

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION

FIRE TECHNOLOGY DEPARTMENT
WWW.FIRE.SWRI.ORG
FAX (210) 522-3377



**TESTING OF *STOVETOP FIRESTOP® MICROHOOD*, IN
GENERAL ACCORDANCE WITH UL SUBJECT 300A,
*OUTLINE OF INVESTIGATION FOR EXTINGUISHING
SYSTEM UNITS FOR RESIDENTIAL RANGE TOP COOKING
SURFACES (ISSUE NO. 3, NOVEMBER 21, 2006)***

**FINAL REPORT
Consisting of 18 Pages**

**SwRI® Project No.: 01.21602.16.104a
Test Dates: September 26-29, 2016
Report Date: December 7, 2016**

Prepared for:

**WilliamsRDM, Inc.
200 Greenleaf Street
Fort Worth, TX 76107**

Prepared by:

Jason Huczek
Principal Engineer
Engineering and Research Section

Approved by:

Matthew S. Blais, Ph. D.
Director
Fire Technology Department

This report is for the information of the client. This report shall not be reproduced except in full, without the written approval of SwRI.
Neither this report nor the name of the Institute shall be used in publicity or advertising.



Benefiting government, industry and the public through innovative science and technology

1.0 INTRODUCTION

The objective of the test program was to evaluate the functionality of the StoveTop FireStop® Microhood automatic fire suppression units in typical residential indoor cooktop fire situations. Testing was conducted in general accordance with UL Subject 300A, *Outline of Investigation for Extinguishing System Units for Residential Range Top Cooking Surfaces (Issue No. 3, November 21, 2006)*, at the Client's test facility, located in Fort Worth, Texas. The testing was conducted in general accordance, since not all the tests described in UL 300A were performed. However, the test setup and extinguishment tests were very similar to Test No. 8, described in Table 4.1 of UL 300A.

Mr. Jason Huczek, representing Southwest Research Institute, was present to witness testing. This report documents the testing performed and the results obtained.

The test methods described in this report are intended to measure and describe the properties of materials or products in response to heat and flame under controlled laboratory conditions. The results should not be used alone to describe or appraise the fire hazard or the fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a complete fire hazard for fire risk assessment, which takes into account all the factors that are pertinent to an assessment of the fire hazard or risk of a particular end-use.

The results presented in this report apply specifically to the specimens tested, in the manner tested, and not to the entire production of these or similar materials, nor to the performance when used in combination with other materials.

2.0 FIRE SUPPRESSION SYSTEM DESCRIPTION

The Client identified the system under test as, *Automatic Fire Suppression System for Grease Fires on Indoor Residential Cooktops (Class K)*. The specific product tested was the Stovetop Firestop® Microhood device. A product data sheet for this device can be referenced in Appendix A.

Figure 1 shows a photograph of the devices in their bulk and individual packaging. Figure 2 provides a close-up photograph of two angles of the device out of the packaging. Figure 3 shows two angles of the devices installed prior to a fire test.



Figure 1. Stovetop Firestop® Bulk and Individual Packaging.

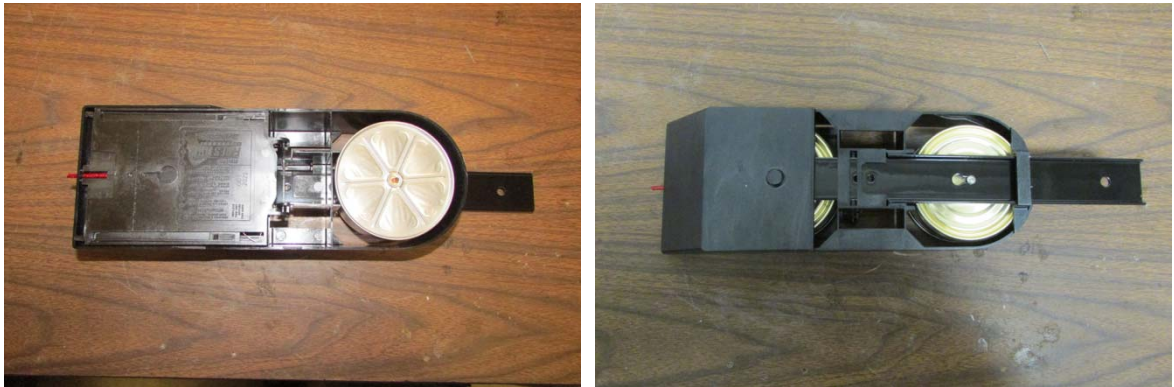


Figure 2. Stovetop Firestop® Close-up View.



Figure 3. Stovetop Firestop® Installed Prior to a Fire Test.

3.0 TEST CONFIGURATION AND PROCEDURE

The testing was conducted in the WilliamsRDM fire test facility which was constructed to replicate a typical kitchen environment. The facility is climate controlled and contains a residential electric stove manufactured by Hotpoint (model number RB526D H1WW). A residential microwave was positioned above the stove and the mounting height is adjustable to allow the distance from the stove to the microwave to be varied as desired. Metal partitions are mounted to both sides of the range hood to simulate upper cabinets which are present in typical kitchen arrangements.

Two Microhood mounting heights were tested, 15 in. and 27 in., as measured from the burner surface to the bottom of the microwave surface. These mounting heights represent the lower and upper range of typical kitchen arrangements, based on a survey conducted by WilliamsRDM.

Two skillet sizes were tested, 10-in and 13-in diameter. These diameters are at the upper and lower ranges of the majority of skillets used for residential cooking, based on a survey conducted by WilliamsRDM. Cast iron construction was selected for both skillets. This represents a worst case due to its composition and thicker construction and likely makes the re-ignition potential greater because it retains heat longer. Two oil depths were used for testing: 1/4-in and 3/8-in.

Vegetable oil was selected for use during all testing because it is the most common oil used for residential shallow pan cooking, based on a survey conducted by WilliamsRDM. Figure 4 shows a photograph of the oil used during testing.



Figure 4. Vegetable Oil Used for Fire Tests.

Instrumentation for the testing included a thermocouple (Omega Engineering, Type K, part number – TJ36-CAXL-14G-18) to measure the oil temperature, a data logger (Extech Instruments, 3 Channel Data logging Thermometer – Model SD200) to record the oil temperature and a video system to document each test and record observations.



Figure 5. Oil Temperature Measurement (Left: Thermocouple Probe, Right: Data Logger).



Figure 6. Photograph of Video Test Screen.

4.0 TEST PROCEDURE

For each test, the skillet is to be placed on the largest burner at the front or rear of the stove. The largest burner produces the most heat input to the skillet. The burner was set at the highest setting for all tests. The general test procedure used for all testing was as follows:

1. Place fire suppression units in range hood per published mounting instructions
2. Place skillet on largest front or rear burner (cast iron 10/13-in. diameter)
3. Pour oil into skillet (vegetable oil to specified depth)
4. Position thermocouple in oil (tip to be approx. 1/8-in. below the surface)
5. Record unit mounting height
6. Record skillet size and material
7. Record oil type (vegetable)
8. Record oil depth and volume
9. Start video recording
10. Turn on range hood fan
11. Turn on burner to the highest setting
12. Heat oil to auto-ignition point
13. Allow fire to grow
14. Observe actuation of unit and suppression of the fire
15. Turn burner off after unit actuation
16. Observe skillet oil temp until it falls below 650°F (below auto-ignition temp)
17. Playback video and record data
 - a. Time to oil auto-ignition
 - b. Oil temperature at auto-ignition time
 - c. Time to unit actuation from auto-ignition time
 - d. Oil temperature at unit actuation

- e. Time to fire extinguishment from unit actuation
 - f. Time from unit actuation to oil temperature decrease to 650°F, or to re-ignition
18. Clean all surfaces and cool the test pan to ambient temperature before next test.

5.0 RESULTS

Testing was conducted in general accordance with UL 300A, and per the procedure outlined above, at the Client's test facility, located in Fort Worth, Texas. Jason Huczek, representing Southwest Research Institute, was present to witness testing. Table 1 provides a summary of the observations and results for each test. The *Stovetop Firestop® Microhood Device* successfully extinguished all the test fires without re-ignition. Figures 7-14 provide selected photographs from each test.

Table 1. Summary of Test Results for Stovetop Firestop® Microhood Device.

Test Date	Test No.	Skillet Diameter (inches)	Oil Depth (inches)	Amount of Oil (cups)	Oil Type	Mounting Height (inches)	Time to Oil Auto-Ignition (min:s)	Oil Temp at Ignition (°F)	Time to Actuation from Ignition (s)	Oil Temp at Actuation (°F)	Time to Ext. from Actuation (s)	Time from Actuation to 650°F Oil Temp (min:s)	Large Burner Position, Front or Rear
9/26/16	1	10	¼	1.0	Vegetable	15	9:32	720	9	775	1	5:36	Rear
9/26/16	2	10	3/8	1.5	Vegetable	15	10:08	707	13	741	1	0:24	Rear
9/26/16	3	13	¼	2.0	Vegetable	15	16:54	701	28	753	2	3:46	Front
9/27/16	4	13	3/8	2.5	Vegetable	15	17:11	754	25	792	2	7:07	Front
9/27/16	5	10	¼	1.0	Vegetable	27	9:09	743	19	808	3	0:12	Rear
9/29/16	6	10	3/8	1.5	Vegetable	27	9:54	731	34	809	2	6:06	Rear
9/27/16	7	13	¼	2.0	Vegetable	27	15:37	727	50	827	5	4:30	Front
9/27/16	8	13	3/8	2.5	Vegetable	27	17:42	710	35	872	2	4:35	Front



Figure 7. Selected Photographs from Test 1.



Figure 8. Selected Photographs from Test 2a.



Figure 9. Selected Photographs from Test 3.



Figure 10. Selected Photographs from Test 4a.



Figure 11. Selected Photographs from Test 5.



Figure 12. Selected Photographs from Test 6a.



Figure 13. Selected Photographs from Test 7.



Figure 14. Selected Photographs from Test 8.

APPENDIX A
CLIENT-SUPPLIED PRODUCT DATA SHEET
(CONSISTING OF 2 PAGES)

STOVETOP FIRESTOP

M I C R O H O O D



AUTOMATIC FIRE SUPPRESSION FOR GREASE FIRES ON INDOOR RESIDENTIAL COOKTOPS (CLASS K)

The Original Automatic Cooktop Fire Suppressor since 1972

⚠ WARNING

- This is a residential cooktop fire suppression device.
- This product is not intended or approved for use with deep-fat frying.
- Verify that there are no electrical or water lines where drilling.
- A StoveTop FireStop unit is activated by direct, sustained contact with a flame. Normal cooking will not activate it.
- After activation, turn off the stove's burner (if it is safe to do so). If the heat source (burner) is not immediately shut off after discharge, the fire may re-ignite.
- Fire-suppressing powder is non-toxic, but may be harmful if swallowed and should not be ingested or exposed to eyes, mouth, open sores, etc. Seek medical attention if needed.
- When activated, falling powder may cause grease fires to splash.
- Keep out of reach of children.
- Do not disassemble the unit or remove fuse. Manufacturer is not responsible for units that have been disassembled or tampered with in any way.
- If more than a very small, controllable fire, get out of the dwelling, call 911 or the local emergency number, and pull the fire alarm or otherwise safely notify any other occupants. Close doors behind you to help contain fire.

FIRE SAFETY

- Cooking fires are the number one cause of residential fires and residential fire injuries.** Unattended cooking is the leading cause of fires in the kitchen. Many injuries occur when occupants attempt to fight the fire themselves.
- Never leave anything cooking on the stovetop unattended!** Do not allow boiling over. If you have to leave the kitchen for even a short time, turn off the stove. Never leave home while you are cooking.
- Never pick up a flaming pan!** You may be burned, or if the pan is dropped, flames may quickly spread to other more flammable areas.
- Never use water to fight a grease fire!** A violent explosion may result. Wet dishcloths or towels are also dangerous.
- Slide a tight-fitting lid or cookie sheet over the pan** to smother the flames (only if it is safe to do so). Turn off burner and wait 20 minutes before removing lid.

PARTS INCLUDED

ONE PAIR FOR EACH 4-BURNER COOKTOP
For indoor residential kitchens only. Not drawn to scale.
Contact your supplier if missing any parts.

[A] Main units, Qty. 2



[B] Wall Brackets, Qty. 2



[C] Drywall Anchors, Qty. 4



[D] #8 Wood Screws, Qty. 4



[E] Wing Nuts, Qty. 2



TOOLS NEEDED

[F] Drill/Driver



[G] Pencil



[H] 1/8" (3 mm) drill bit



[J] #2 phillips screwdriver or driver bit



LIMITED WARRANTY

WilliamsRDM, Inc. ("WRDM") warrants this StoveTop FireStop® product against defects in material or workmanship for the time periods and under the terms set forth below. Pursuant to this Limited Warranty, WRDM will, at its option, (i) repair the product using new or refurbished parts or (ii) replace the product with a new or refurbished product. For purposes of this Limited Warranty, "refurbished" means a product or part that has been returned to its original specifications. In the event of a defect, these are your exclusive remedies.

WRDM warrants to the original retail purchaser all WRDM products for a period of one (1) year against defective material and faulty workmanship. Any unit found to be defective during the warranty period will be repaired if possible, or replaced free of charge upon the buyer's prepaid return of the defective unit—only after receipt of an official Return Material Authorization (RMA) number. Proof of retail purchase is required. This warranty gives the buyer specific legal rights which may vary by state (or country).

THE FORGOING WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES WITH RESPECT TO THIS PRODUCT, INCLUDING

ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE—WHICH ARE HEREBY DISCLAIMED. THERE ARE NO IMPLIED WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY, OR TO ASSUME FOR WRDM ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR INSTALLATION OF ITS PRODUCTS. REPLACEMENT OF THE PRODUCT WILL BE THE SOLE REMEDY WITH RESPECT TO ANY LOSS OR DAMAGE TO PROPERTY. BUYER IS NOT RELYING ON SELLER'S JUDGMENT REGARDING BUYER'S PARTICULAR REQUIREMENTS AND BUYER HAS HAD AN OPPORTUNITY TO INSPECT THE PRODUCT TO BUYER'S SATISFACTION. UNAUTHORIZED SERVICE OF ANY KIND INVALIDATES ALL WARRANTY PROVISIONS.

This Limited Warranty covers only the hardware components packaged with this product. It does not cover technical assistance for hardware. Any parts or product replaced under this Limited Warranty will become the property of WRDM.

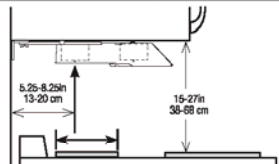
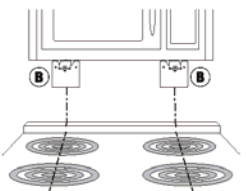
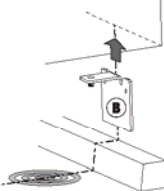
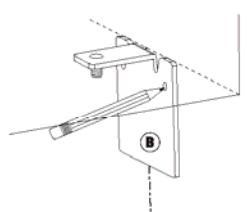
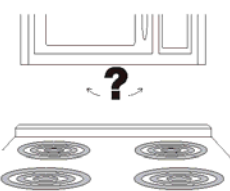
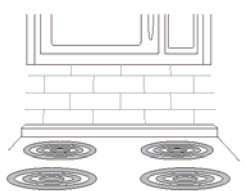
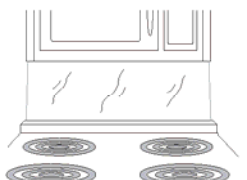
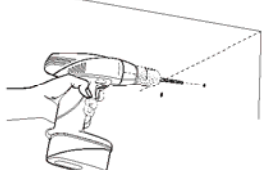
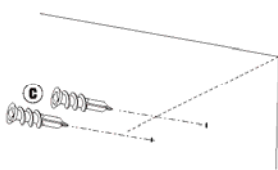
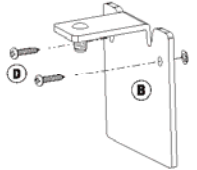
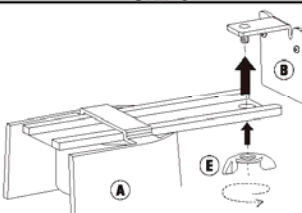

LIMITATION ON DAMAGES: WRDM SHALL NOT BE LIABLE FOR

ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO ANY SUCH DAMAGES FOR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT.

Instructions: To obtain warranty service, you must deliver the product, freight prepaid, in either its original packaging, or packaging affording an equal degree of protection, to WRDM's specified manufacturing facility.

This Limited Warranty only covers product issues caused by defects in material or workmanship during ordinary consumer use; it does not cover product issues caused by any other reason, including but not limited to product issues due to commercial use, acts of God, misuse, limitations of technology, or modification of or to any part of the WRDM product. This Limited Warranty is invalid if either the factory-applied work order number or date code has been altered or removed from the product. This Limited Warranty is valid only in the United States.

For StoveTop FireStop customer service:
go to www.STFS.com or call 1-888-616-7976.

INSTALLATION INSTRUCTIONS		
MOUNTING REQUIREMENTS  <p>Requires 15-27" (38-68 cm) of clearance. The center of the rear canister must be over the rear burner. If not, go to www.STFS.com or call 888-616-7976 to order free extension brackets.</p>	STEP 1  <p>Align wall bracket [B] with center line of burners.</p>	STEP 2  <p>Slide wall bracket up to touch bottom of microwave or cabinet.</p>
STEP 3  <p>Mark location of bracket holes with a pencil.</p>	STEP 4  <p>What is your backsplash material? If it is drywall, go to Step 5. Otherwise, go to Step 4a or 4b.</p>	STEP 4A  <p>If backsplash is tile or masonry, install a suitable screw and anchor (not included) and #8 screw. Go to Step 7.</p>
STEP 4B  <p>If backsplash is stainless steel, do not drill holes. Go to STFS.com or call 888-616-7976 to order a Microhood Adhesive Mounting Kit.</p>	STEP 5  <p>If backsplash is drywall, drill 1/8" pilot holes in the marked locations.</p>	STEP 6  <p>Install anchors [C] in the pilot holes. (Use in drywall only.)</p>
STEP 7  <p>Align bracket [B] and attach with screws [D] (or use screws suitable for your backsplash material).</p>	STEP 8  <p>Secure main unit [A] to wall bracket [B] with wing nut [E]. Do not overtighten. Installation is complete.</p>	MANUFACTURER'S INFORMATION <p>Designed for suppressing cooktop grease fires in indoor residential kitchens only.</p> <p>Products do not need to be recharged or inspected by a fire service professional.</p> <p>For storage and disposal information, or to learn more about StoveTop FireStop, please visit our website at www.STFS.com or call 1-888-616-7976.</p> <p>Designed & manufactured by WilliamsRDM, Inc., Fort Worth, TX, USA.</p> <p>williamsrdm </p>