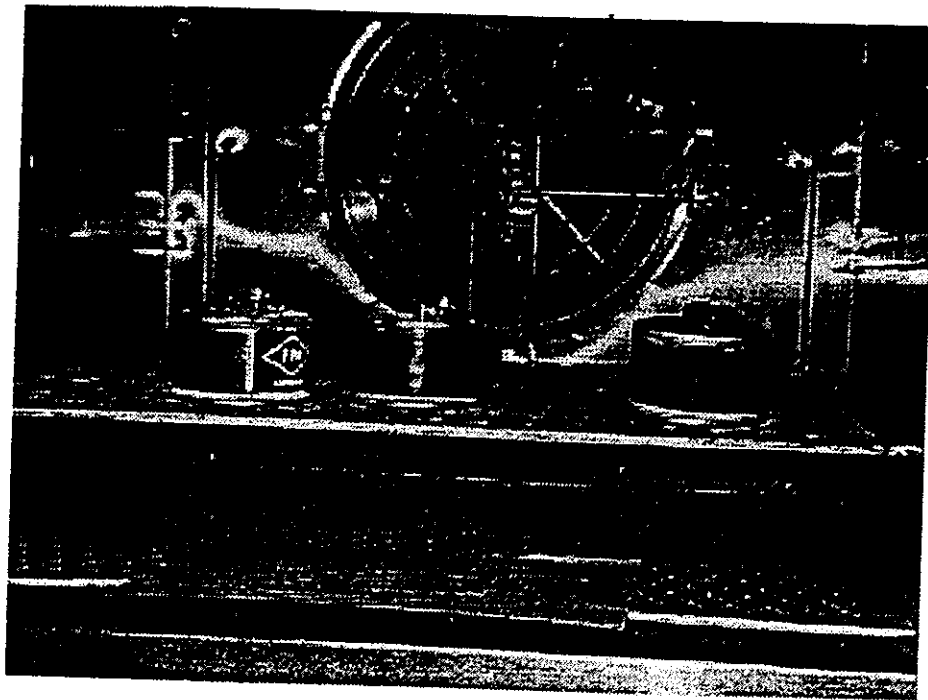
**Photograph 1**  
**Range Fire Test Setup**



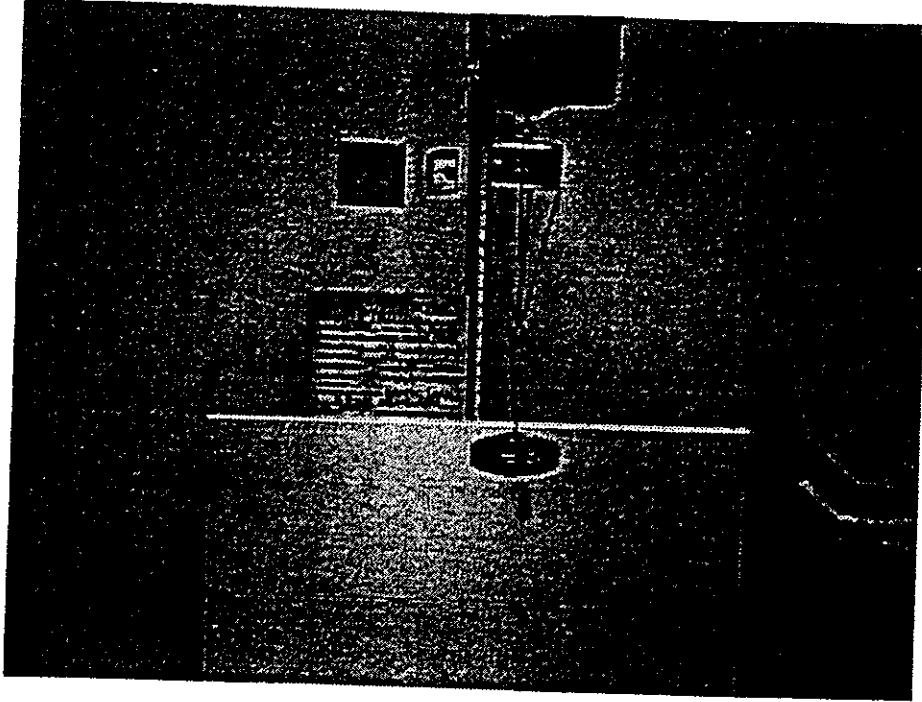
**Photograph 2**  
**Extinguisher Installed in Range Hood**



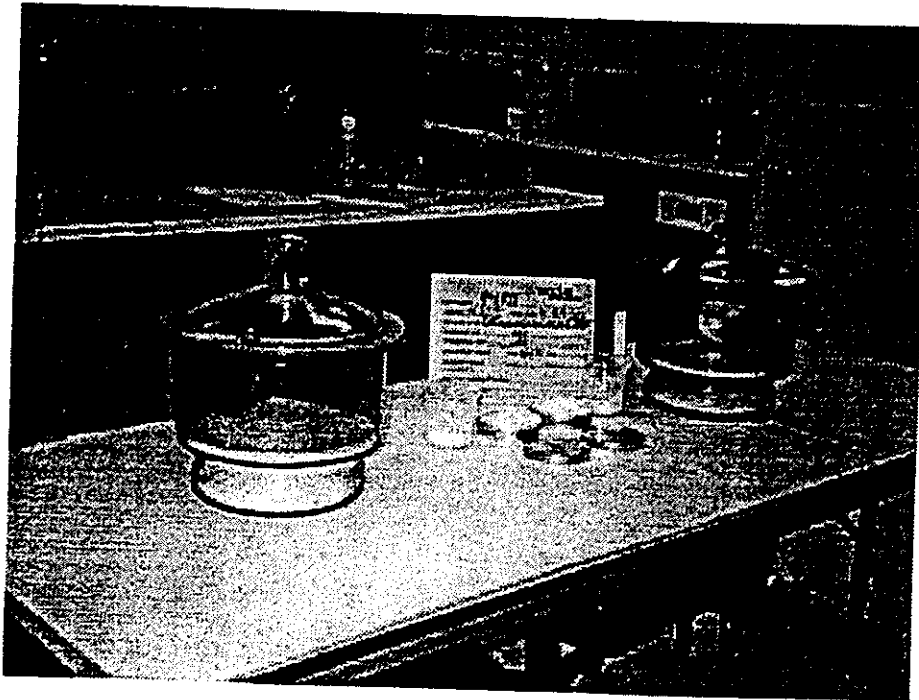
**Photograph 3**  
**High Temperature Test Setup**



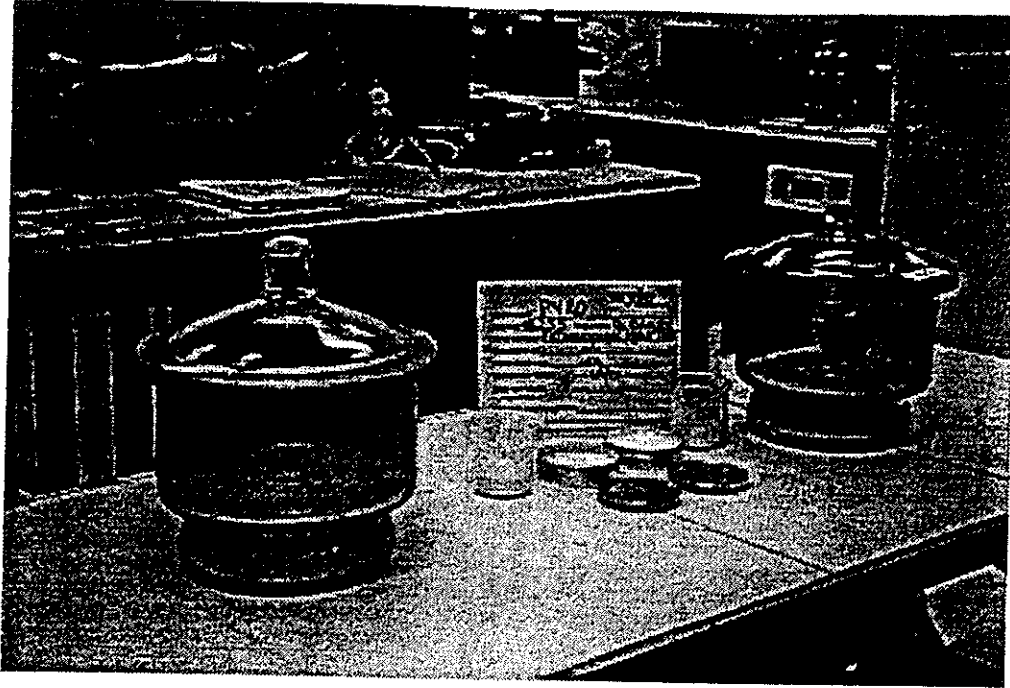
**Photograph 4**  
**Preparing for 30-Day Test**



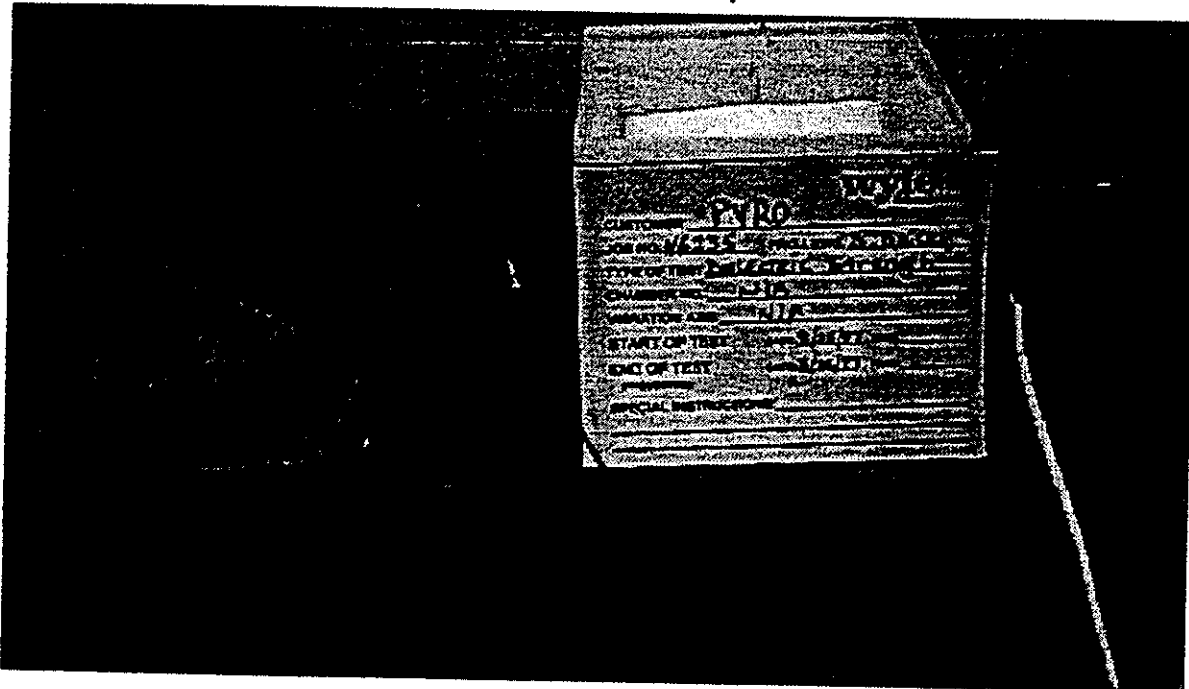
**Photograph 5**  
**Load Test Setup**



**Photograph 6**  
**Extinguishing Media Preparation**



Photograph 7  
Extinguishing Media Hygroscopicity Test



Photograph 8  
Dielectric Strength Setup