

CONCLUSIONS

As expected, Fabrics 19 and 22 failed the 20-second flame application criteria with and without the applied fabric protectant. The fabric protectant decreased the ignition time. The fire resistant fabric, Fabric 28, met the criteria with and without the fabric protectant. However, after an extended, 30-second, flame application Fabric 28 did not self-extinguish within the 120 second limit.

Both Fabrics 19 and 22, treated with the "spray-on" fire retardant finish, passed the small open flame ignition test. However, both sprayed fabrics failed the same test after being soaked in water for 24 hours and then dried. It appears that the fire retardant spray is not durable enough to survive soaking in water.

¹ Draft Standard for Small Open Flame Ignition Resistance of Upholstered Furniture, R. Khanna, ESME, October 1997, Consumer Product Safety Commission.

² Furniture Flammability Fixture, Operational Manual, Version 1.1, Consumer Product Safety Commission, Directorate for Laboratory Sciences, June 1997.



U.S. Consumer Product Safety Commission
Washington, DC 20207

September 2000

CPSC Interlaboratory Study on Upholstered Furniture Small Open Flame Test Method

The U.S. Consumer Product Safety Commission (CPSC) sponsored an interlaboratory study of an upholstered furniture flammability test method and related test fixtures developed by the CPSC staff. This test method is being considered as part of a draft standard addressing furniture fires ignited by small open flame sources such as lighters, matches and candles.

Two CPSC staff reports on this study are attached: "Interlaboratory Study of Upholstered Furniture Fabric Flammability Draft Test Method," prepared by the CPSC Directorate for Laboratory Sciences; and "Interlaboratory Study of CPSC Draft Upholstered Furniture Small Open Flame Test Method: Statement of Precision," a statistical analysis prepared by the CPSC Directorate for Epidemiology. The overall goal of the interlaboratory study was to examine the consistency and precision of the test method, with respect to both repeatability (*within-lab* variability) and reproducibility (total *within-* and *between-lab* variability) of test results. The reports show that the method yields consistent results, with reasonable precision. The CPSC staff concludes that the method is suitable for use in the standard.

Laboratory Testing

Nine laboratories, including the CPSC Engineering Laboratory, participated in the study during 1999-2000. The other 8 labs, representing a cross section of industry, academic and government stakeholders with extensive experience in upholstery and textile flammability testing, were:

- *BASF Corporation* (a chemicals and plastics manufacturer);
- *Diversified Testing Laboratory* (an independent testing firm);
- *CMI Industries* (a textiles manufacturer);
- *California Bureau of Home Furnishings* (a state government agency that administers that state's existing upholstered furniture regulations);
- *National Institute of Standards & Technology* (the federal government's preeminent fire research and testing organization);
- *Burlington Industries, Inc.* (a textiles manufacturer);
- *Louisiana State University* (a college research lab); and
- *Akzo-Nobel Chemicals, Inc.* (a flame retardant chemicals manufacturer).

The test method focuses on the role of fabrics in the ignition of upholstered furniture. The method prescribes the application of a small butane flame to pre-conditioned, composite test specimens (or "mockups") representing the seating area and dust cover of an upholstered chair or sofa. For the interlaboratory study, the CPSC staff selected five upholstery fabrics and two dust cover fabrics, representing a variety of materials found in the market and a range of expected small open flame ignition resistance. The staff also devised a scheme of randomized "blocks" of test fabric samples to ensure that the tested materials provided to each lab were as uniform as possible. Under the study design, each of the 9 participating labs conducted 3 tests on each of 10 specimens of each of the 5 seating area fabrics,

plus 10 tests on each of the 2 dust cover materials, for a total of $9 \times 3 \times 10 \times 5 = 1,350$ seating area tests and $9 \times 10 \times 2 = 180$ dust cover tests.

Some of the seating area test fabrics were flame retardant (FR) treated. It is important to note that *the interlaboratory study was not intended to establish the technical feasibility of specific flame retardant treatments. In fact, one of the fabrics used in the study was selected for its inconsistent performance in previous tests.*

The test data showed consistent results overall, within and between laboratories. For the seating area tests, the fabric expected to "fail" the test did so in all labs in all tests. The fabrics expected to "pass" the test did so in over 96% of all tests. The fabrics expected to yield mixed results (due to their inherent ignition performance variability) exhibited the expected inconsistency. The dust cover test results were identical for 8 of the labs (combustion time data from the ninth lab were incorrectly reported such that conclusions could not be drawn, although the tests appeared to have been done properly).

Statistical Analysis

The CPSC staff analyzed the distribution and variability of mean combustion times and pass/fail results for the seating area test data (since the dust cover tests yielded identical results in all tests in all labs, there was no observed variability to examine). The analysis was performed in accordance with ASTM E691-92, *Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method*, ASTM E177-90a, *Standard Practice for the Use of the Terms Precision and Bias in ASTM Test Methods*, and published methods for analyzing binomial test data.

Consistency statistics were computed for each combination of the 5 tested seating fabrics and 9 laboratories to measure the relationship between the test results for each fabric or laboratory and the results for all laboratories. The within-lab consistency statistics were below their acceptable maximum at the 0.5% significance level, with the exception of one (wool) fabric in one laboratory (due to a few failures that appear to have been caused by an incorrectly positioned test fixture). The between-lab consistency statistics all fell within their acceptable range at the 0.5% significance level. The analysis concludes that the laboratories exhibited consistent means and variances.

Precision statistics for repeatability and reproducibility were computed for each fabric in all labs to measure the degree to which similar test results may be obtained under similar conditions. Significant combustion time variation was shown for 2 of the 5 test fabrics; this was expected due to the inherent variability of the physical characteristics of those 2 fabrics (cotton/rayon blends selected for their mixed results in prior testing). The greatest proportional variation occurred, as expected, among fabrics with the shortest average combustion times; thus, this variation had the least effect on whether a fabric would pass or fail the test. The pass/fail data exhibited very little variability for fabrics with low or high expected failure rates. For both continuous combustion time and pass/fail data, reproducibility standard deviations were only slightly larger than repeatability standard deviations, indicating little between-lab variation.

The interlaboratory study shows that the CPSC staff's draft test method yields consistent results within and between laboratories, and that repeatability and reproducibility statistics for pass/fail data indicate acceptably low dispersion. The staff concludes that the method is acceptable for use in determining pass/fail performance in the draft small open flame standard.



United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: September 28, 2000

TO : Dale Ray, Directorate for Economic Analysis
Project Manager, Upholstered Furniture

Through : Andrew G. Stadnik, Associate Executive Director *Andrew G. Stadnik*
Directorate of Laboratory Sciences
Warren Porter, Division Director, Division of Chemistry (LSC), *WPH*
Directorate of Laboratory Sciences

FROM : David Cobb, Division of Chemistry, LSC *David Cobb*

SUBJECT : Interlaboratory Study of Upholstered Furniture Fabric Flammability Draft
Test Method

BACKGROUND

This memorandum describes the interlaboratory study conducted in Fiscal Year (FY) 2000 for the U.S. Consumer Product Safety Commission's (CPSC) upholstered furniture project to evaluate the repeatability and reproducibility of test results obtained using the CPSC staff's draft flammability test method and associated test fixtures. As part of the upholstered furniture project, in FY 1998 the CPSC staff developed a test method for determining the fire resistance of upholstered furniture when it is exposed to small open flame sources. The test method involves the application of a butane flame to mockups representing the seating area and dust cover. The butane flame is applied by means of test fixtures that automatically control the placement of the flame and application time. Two separate types of test fixtures were developed, one for testing the seating area, the second for testing dust covers. The test method is contained in attachment (A). The test method is similar in concept to the test method used in British Standard (BS) 5852: "Fire Tests for Furniture, Part 1, British Standards Institute - 1982."

In FY 2000 nine laboratories participated in an interlaboratory study of the CPSC staff's draft test method. Test fixtures and mockup frames built by CPSC staff were shipped to the participants along with fabric samples and foam. The list of participating labs is contained in attachment (B), and the interlaboratory data sheets are contained in attachment (C).

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SUMMARY OF TEST METHOD

As discussed in detail in attachment A, the test method involves applying a 35 millimeter(mm) flame for 20 seconds to prepared mockups using the appropriate test fixture. After the burner is removed from the mockup, test personnel observe and measure times for afterflame, afterglow, and smolder. The individual times for these events are recorded along with combustion time which is the summation of the three events. Tests are stopped when flames reach the top or edge of the mockup, or the combustion time reaches 120 seconds.

The conditioning requirements used in the interlaboratory study were slightly different from reference (a). The conditioning temperature used was expanded from $25\pm 2^{\circ}\text{C}$ to $25\pm 3^{\circ}\text{C}$. The change in conditioning temperature was requested by one the participants. The procedure used in the interlaboratory study also differed from reference (a) as follows:

1. The water soak procedure was not used. The intent of the water soak procedure is to remove any nondurable fire retardant finishes. There has been some concern that ions found in tap water may affect flammability test results, so it was decided that the water soak procedure would not be used during the interlab study.
2. Three burn tests were done on a seating area mockup instead of one. This was done so that more data could be obtained for statistical analysis.
3. *Flaming reaching the top of the mockup was clarified to mean the material at the top of the mockup was flaming.*

DESCRIPTION OF INTERLABORATORY TEST PROTOCOL

This section describes the protocol used in the interlaboratory study to evaluate the repeatability of the test method and test fixtures. The series of tests that each lab was required to perform is described along with the rationale for the scope of the tests. One of the major goals of the interlaboratory test program was assess how consistent the results would be between various test facilities. To evaluate the effectiveness of the draft test method and fixtures, CPSC staff obtained a variety of upholstery fabrics and dust covers that represented the spectrum of fabrics found in the market. Five upholstery fabrics were selected on the basis of preliminary screening tests conducted by the CPSC staff on nine typical upholstered furniture fabrics. The fabrics selected represent a range of resistance to ignition from a small open flame source. Two dust cover selected fabrics were also selected for the interlaboratory study. The two types of dust cover fabrics make up the vast majority of the market. Descriptions of the fabrics are listed in Table 1.

Table 1. Description of Fabrics

Designation	Fabric Description	Expected resistance towards ignition
B	100% wool	Good
E	cotton/polyester/rayon, backcoated with flame retardant (FR)	Good
D	cotton/rayon	Mixed
I	cotton/rayon, backcoated with FR	Mixed
F	cotton/polyester/rayon	Poor
Dustcover A	Cotton/polyester	Poor
Dustcover B	Olefin	Good

The Division of Hazard Analysis in the Directorate of Epidemiology (EPHA) developed a randomized sampling plan for cutting the fabrics into block and specimen units, and for assigning the units to the participating labs. Ten specimens of each fabric type were tested by each participant. Three burn tests per specimen were conducted on the upholstery fabric, and one burn test per specimen was conducted on the dust cover fabrics. A total of 30 burn tests were conducted by each lab for each upholstery fabric type, and a total of 10 burn tests were conducted by each lab for each dust cover fabric type. Thus, 270 upholstery fabric tests were conducted for each fabric type by all the labs combined, and 90 dust cover tests were conducted for each dust cover type by all the labs combined

The nine participants, hereafter referred to as Laboratories 1-9, are identified in attachment B. The labs represented industry, government, and academic organizations. Participants were invited to the CPSC's laboratory in Gaithersburg, MD for a training course on the test method prior to the start of the interlaboratory study. Six of the nine laboratories participated in this training. The CPSC staff also provided on-site training for all 9 participants to ensure that each lab had all test equipment and samples, and the test equipment was set up properly. Training on performing tests and recording data in accordance with the test method using practice fabrics was also conducted during these on-site visits.

CPSC built five dust cover and five seating area test fixtures. The test fixtures were identified by a numbers, #1-5. Each fixture was sent to at least one lab. Photographs of the fixtures are included in attachment D.

Each laboratory was provided with the test method, instructions, and data sheets for recording the results. The laboratories were also provided with pre-cut samples to be tested, pre-cut foam, test fixtures, mockup frames, and burner tubes. Each laboratory was required to provide the butane gas, cylinder regulator, fire extinguishers, stopwatch and video camera used during the testing. At the conclusion of the testing, the labs were asked to return to CPSC all test fixtures and equipment, along with the completed data sheets and video recordings of the testing.

The laboratories were asked to record the following information on the data sheets: afterflame time, afterglow time, smolder time, combustion time, date tested, temperature and humidity of the conditioning room, temperature and humidity of the test room, flame height, gas pressure, and gas flowrate.

INTERLABORATORY TEST PROGRAM RESULTS

None of the labs reported problems with building the mockups and operating the test fixtures. Two test fixtures failed to work properly during the interlab study. Seat Cover Fixture #2 failed at both of the labs where it was sent, and Dust Cover Fixture #1 failed at one of the labs where it was sent. Replacement test fixtures were sent to those labs, and the laboratories completed the testing without any problems being reported. One other test fixture, Seat Cover Fixture #1 failed to retract during 2 burn tests while at laboratory 4. Data for those 2 burn tests could not be obtained, but the test fixture operated properly during all the other tests at laboratory 4, and previous to that it operated without any problems being reported at laboratory 1.

All labs except for laboratory 7, filled in the required data correctly on the provided data sheets. Laboratory 7 did not record all the required data, and much of what was reported was done incorrectly. Laboratory 7 did not record temperatures and humidity readings of the test room and conditioning room. Flame height, gas pressure, and gas flow rates were also not recorded. Measurement times for afterflame, afterglow, smolder, and combustion were not always placed in the appropriate columns. Although there were reporting errors by laboratory 7 in filling out the data sheets, these errors could be corrected. The tests appear to have been performed properly, and results of the upholstery fabric testing by laboratory 7 were not affected. Therefore, laboratory 7's seating area results were not deleted from the study. The dust cover results, however, were reported improperly such that the actual result could not be determined. All afterflame test results for the dust covers were recorded as < 20. These reports could not be compared with the combustion time reports from the other laboratories. Therefore, the dust cover results from laboratory 7 could not be included in the assessment of the test method and dust cover fixture.

CPSC did not receive any comments or complaints about the ease of using the test fixtures to perform the tests from the participating laboratories after the interlaboratory study was completed. During the training sessions at CPSC and the on site visits, test personnel demonstrated their ability to build the mockups and operate the test fixtures properly.

DISCUSSION OF RESULTS

The overall results from all the labs appear to be consistent. The fabric expected to fail, fabric F, failed in all labs for all the burn tests. The two fabrics expected to be borderline, fabrics D and I, produced mixed results in all the labs. Fabric D failed 88 tests by afterflame, 1 test by smolder, and passed 180 tests. Fabric I failed 141 tests by afterglow, 28 tests by smolder, and passed 100. The fabrics expected to pass, fabrics B and E, passed over 96% of the burn tests. Table 2 summarizes the results. The results for dust cover testing are identical for 8 of the labs. The results of laboratory 7 may be similar, but conclusions can not be drawn from the data submitted.

Table 2. Results Summary

FABRIC	AT LEAST 1 FAIL	# OF FAILED BURN TESTS
E - pass	4 of 9 labs	4/270(3 glow, 1 smoke)
B - pass	5 of 9 labs	9/270 (9 flame)
D - borderline	9 of 9 labs	89/269 (88 flame, 1 smoke)
I - borderline	9 of 9 labs	169/269(141 glow, 28 smoke)
F - fail	9 of 9 labs	270/270 (flame)

- Fabric D and I had 269 total tests because test fixture failed to retract during 2 tests at lab 4

Fabric E, which passed preliminary screening tests and was thought to be a fabric that would pass the testing, failed one burn test in 4 of 9 labs. It failed 4 of the 270 total tests completed by the interlaboratory participants. Three of the failures were by afterglow at the 120 second point during the test. One failure was by afterflame. All four of the failures were on separate specimens.

Fabric B, which passed preliminary screening tests and was thought to be a fabric that would pass the testing, failed at least one burn test in 5 of 9 labs. It failed 9 of the 270 total tests completed by the interlaboratory participants. All nine of the failures were by afterflame time reaching 120 seconds or flames reaching top of the mockup. Three of the failures occurred at laboratory 7, and two of those failures were on the same specimen. Six of the failures occurred on the first test of the specimen. The operation of the test fixture may have been involved. The first test is conducted on the end farthest away from the fixture arm, and is the most difficult to align. The video recordings of some of the tests showed the burner tube going slightly deeper than normal into the seat crevice. Once the burner flame penetrated the fabric, the foam quickly caught fire and flames reached the top of the mockup.

Fabric D had mixed results during the preliminary screening tests and was thought to be a borderline fabric, passing some tests and failing others. Results of the interlaboratory study indicated this fabric failed at least once in 9 of 9 labs. It failed 89 of the 269 total tests completed. It failed 88 times due to afterflame reaching 120 seconds or flames reaching the top of the mockup. It failed once when smolder was still present at 120 seconds during the test. During one burn test the test fixture failed to retract so the total tests completed were 269 instead of 270.

Fabric I had mixed results during the preliminary screening tests and was thought to be a borderline fabric, passing some tests and failing others. Results of the interlaboratory study indicated this fabric failed at least once in 9 of 9 labs. It failed 169 of the 269 total tests completed. All of the failures were due to afterglow or smolder being present at the 120 second point during the test. During one burn test the test fixture failed to retract so the total tests completed were 269 instead of 270.

Fabric F failed the preliminary screening tests. It failed in 9 of 9 labs. It failed all 270 tests. All failures were due to afterflame reaching 120 seconds or flames reaching the top of the mockup.

Dust Cover A was expected to fail based on previous testing conducted at CPSC. It failed in 8 labs in 80 of 80 tests. All failures were the result of the dust covers completely

burning to the edge of the frame typically before the 20 flame application time was completed. Results for one lab were recorded incorrectly and the meaning was unclear.

Dust Cover B was expected to pass based on previous testing conducted at CPSC. It passed in 8 labs in 80 of 80 tests. As noted results for one lab were recorded incorrectly and could not be used.

CONCLUSIONS:

To assess the degree of reproducibility, a separate statistical analysis is being conducted by EPHA. Generally all laboratories were able to repeat the tests and obtain what appear to be reproducible results using the draft method and test fixtures.

Attachment (A)

UPHOLSTERED FURNITURE FLAMMABILITY DRAFT SMALL OPEN FLAME TEST METHOD

1. Purpose

This draft test method prescribes requirements for testing small open flame ignition resistance of upholstered furniture that will be followed during the Interlaboratory Study. The flammability test method measures the ability of upholstered furniture to resist ignition when subjected to a small open flame source (e.g. match, candle, or lighter).

2. Definitions

Afterflame – The production of a visible flame after the ignition source has been removed.

Afterglow – The observation that a material continues to glow after the ignition source has been removed, and after cessation of flaming of the material.

Combustion – An exothermic, self sustaining reaction in which hydrocarbon materials react with oxygen to form carbon dioxide and water vapor. Depending on the nature of the hydrocarbon material and the amount of oxygen present, other gases such as carbon monoxide may also be formed during combustion. It can occur through flaming, glowing, or smoldering.

Cover Fabric – The outermost layer of fabric or related material used to enclose the main support system and upholstery filling used in the furniture item.

Dust Cover – The outermost layer of non-structural material on the underside of the finished item of upholstered furniture.

Glow – Combustion characterized by incandescence, without visible flame.

Ignition – Initiation of combustion. It is perceived by the presence of any visible flaming, glowing, or smoldering after removal of the test flame.

Seating Area – The vertical and horizontal surfaces of upholstered furniture that are intended for seating purposes.

Seat Base – The horizontal surface of the seating area.

Seat Back – The vertical surface of the seating area.

Self-Extinguishment – The spontaneous termination of any visible sign of combustion, which include flames, glowing, and smoldering.

Small Open-Flame – A flaming ignition source that simulates the heat output of a match, candle, or lighter.

Smolder – Combustion characterized by smoke production, without visible flame or glowing.

Specimen – A specific portion of a material or a laboratory sample upon which a test is performed.

Upholstered Furniture – A unit of interior furnishing with a resilient surface covered in whole or part with fabric or related material that is intended for use or may be expected to be used in homes, and is intended or promoted for sitting or reclining upon.

3. General Requirements

- (a) *Summary of test method.* The test method measures the ability of upholstered furniture to resist ignition when subjected to a small open flame source. The surfaces to be tested are the seat/back or side intersection of the seating area and the dust cover. Materials used in

upholstered furniture seating area construction are to be tested on a small scale mock-up consisting of the test fabric and a standard polyurethane foam. Dust covers are also tested on small scale mock-ups.

- (b) **Data collection.** After flame time, after glow time, smolder time, and the time at which all forms of combustion cease is recorded. If the specimen does not ignite, or if it fails to self extinguish that is also recorded.

4. Test Apparatus and Materials

- (a) **Specimen Holders and Frame:** The specimen holders consist of metal frames used to mount the test specimens in the test fixture.

Specimen Holder and Mock-up Frame Dimensions

Test Location	Length	Width
	Max/Min	Max/Min
Seating Area Back Frame	11.9 in (302 mm)	17.8 in (452 mm)
	11.7 in (297 mm)	17.6 in (447 mm)
Seating Area Base Frame	6.0 in (152 mm)	17.8 in (452 mm)
	5.8 in (147 mm)	17.6 in (447 mm)
Dust Cover	10.1 in (257 mm)	10.1 in (257 mm)
	9.9 in (251 mm)	9.9 in (251 mm)

- (b) **Seating Area Mock-up:** The test frame consists of two rectangular frames locked at a right angle to each other. The frames shall be made of 1 in. x 1 in. (25 mm x 25 mm) steel angle 1/8 in. (3 mm) thick, and shall securely hold platforms of steel mesh set 0.25 ± 0.05 in. (6 ± 1 mm) below the front face of each test frame.
- (c) **Clips:** Clips are used to secure the specimens to the holders. The clips supplied are manufactured by Hunt, and are No. 2 Clips, 2 1/4 inch long.
- (d) **Gas:** The gas shall be butane, C.P. Grade, 99.0 % purity.
- (e) **Burner:** Two stainless steel burner tubes, one 24 inches long used for seating area test, the second 6 inches long used for the dust cover test. Both tubes have the following dimensions
 Inside Diameter 0.237 ± 0.002 in. (6.02 ± 0.05 mm)
 Outside Diameter 0.312 ± 0.005 in. (7.92 ± 0.12 mm)
- (f) **Gas Supply System:** Consists of a pressure gage, flowmeter, fine control valve, and cylinder regulator providing an outlet pressure of 2.75 kPa (0.4 psi). The flowmeter shall be calibrated to supply the butane gas at 45 ± 2 ml/min (2.75 in³/min) at 25° C (77°F). Under the above conditions, the burner should produce a flame approximately 35 mm (1.4 in.) in height.
- (g) **Gas Flow Controls:** It is essential that the gas flow rate to the burner and the flame height are as specified. Some difficulties have been reported with the supply and measurement of the gas, particularly where the gas cylinder has to be stored in an environment cooler than the specified test conditions and/or some distance from the test specimen. The gas cylinder should be stored near the test specimen and at the same room temperature as the test room.
- (h) **Furniture Flammability Test Fixture (FFF):** Device used to place flame on fabric samples. CPSC will provide for interlaboratory study. The device was developed to provide an automated test apparatus capable of delivering the test flame to the specimen in a repeatable and reproducible manner. The major components of the test fixture are the actuator, mock-up assembly, and the control box.

- (i) Foam: Two pieces, the seat back foam 18.0 ± 0.2 in (458 ± 5 mm) x 12.0 ± 0.2 in (303 ± 5 mm) x 3.0 ± 0.2 in (76 ± 5 mm), and the seat base foam 18.0 ± 0.2 in (458 ± 5 mm) x 3.25 ± 0.2 in (83 ± 5 mm) x 3.0 ± 0.2 in (76 ± 5 mm) are required for each test. The foam shall be polyether type non-FR polyurethane with a density of 1.5 to 1.8 lb/ft³ and firmness of 25-30 pounds (lbf) or IFD.
- (j) Cover Fabric: The cover fabric needed for each specimen is 40 in (1016 mm) x 27 ½ in (699 mm). The cover fabric specimens shall have triangular cut-outs 22 ½ in (572 mm) from one end on both sides. The size of these cut-outs shall be approximately 2 in (55 mm) x 5 ¼ in (140 mm) high.
- (k) Dust Cover Materials: The dust cover material size needed for each test is 12 in x 12 in (305 mm).
- (l) Stopwatch: Used to measure time until self extinguishment.
- (m) Videocamera: Used to record testing.
- (n) Carbon Dioxide Fire Extinguisher: Used to extinguish ignitions that continue at end of test or burn to any edge of the mock-up.

5. Safety

- (a) Flammability testing can result in a large generation of heat and other products of combustion. Extreme caution is necessary. The potential hazards that can result from performing this test include: fire, and the production of toxic fumes from the combustion of the fabric materials.
- (b) Ensure means of extinguishing fires are close at hand before conducting this test. Test specimens should be extinguished with CO₂ fire extinguisher.
- (c) Test shall be conducted where there is adequate ventilation available to remove potential toxic fumes. A self contained breathing apparatus should be provided.

6. Criteria for Conditioning and Testing

- (a) Test Enclosure: The test enclosure shall consist of a room with a volume greater than 20 m³ (706 ft³), which contains adequate air for testing. If a smaller enclosure is used, it must have adequate airflow for combustion testing. Inlet and extraction systems shall provide an air flow of less than 0.2 m/s (0.66 ft/s) in the proximity of the test specimen to provide adequate air without disturbing burning behavior.
- (b) Conditioning: The specimens to be tested shall be conditioned for at least 24 hours immediately before the tests in the following atmosphere:
 - Temperature: $25 \pm 4^{\circ}$ C ($77 \pm 8^{\circ}$ F)
 - Relative Humidity: 40-55 %
- (c) Testing Initiation: The test shall be performed in an atmosphere having a temperature between 10°-30°C (50°-86°F) and a relative humidity between 20% to 70%. If the test room does not meet the condition of paragraph 6b, then testing shall be initiated within 10 minutes after the specimens are removed from the conditioning room. Otherwise the specimen must be reconditioned.

7 Test Sample Preparation

- (a) Seating Area Samples: The sample materials should be removed from any packaging prior

to conditioning. The test materials shall be the cover fabric and standard polyurethane foam as the filling material. Preparation of the seating area mock-up is described below. A seating area sample consists of ten specimens.

- (1) Position seat mock-up in the upright position. Insert the larger 22.5 in. dimension of the fabric from the front of the mock-up and under the rod. Refer to step 1 of photographs.
 - (2) Bring the larger, 22.5 inch dimension of fabric back over the rod and under seat back of mock-up. Refer to step 2 of photographs. The fabric specimen should be placed such that the apex of the triangular cutout is on the back side of the hinged rod. Both ends shall be pulled taut and laid across the horizontal seating surface (seat base).
 - (3) Place seat back foam against the vertical back of mock-up and on top of the fabric lying over the horizontal seat. Refer to step 3 of photographs.
 - (4) Lift the top layer of fabric, draw it over the foam and clip to the top rail of the seat back. Refer to step 4 of photographs.
 - (5) Pull the side flaps of fabric taut and clip to the side frames of the vertical seat back. Refer to step 5 of photographs.
 - (6) Place mock-up such that seat back is horizontal. Lift the seat base cover fabric, and drape over the seat back. Refer to step 6 of photographs.
 - (7) Place the seat base foam flush against seat base. Ensure that the wider, 3.25 inch dimension is parallel with the seat base. Refer to step 7 of photographs.
 - (8) Draw seat base fabric over the seat base foam, pull taut and clip to the front seat frame. Refer to step 8 of photographs.
 - (9) Pull fabric taut to eliminate air pockets between fabric and foam, but do not create a gap larger than 1/8" along the crevice. Clip the side flaps to the frame for the seat base and seat back. Ensure that the fabric is secured and under even tension. Refer to step 9 of photographs.
- (b) Dust Cover Material Sample: The dust cover materials should be removed from any packaging prior to conditioning. One specimen shall be used for each dust cover test. A test sample consists of ten specimens. Secure dust cover specimen with metal clips in the holder to avoid wrinkles in the fabric. Pull specimen taut around the edges to avoid any dipping or sagging.

8. Seating Area Test Procedure

- (a) Sample Positioning: Install the seat mock-up on the test fixture rails, align and adjust such that the horizontal burner tube rests uniformly along the vertical and horizontal intersection of the crevice.
- (b) Ignition Source: Light the gas emerging from the 24 in burner tube, set the outlet pressure to 2.75 kPa (0.4 psi), adjust the gas flow rate to 45 ± 2 ml/min, and allow the flame to stabilize before starting any tests. After the flame has stabilized, ensure that the flame height is approximately 35 mm (1.4 in.). Between tests the burner flame is put out to allow for sample positioning. Once the sample position is aligned, light the gas emerging from the burner tube and allow 2 minutes for the flame to stabilize before recommencing testing.
- (c) Application: Actuate the Furniture Flammability Fixture (FFF) to apply the lit burner tube axially along the crevice between the seat and back for 20 seconds. The flame must be at least 2.0 in (50 mm) from the nearest side edge and from any marks left by previous tests.

- (d) **Measurement:** After the burner is removed from the test sample at 20 seconds, use a stopwatch to measure how much time it takes for all signs of combustion (afterflame, afterglow, and smoldering) to cease. Record observations and burn times on the data sheet. If the burner goes out before 20 seconds, the test should be considered invalid, and the test repeated on a different part of the test specimen following procedure in 8(c).
- (e) Stop the test if the flames reach the top of the mockup within 120 seconds or if any burning (flames, flowing, smoldering) is present after 120 seconds. (Use carbon dioxide fire extinguisher) If a sample fails to self-extinguish, record times with a ">" in the appropriate column on the data sheet.
- (f) If no ignition occurs after the burner is removed, record "0" in the appropriate spaces on the data sheet.
- (g) Repeat the test until the burner has been placed in the seat back crevice junction a total of 3 times. If burn area from test is extensive, and specimen cannot be tested 3 times, perform as many tests as possible.
- (h) Repeat seat area test on the remaining nine specimens.

9. Dust Cover Test Procedure

- (a) **Sample Positioning:** Place the specimen horizontally in its holder in the FFF and adjust the burner tube by placing the 35 mm flame gage on the tube until the tip of the gages touches the center of the dust cover specimen.
- (b) **Ignition Source:** Light the gas emerging from the shorter 6 in (152 mm) burner tube, adjust the gas flow rate to 45 ± 2 ml/min, and allow the flame to stabilize for at least 2 minutes. Ensure that the flame height is approximately 35 mm (1.4 in.).
- (c) **Application:** Actuate the Furniture Flammability Fixture (FFF) to apply the lit burner flame at the bottom center of the specimen for 20 seconds.
- (d) **Measurement:** After the burner is removed from the test sample at 20 seconds, use a stopwatch to measure how much time it takes for all signs of combustion (afterflame, afterglow, and smoldering) to cease. Record observations and burn times on the data sheet.
- (e) Stop the test if any burning (flames, glowing, smoldering) is present after 120 seconds. (Use carbon dioxide fire extinguisher). If a sample fails to self-extinguish, record times with a ">" in the appropriate column on the data sheet.
- (f) If no ignition occurs after the burner is removed, record "0" in the appropriate space on the data sheet
- (g) Only one test per specimen is performed. Repeat dust cover test on the remaining nine specimens.

Attachment (B)
INTERLAB PARTICIPANTS

LAB DESIGNATION	NAME OF PARTICIPATING LABORATORY	AFFILIATION
1	BASF Corporation	SPI
2	Diversified Testing Laboratory	AFMA
3	CMI Industries	ATMI
4	State of California, Bureau of Home Furnishings and Thermal Insulation	Government
5	US Consumer Product Safety Con CPSC)	Government
6	National Institute of Standards and Technology (NIST)	Government
7	Burlington	ATMI
8	Louisiana State University, School of Human Ecology	Academic
9	AKZO NOBEL	FRCA

SPI = Society of the Plastics Industry

AFMA = American Furniture Manufacturers Association

ATMI = American Textile Manufacturers Institute

FRCA = Fire Retardant Chemical Association

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #1 _____

Apparatus ID SEAT FIXTURE #5 _____

Start Date 11/08/99 End Date 11/08/99

Conditioning Room Conditions:

Temperature _____
Humidity _____

Test Room Conditions:

Temperature _____
Humidity _____
Barometric Pressure _____

Flame Ht _____ Gas Pressure _____ Gas Flowrate _____

Practice Trials

Tests were done when CPSC rep on site, results were not sent

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1								
P2								
P3								
P4								
P5								

Laboratory 1

Critical Trials

Start Date 11/10/99 End Date 11/10/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 50%

Test Room Conditions:

Temperature 76°F
Humidity 24%
Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig Gas Flowrate 45 ml/min

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	1	8	3	5	3	11	
2	D	1	8	2	0	4	6	
3	D	1	8	3	0	3	6	
4	D	2	2	1	0	5	6	
5	D	2	2	3	0	7	10	
6	D	2	2	>120	---	---	>120	
7	D	3	3	2	0	5	7	
8	D	3	3	>120	---	---	>120	
9	D	3	3	2	0	4	6	
10	D	4	1	3	0	9	12	
11	D	4	1	3	0	7	10	
12	D	4	1	>120	---	---	>120	
13	D	5	7	4	6	3	13	
14	D	5	7	2	0	6	8	
15	D	5	7	6	0	7	13	
16	D	6	4	3	0	5	8	
17	D	6	4	1	0	4	5	
18	D	6	4	>120	---	---	>120	
19	D	7	10	0	0	7	7	
20	D	7	10	>120	---	---	>120	
21	D	7	10	1	0	4	5	
22	D	8	6	1	0	3	4	
23	D	8	6	2	0	6	8	
24	D	8	6	0	4	2	6	
25	D	9	9	0	0	2	2	
26	D	9	9	0	0	2	2	
27	D	9	9	0	0	4	4	
28	D	10	5	>120	---	---	>120	
29	D	10	5	1	0	4	5	
30	D	10	5	3	2	4	9	

Laboratory 1

Critical Trials

Start Date 11/11/99 End Date 11/11/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 50%

Test Room Conditions:

Temperature 71°F
Humidity 23%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	1	8	33	>87	---	>120	
32	I	1	8	24	0	14	38	
33	I	1	8	4	16	4	24	
34	I	2	2	34	>86	---	>120	
35	I	2	2	36	>84	---	>120	
36	I	2	2	3	5	3	11	
37	I	3	3	46	>74	---	>120	
38	I	3	3	25	>95	---	>120	
39	I	3	3	2	0	3	5	
40	I	4	1	1	1	2	4	
41	I	4	1	38	>82	---	>120	
42	I	4	1	31	>89	---	>120	
43	I	5	7	3	5	2	10	
44	I	5	7	24	>96	---	>120	
45	I	5	7	6	15	15	36	
46	I	6	4	12	0	6	18	
47	I	6	4	28	>92	---	>120	
48	I	6	4	4	2	7	13	
49	I	7	10	22	0	7	29	
50	I	7	10	5	0	2	7	
51	I	7	10	36	0	14	50	
52	I	8	6	33	>87	---	>120	
53	I	8	6	3	16	1	20	
54	I	8	6	23	>97	---	>120	
55	I	9	9	25	>95	---	>120	
56	I	9	9	26	>94	---	>120	
57	I	9	9	31	>89	---	>120	
58	I	10	5	26	>94	---	>120	
59	I	10	5	0	15	1	16	
60	I	10	5	24	>96	---	>120	

Laboratory 1

Critical Trials

Start Date 11/15/99 End Date 11/15/99

Conditioning Room Conditions:

Temperature 72°F

Humidity 50%

Test Room Conditions:

Temperature 71°F

Humidity 22%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	1	8	0	0	6	6	
62	B	1	8	0	0	6	6	
63	B	1	8	0	0	6	6	
64	B	2	2	0	0	5	5	
65	B	2	2	0	0	6	6	
66	B	2	2	0	0	6	6	
67	B	3	3	0	0	5	5	
68	B	3	3	0	0	7	7	
69	B	3	3	0	0	7	7	
70	B	4	1	0	0	7	7	
71	B	4	1	0	0	6	6	
72	B	4	1	0	0	6	6	
73	B	5	7	0	0	5	5	
74	B	5	7	0	0	5	5	
75	B	5	7	0	0	5	5	
76	B	6	4	0	0	5	5	
77	B	6	4	1	0	5	6	
78	B	6	4	2	0	4	6	
79	B	7	10	0	0	6	6	
80	B	7	10	0	0	5	5	
81	B	7	10	0	0	4	4	
82	B	8	6	0	0	4	4	
83	B	8	6	1	0	3	4	
84	B	8	6	0	0	5	5	
85	B	9	9	0	0	4	4	
86	B	9	9	0	0	6	6	
87	B	9	9	0	0	6	6	
88	B	10	5	0	0	5	5	
89	B	10	5	0	0	5	5	
90	B	10	5	0	0	5	5	

Laboratory 1

Critical Trials

Start Date 11/16/99 End Date 11/17/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 50%

Test Room Conditions:

Temperature 69°F/67°F
Humidity 17%/11%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4 psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	1	8	>13	---	---	>13	*
92	F	1	8	>13	---	---	>13	*
93	F	1	8	>15	---	---	>15	*
94	F	2	2	>14	---	---	>14	*
95	F	2	2	>17	---	---	>17	*
96	F	2	2	>19	---	---	>19	*
97	F	3	3	>17	---	---	>17	*
98	F	3	3	>19	---	---	>19	*
99	F	3	3	>14	---	---	>14	*
100	F	4	1	>14	---	---	>14	*
101	F	4	1	>19	---	---	>19	*
102	F	4	1	>20	---	---	>20	*
103	F	5	7	>16	---	---	>16	*
104	F	5	7	>14	---	---	>14	*
105	F	5	7	>16	---	---	>16	*
106	F	6	4	>12	---	---	>12	*
107	F	6	4	>19	---	---	>19	*
108	F	6	4	>13	---	---	>13	*
109	F	7	10	>17	---	---	>17	*
110	F	7	10	>20	---	---	>20	*
111	F	7	10	>20	---	---	>20	*
112	F	8	6	>11	---	---	>11	*
113	F	8	6	>16	---	---	>16	*
114	F	8	6	>14	---	---	>14	*
115	F	9	9	>14	---	---	>14	*
116	F	9	9	>21	---	---	>21	*
117	F	9	9	>18	---	---	>18	*
118	F	10	5	>17	---	---	>17	*
119	F	10	5	>19	---	---	>19	*
120	F	10	5	>17	---	---	>17	*

* respirator need for this fabric

Laboratory 1

Critical Trials

Start Date 11/18/99 End Date 11/19/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 50%

Test Room Conditions:

Temperature 66°F/71°F
Humidity 24%/26%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	1	8	1	0	14	15	
122	E	1	8	2	0	17	19	
123	E	1	8	1	0	16	17	
124	E	2	2	8	33	3	44	
125	E	2	2	1	0	16	17	
126	E	2	2	1	0	20	21	
127	E	3	3	1	0	16	17	
128	E	3	3	8	0	9	17	
129	E	3	3	8	0	8	16	
130	E	4	1	12	>108	---	>120	
131	E	4	1	0	0	10	10	
132	E	4	1	1	0	11	12	
133	E	5	7	1	0	11	12	
134	E	5	7	10	0	7	17	
135	E	5	7	1	0	12	13	
136	E	6	4	1	0	12	13	
137	E	6	4	1	0	13	14	
138	E	6	4	1	0	11	12	
139	E	7	10	3	0	16	19	
140	E	7	10	1	0	14	15	
141	E	7	10	1	0	13	14	
142	E	8	6	1	0	15	16	
143	E	8	6	1	0	15	16	
144	E	8	6	1	0	12	13	
145	E	9	9	1	0	12	13	
146	E	9	9	1	0	17	18	
147	E	9	9	4	0	12	16	
148	E	10	5	0	0	18	18	
149	E	10	5	0	0	14	14	
150	E	10	5	1	0	16	17	

Laboratory 1

Critical Trials Dust Covers

Start Date 11/23/99 End Date 11/24/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 50%

Test Room Conditions:

Temperature 75°F
Humidity 44%
Barometric Pressure _____

Flame Ht. 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	1	8	>4	---	---	---	*
152	A	2	2	---	---	---	---	*
153	A	3	3	---	---	---	---	*
154	A	4	1	---	---	---	---	*
155	A	5	7	---	---	---	---	*
156	A	6	4	---	---	---	---	*
157	A	7	10	---	---	---	---	*
158	A	8	6	---	---	---	---	*
159	A	9	9	---	---	---	---	*
160	A	10	5	---	---	---	---	*
161	B	1	8	0	0	0	0	
162	B	2	2	0	0	0	0	
163	B	3	3	0	0	0	0	
164	B	4	1	0	0	0	0	
165	B	5	7	0	0	0	0	
166	B	6	4	0	0	0	0	
167	B	7	10	0	0	0	0	
168	B	8	6	0	0	0	0	
169	B	9	9	0	0	0	0	
170	B	10	5					**

* Flame reached edge before 20 second flame application done. Extinguished with CO2

** Used during training session with D. Cobb, dust cover fixture failed to operate properly, burner did not retract

Laboratory 2

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #2 _____

Apparatus ID SEAT FIXTURE #4 _____

Start Date 11/3/99 _____ End Date 11/3/99 _____

Conditioning Room Conditions:

Temperature 77°F _____

Humidity 49% _____

Test Room Conditions:

Temperature 73°F _____

Humidity 48% _____

Barometric Pressure 30.19 _____

Flame Ht 35 mm Gas Pressure 2.75 _____

Gas Flowrate 179 _____

Gas flow meter 177=45ml/min,

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	G			0	0	3	3	
	G			1	0	7	8	
	G			1	0	6	7	
P2	C	9	8	1	0	17	18	
	C	9	8	1	0	14	15	
	C	9	8	1	0	12	13	
P3	H	8	5	17	>103	---	>120	
	H	8	5	14	>106	---	>120	
	H	8	5	13	>107	---	>120	
P4	A	10	10	>45	---	---	>45	
	A	10	10	>41	---	---	>41	
	A	10	10	>37	---	---	>37	
P5	G	10	10	0	0	5	5	
	G	10	10	0	0	10	10	
	G	10	10	0	0	10	10	

Laboratory 2

Critical Trials

Start Date 11/18/99 End Date 11/18/99

Conditioning Room Conditions:

Temperature 76°F

Humidity 49%

Test Room Conditions:

Temperature 69°F

Humidity 44%

Barometric Pressure 30.24

Flame Ht 35 mm Gas Pressure 2.75 Gas Flowrate 181

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	10	10	>114	---	---	>114	
2	D	10	10	>110	---	---	>110	
3	D	10	10	9	1	0	10	
4	D	8	5	3	2	0	5	
5	D	8	5	7	0	2	9	
6	D	8	5	5	4	0	9	
7	D	7	2	>44	---	---	>44	
8	D	7	2	11	0	4	15	
9	D	7	2	>89	---	---	>89	
10	D	6	6	>114	---	---	>114	
11	D	6	6	>115	---	---	>115	
12	D	6	6	11	>109	---	>120	
13	D	5	1	7	1	0	8	
14	D	5	1	>102	---	---	>102	
15	D	5	1	>97	---	---	>97	
16	D	3	4	5	0	2	7	
17	D	3	4	5	0	4	9	
18	D	3	4	>85	---	---	>85	
19	D	4	3	6	0	2	8	
20	D	4	3	4	0	2	6	
21	D	4	3	4	0	6	10	
22	D	1	7	>114	---	---	>114	
23	D	1	7	2	0	3	5	
24	D	1	7	4	0	8	13	
25	D	9	8	6	0	0	6	
26	D	9	8	>115	---	---	>115	
27	D	9	8	>89	---	---	>89	
28	D	2	4	5	0	2	7	
29	D	2	4	>97	---	---	>97	
30	D	2	4	1	0	1	2	

Laboratory 2

Critical Trials

Start Date 11/18/99 End Date 11/18/99

Conditioning Room Conditions:

Temperature 77°F

Humidity 48%

Test Room Conditions:

Temperature 68°F

Humidity 41%

Barometric Pressure 30.24

Flame Ht 35mm Gas Pressure 2.75

Gas Flowrate 175

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	10	10	31	>89	—	>120	
32	I	10	10	39	36	>45	>120	
33	I	10	10	25	2	>93	>120	
34	I	9	8	53	37	>29	>120	
35	I	9	8	48	54	>18	>120	
36	I	9	8	35	57	>28	>120	
37	I	8	5	39	60	>21	>120	
38	I	8	5	28	64	>28	>120	
39	I	8	5	31	63	>26	>120	
40	I	7	2	33	73	>14	>120	
41	I	7	2	28	69	>23	>120	
42	I	7	2	30	85	>5	>120	
43	I	6	6	24	90	>6	>120	
44	I	6	6	42	64	>14	>120	
45	I	6	6	35	67	>18	>120	
46	I	5	1	26	79	>14	>120	
47	I	5	1	33	64	>23	>120	
48	I	5	1	41	>79	—	>120	
49	I	4	3	37	>79	>4	>120	
50	I	4	3	32	81	>6	>120	
51	I	4	3	29	85	>6	>120	
52	I	3	9	38	54	>28	>120	
53	I	3	9	35	58	>27	>120	
54	I	3	9	38	64	>18	>120	
55	I	2	4	35	57	>28	>120	
56	I	2	4	45	69	>6	>120	
57	I	2	4	30	71	>19	>120	
58	I	1	7	44	71	>4	>120	
59	I	1	7	51	53	>16	>120	
60	I	1	7	39	55	>26	>120	

Laboratory 2

Critical Trials

Start Date 11/17/99 End Date 11/17/99

Conditioning Room Conditions:

Temperature 76°F
Humidity 48%

Test Room Conditions:

Temperature 71°F
Humidity 44%
Barometric Pressure 30.16

Flame Ht 35mm Gas Pressure 2.75 Gas Flowrate 176

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	10	10	0	0	7	7	
62	B	10	10	0	0	4	4	
63	B	10	10	0	0	4	4	
64	B	9	8	0	0	5	5	
65	B	9	8	>18	---	---	>18	
66	B	9	8	2	0	4	6	
67	B	8	5	1	0	8	9	
68	B	8	5	0	0	6	6	
69	B	8	5	0	0	7	7	
70	B	7	2	0	0	5	5	
71	B	7	2	4	0	6	10	
72	B	7	2	0	0	7	7	
73	B	6	6	2	0	5	7	
74	B	6	6	0	0	5	5	
75	B	6	6	1	0	4	5	
76	B	5	1	0	0	3	3	
77	B	5	1	0	0	5	5	
78	B	5	1	0	0	4	4	
79	B	4	3	0	0	5	5	
80	B	4	3	0	0	6	6	
81	B	4	3	0	0	6	6	
82	B	3	9	>26	---	---	>26	
83	B	3	9	0	0	9	9	
84	B	3	9	2	0	5	7	
85	B	2	4	4	0	4	8	
86	B	2	4	2	0	5	7	
87	B	2	4	0	0	5	5	
88	B	1	7	2	0	6	8	
89	B	1	7	2	0	5	7	
90	B	1	7	2	0	5	7	

Laboratory 2

Critical Trials

Start Date 11/17/99 End Date 11/18/99

Conditioning Room Conditions:
 Temperature 76°F/74°F
 Humidity 48%/49%

Test Room Conditions:
 Temperature 71°F/69°F
 Humidity 44%/43%
 Barometric Pressure 30.2

Flame Ht 35mm Gas Pressure 2.75 Gas Flowrate 176

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	10	10	>18	---	---	>18	
92	F	10	10	>8	---	---	>8	
93	F	10	10	>12	---	---	>12	
94	F	9	8	>8	---	---	>8	
95	F	9	8	>10	---	---	>10	
96	F	9	8	>14	---	---	>14	
97	F	8	5	>7	---	---	>7	
98	F	8	5	>4	---	---	>4	
99	F	8	5	>4	---	---	>4	
100	F	7	2	>7	---	---	>7	
101	F	7	2	>8	---	---	>8	
102	F	7	2	>7	---	---	>7	
103	F	6	6	>8	---	---	>8	
104	F	6	6	>8	---	---	>8	
105	F	6	6	>9	---	---	>9	
106	F	5	1	>7	---	---	>7	
107	F	5	1	>4	---	---	>4	
108	F	5	1	>4	---	---	>4	
109	F	4	3	>5	---	---	>5	
110	F	4	3	>5	---	---	>5	
111	F	4	3	>5	---	---	>5	
112	F	3	9	>6	---	---	>6	
113	F	3	9	>6	---	---	>6	
114	F	3	9	>12	---	---	>12	
115	F	2	4	>7	---	---	>7	
116	F	2	4	>6	---	---	>6	
117	F	2	4	>7	---	---	>7	
118	F	1	7	>5	---	---	>5	
119	F	1	7	>4	---	---	>4	
120	F	1	7	>4	---	---	>4	

Laboratory 2

Critical Trials

Start Date 11/18/99 End Date 11/18/99

Conditioning Room Conditions:

Temperature 77°F

Humidity 49%

Test Room Conditions:

Temperature 22°C

Humidity 44%

Barometric Pressure 30.2

Flame Ht 35mm Gas Pressure 2.75 Gas Flowrate 180

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	10	10	1	0	10	11	
122	E	10	10	1	0	9	10	
123	E	10	10	1	0	7	8	
124	E	9	8	1	0	8	9	
125	E	9	8	2	0	7	9	
126	E	9	8	2	0	7	9	
127	E	8	5	1	0	8	9	
128	E	8	5	5	0	5	10	
129	E	8	5	1	0	8	9	
130	E	7	2	10	1	10	21	
131	E	7	2	1	0	12	13	
132	E	7	2	2	0	11	13	
133	E	6	6	1	0	11	12	
134	E	6	6	2	0	11	13	
135	E	6	6	12	0	11	23	
136	E	5	1	1	0	12	13	
137	E	5	1	1	0	11	12	
138	E	5	1	1	0	12	13	
139	E	4	3	1	0	14	15	
140	E	4	3	13	18	21	52	
141	E	4	3	2	0	13	15	
142	E	3	9	2	0	13	15	
143	E	3	9	1	0	14	15	
144	E	3	9	1	0	14	15	
145	E	2	4	1	0	10	11	
146	E	2	4	1	0	10	11	
147	E	2	4	1	0	10	11	
148	E	1	7	1	0	13	14	
149	E	1	7	>34	---	---	>34	
150	E	1	7	1	0	11	12	

Laboratory 2

Critical Trials Dust Covers

Start Date 11/18/99 End Date 11/19/99

Conditioning Room Conditions:

Temperature 74°F

Humidity 49%

Test Room Conditions:

Temperature 70°F

Humidity 44%

Barometric Pressure 30.31

Flame Ht 35mm Gas Pressure 2.75

Gas Flowrate 182

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	10	10	>11	---	---	>11	*
152	A	1	7	>8	---	---	>8	*
153	A	2	4	>11	---	---	>11	*
154	A	9	8	>4	---	---	>4	*
155	A	8	5	>8	---	---	>8	*
156	A	7	2	>9	---	---	>9	*
157	A	6	6	>5	---	---	>5	*
158	A	5	1	>7	---	---	>7	*
159	A	4	3	>11	---	---	>11	*
160	A	3	9	>7	---	---	>7	*
161	B	10	10	0	0	0	0	
162	B	9	8	0	0	0	0	
163	B	8	5	0	0	0	0	
164	B	7	2	0	0	0	0	
165	B	6	6	0	0	0	0	
166	B	5	1	0	0	0	0	
167	B	4	3	0	0	0	0	
168	B	3	9	0	0	0	0	
169	B	2	4	0	0	0	0	
170	B	1	7	0	0	0	0	

Laboratory 3

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #3 _____

Apparatus ID SEAT FIXTURE #3 _____

Start Date 11/4/99 _____ End Date 11/4/99 _____

Conditioning Room Conditions:

Temperature 70°F _____

Humidity 50% _____

Test Room Conditions:

Temperature 69°F _____

Humidity 35% _____

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig _____ Gas Flowrate 45 ml/min _____

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	G	10	8	0	0	13	13	
	G	10	8	0	0	16	16	
	G	10	8	0	0	13	13	
P2	H	10	8	17	>103	---	>120	
	H	10	8	16	>104	---	>120	
	H	10	8	16	>104	---	>120	
P3	C	10	8	1	0	18	19	
	C	10	8	0	0	15	15	
	C	10	8	0	0	16	16	
P4	A	10	8	>50	---	---	>50	
	A	10	8	>55	---	---	>55	
	A	10	8	>54	---	---	>54	
P5	C	9	6	0	0	14	14	
	C	9	6	0	0	14	14	
	C	9	6	0	0	16	16	

Laboratory 3

Critical Trials

Start Date 11/4/99 End Date 11/5/99

Conditioning Room Conditions:

Temperature 70°F
Humidity 50%

Test Room Conditions:

Temperature 70°F/72°F
Humidity 31/35%
Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	1	5	6	0	10	16	
2	D	1	5	>120	---	---	>120	
3	D	1	5	>120	---	---	>120	
4	D	2	1	>120	---	---	>120	
5	D	2	1	5	6	5	16	
6	D	2	1	5	0	15	20	
7	D	3	4	3	0	16	19	
8	D	3	4	4	6	12	22	
9	D	3	4	4	0	15	19	
10	D	4	2	0	0	17	17	
11	D	4	2	0	0	19	19	
12	D	4	2	5	0	12	17	
13	D	5	10	>120	---	---	>120	
14	D	5	10	>120	---	---	>120	
15	D	5	10	0	0	7	7	
16	D	6	3	>120	---	---	>120	
17	D	6	3	>120	---	---	>120	
18	D	6	3	3	0	13	16	
19	D	7	7	>120	---	---	>120	
20	D	7	7	3	6	5	14	
21	D	7	7	>120	---	---	>120	
22	D	8	9	>120	---	---	>120	
23	D	8	9	>120	---	---	>120	
24	D	8	9	>120	---	---	>120	
25	D	9	6	>120	---	---	>120	
26	D	9	6	4	7	5	16	
27	D	9	6	>120	---	---	>120	
28	D	10	8	2	5	9	16	
29	D	10	8	10	30	7	47	
30	D	10	8	>120	---	---	>120	

Laboratory 3

Critical Trials

Start Date 11/5/99 End Date 11/9/99

Conditioning Room Conditions:

Temperature 70°F

Humidity 51%

Test Room Conditions:

Temperature 72°F/72°F/77°F

Humidity 35%/33%/40%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	1	5	0	20	7	27	
32	I	1	5	42	>78	---	>120	
33	I	1	5	39	>81	---	>120	
34	I	2	1	0	4	8	12	
35	I	2	1	39	>81	---	>120	
36	I	2	1	42	>78	---	>120	
37	I	3	4	40	>80	---	>120	
38	I	3	4	32	>88	---	>120	
39	I	3	4	25	>95	---	>120	
40	I	4	2	0	12	4	16	
41	I	4	2	41	>79	---	>120	
42	I	4	2	45	>75	---	>120	
43	I	5	10	29	>91	---	>120	
44	I	5	10	24	>96	---	>120	
45	I	5	10	33	>87	---	>120	
46	I	6	3	31	>89	---	>120	
47	I	6	3	34	>86	---	>120	
48	I	6	3	36	>84	---	>120	
49	I	7	7	2	4	9	15	
50	I	7	7	38	>82	---	>120	
51	I	7	7	1	2	9	12	
52	I	8	9	0	2	5	7	
53	I	8	9	37	>83	---	>120	
54	I	8	9	33	>87	---	>120	
55	I	9	6	27	>93	---	>120	
56	I	9	6	29	>91	---	>120	
57	I	9	6	41	>79	---	>120	
58	I	10	8	6	1	4	11	
59	I	10	8	66	>54	---	>120	
60	I	10	8	32	>88	---	>120	

Laboratory 3

Critical Trials

Start Date 11/9/99 End Date 11/10/99

Conditioning Room Conditions:

Temperature 70°F

Humidity 50%

Test Room Conditions:

Temperature 77°F/76°F

Humidity 40/44%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	1	5	2	0	6	8	
62	B	1	5	0	0	6	6	
63	B	1	5	1	0	5	6	
64	B	2	1	0	0	5	5	
65	B	2	1	0	0	6	6	
66	B	2	1	0	0	6	6	
67	B	3	4	0	0	5	5	
68	B	3	4	1	0	5	6	
69	B	3	4	0	0	5	5	
70	B	4	2	0	0	4	4	
71	B	4	2	0	0	5	5	
72	B	4	2	0	0	4	4	
73	B	5	10	0	0	4	4	
74	B	5	10	0	0	4	4	
75	B	5	10	0	0	6	6	
76	B	6	3	0	0	5	13	
77	B	6	3	0	0	5	5	
78	B	6	3	0	0	5	5	
79	B	7	7	0	0	6	6	
80	B	7	7	0	0	4	4	
81	B	7	7	0	0	4	4	
82	B	8	9	1	0	5	6	
83	B	8	9	0	0	5	5	
84	B	8	9	0	0	6	6	
85	B	9	6	0	0	5	5	
86	B	9	6	0	0	5	5	
87	B	9	6	0	0	7	7	
88	B	10	8	0	0	6	6	
89	B	10	8	0	0	5	5	
90	B	10	8	0	0	4	4	

Laboratory 3

Critical Trials

Start Date 11/10/99 End Date 11/10/99

Conditioning Room Conditions:

Temperature 70°F
Humidity 51%

Test Room Conditions:

Temperature 76°F
Humidity 44%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4 psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	1	5	>30	---	---	>30	*
92	F	1	5	>24	---	---	>24	*
93	F	1	5	>25	---	---	>25	*
94	F	2	1	>23	---	---	>23	*
95	F	2	1	>22	---	---	>22	*
96	F	2	1	>23	---	---	>23	*
97	F	3	4	>23	---	---	>23	*
98	F	3	4	>23	---	---	>23	*
99	F	3	4	>28	---	---	>28	*
100	F	4	2	>30	---	---	>30	*
101	F	4	2	>23	---	---	>23	*
102	F	4	2	>22	---	---	>22	*
103	F	5	10	>23	---	---	>23	*
104	F	5	10	>24	---	---	>24	*
105	F	5	10	>25	---	---	>25	*
106	F	6	3	>26	---	---	>26	*
107	F	6	3	>20	---	---	>20	*
108	F	6	3	>22	---	---	>22	*
109	F	7	7	>23	---	---	>23	*
110	F	7	7	>20	---	---	>20	*
111	F	7	7	>21	---	---	>21	*
112	F	8	9	>19	---	---	>19	*
113	F	8	9	>25	---	---	>25	*
114	F	8	9	>20	---	---	>20	*
115	F	9	6	>27	---	---	>27	*
116	F	9	6	>27	---	---	>27	*
117	F	9	6	>29	---	---	>29	*
118	F	10	8	>22	---	---	>22	*
119	F	10	8	>21	---	---	>21	*
120	F	10	8	>24	---	---	>24	*

* reached top of mockup, extinguished with CO2

Laboratory 3

Critical Trials

Start Date 11/12/99 End Date 11/12/99

Conditioning Room Conditions:
 Temperature 70°F
 Humidity 50%

Test Room Conditions:
 Temperature 73°F
 Humidity 46%
 Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	1	5	1	0	13	14	
122	E	1	5	1	0	13	14	
123	E	1	5	1	0	14	15	
124	E	2	1	5	0	14	19	
125	E	2	1	14	0	10	24	
126	E	2	1	2	0	14	16	
127	E	3	4	2	0	15	17	
128	E	3	4	22	0	16	38	
129	E	3	4	2	0	16	18	
130	E	4	2	0	0	18	18	
131	E	4	2	0	0	16	16	
132	E	4	2	0	0	17	17	
133	E	5	10	1	0	17	18	
134	E	5	10	3	0	13	16	
135	E	5	10	0	0	16	16	
136	E	6	3	0	0	18	18	
137	E	6	3	7	0	13	20	
138	E	6	3	0	0	18	18	
139	E	7	7	0	0	14	14	
140	E	7	7	8	62	10	80	
141	E	7	7	2	0	17	19	
142	E	8	9	0	0	16	16	
143	E	8	9	0	0	19	19	
144	E	8	9	0	0	19	19	
145	E	9	6	6	0	18	24	
146	E	9	6	1	0	18	19	
147	E	9	6	0	0	17	17	
148	E	10	8	0	0	17	17	
149	E	10	8	0	0	18	18	
150	E	10	8	0	0	21	21	

Laboratory 3

Critical Trials Dust Covers

Start Date 11/15/99 End Date 11/15/99

Conditioning Room Conditions:

Temperature 25°C

Humidity 50%

Test Room Conditions:

Temperature 74°F

Humidity 49%

Barometric Pressure _____

Flame Ht. 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	1	5	>7	---	---	>7	test stopped
152	A	2	1	>13	---	---	>13	"
153	A	3	4	>10	---	---	>10	"
154	A	4	2	>10	---	---	>10	"
155	A	5	10	>11	---	---	>11	"
156	A	6	3	>10	---	---	>10	"
157	A	7	7	>10	---	---	>10	"
158	A	8	9	>10	---	---	>10	"
159	A	9	6	>10	---	---	>10	"
160	A	10	8	>10	---	---	>10	"
161	B	1	5	15	0	6	21	
162	B	2	1	0	0	0	0	
163	B	3	4	0	0	0	0	
164	B	4	2	0	0	0	0	
165	B	5	10	0	0	0	0	
166	B	6	3	0	0	0	0	
167	B	7	7	0	0	0	0	
168	B	8	9	0	0	0	0	
169	B	9	6	0	0	0	0	
170	B	10	8	0	0	0	0	

Laboratory 4

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #4 _____

Apparatus ID SEAT FIXTURE #1 _____

Start Date 01/04/2000 _____ End Date 01/04/2000 _____

Conditioning Room Conditions:

Temperature 73°F _____

Humidity 45% _____

Test Room Conditions:

Temperature 73°F _____

Humidity 45% _____

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psi _____ Gas Flowrate 45 ml/min _____

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	A	10	7	>40	---	---	>40	
	A	10	7	>26	---	---	>26	
	A	10	7	>30	---	---	>30	
P2	C	10	7	0	0	12	12	
	C	10	7	0	0	14	14	
	C	10	7	0	0	15	15	
P3	H	10	7	20	>100	---	>120	
	H	10	7	24	>96	---	>120	
	H	10	7	23	>97	---	>120	
P4	G	10	7	1	0	8	9	
	G	10	7	1	0	8	9	
	G	10	7	1	0	8	9	
P5	C	9	5	1	0	18	19	
	C	9	5	0	0	16	16	
	C	9	5	1	0	15	16	

Laboratory 4

Critical Trials

Start Date 01/14/2000 End Date 01/18/00

Conditioning Room Conditions:

Temperature 72°F/73°F

Humidity 52%

Test Room Conditions:

Temperature 72°F/73°F

Humidity 52%

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.3 psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	10	7	>110	---	---	>110	
2	D	10	7	3	0	1	4	
3	D	10	7	>110	---	---	>110	
4	D	9	5	1	9	2	12	
5	D	9	5	>107	---	---	>107	
6	D	9	5	1	0	2	3	
7	D	8	8	3	3	2	8	
8	D	8	8	4	3	2	9	
9	D	8	8	>100	---	---	>100	
10	D	7	1	2	0	1	3	
11	D	7	1	2	0	1	>120	
12	D	7	1	>108	---	---	>108	
13	D	6	9	3	0	3	6	
14	D	6	9	>112	---	---	>112	
15	D	6	9	>108	---	---	>108	
16	D	1	10	>86	---	---	>86	
17	D	1	10	>86	---	---	>86	
18	D	1	10	>89	---	---	>89	
19	D	2	3	>96	---	---	>96	
20	D	2	3	3	0	3	6	
21	D	2	3	>96	---	---	>96	
22	D	5	2	3	3	2	8	
23	D	5	2	3	3	2	8	
24	D	5	2	>110	---	---	>110	
25	D	4	4	>95	---	---	>95	
26	D	4	4	>97	---	---	>97	
27	D	4	4	1	3	1	5	
28	D	3	6	Ignitor failed to retract
29	D	3	6	1	1	2	4	
30	D	3	6	0	4	1	5	

Laboratory 4

Critical Trials

Start Date 01/26/00 End Date 01/27/00

Conditioning Room Conditions:

Temperature 72°F

Humidity 55%

Test Room Conditions:

Temperature 72°F

Humidity 55%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.3psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	1	10	36	>84	---	>120	
32	I	1	10	29	>91	---	>120	
33	I	1	10	19	>101	---	>120	
34	I	2	3	30	>90	---	>120	
35	I	2	3	30	>90	---	>120	
36	I	2	3	0	0	0	0	
37	I	3	6	*	*	*	*	Igniter did not retract
38	I	3	6	21	0	9	30	
39	I	3	6	0	0	0	0	
40	I	4	4	25	>95	---	>120	
41	I	4	4	29	>91	---	>120	
42	I	4	4	21	>99	---	>120	
43	I	5	2	0	8	0	8	
44	I	5	2	29	>91	---	>120	
45	I	5	2	30	>90	---	>120	
46	I	6	9	19	>101	---	>120	
47	I	6	9	32	>82	---	>120	
48	I	6	9	14	0	13	27	
49	I	7	1	28	>92	---	>120	
50	I	7	1	35	>85	---	>120	
51	I	7	1	22	>98	---	>120	
52	I	8	8	9	7	0	16	
53	I	8	8	6	17	0	23	
54	I	8	8	3	3	0	6	
55	I	9	5	22	>98	---	>120	
56	I	9	5	17	>103	---	>120	
57	I	9	5	31	>89	---	>120	
58	I	10	7	33	>87	---	>120	
59	I	10	7	31	>89	---	>120	
60	I	10	7	25	>95	---	>120	

Laboratory 4

Critical Trials

Start Date 1/18/00 End Date 1/19/00

Conditioning Room Conditions:
 Temperature 70°F
 Humidity 53%

Test Room Conditions:
 Temperature 70°F
 Humidity 53%
 Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.3psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	10	7	0	0	5	5	
62	B	10	7	0	0	3	3	
63	B	10	7	0	0	3	3	
64	B	9	5	0	0	4	4	
65	B	9	5	0	0	4	4	
66	B	9	5	0	0	4	4	
67	B	8	8	0	0	3	3	
68	B	8	8	0	0	3	3	
69	B	8	8	0	0	3	3	
70	B	7	1	0	0	3	3	
71	B	7	1	0	0	3	3	
72	B	7	1	0	0	3	3	
73	B	6	9	>25	--	--	>25	
74	B	6	9	0	0	5	5	
75	B	6	9	0	0	4	4	
76	B	5	2	0	0	3	3	
77	B	5	2	0	0	4	4	
78	B	5	2	0	0	4	4	
79	B	4	4	0	0	3	3	
80	B	4	4	0	0	3	3	
81	B	4	4	0	0	3	3	
82	B	3	6	0	0	3	3	
83	B	3	6	0	0	3	3	
84	B	3	6	0	0	3	3	
85	B	2	3	0	0	3	3	
86	B	2	3	0	0	3	3	
87	B	2	3	0	0	3	3	
88	B	1	10	0	0	4	4	
89	B	1	10	0	0	3	3	
90	B	1	10	0	0	3	3	

Laboratory 4

Critical Trials

Start Date 01/21/00 End Date 01/21/00

Conditioning Room Conditions:

Temperature 72°F

Humidity 54%

Test Room Conditions:

Temperature 72°F

Humidity 54%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.3 psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	1	10	>9	---	---	>9	
92	F	1	10	>7	---	---	>7	
93	F	1	10	>10	---	---	>10	
94	F	9	5	>10	---	---	>10	
95	F	9	5	>9	---	---	>9	
96	F	9	5	>10	---	---	>10	
97	F	2	3	>8	---	---	>8	
98	F	2	3	>10	---	---	>10	
99	F	2	3	>9	---	---	>9	
100	F	8	8	>9	---	---	>9	
101	F	8	8	>11	---	---	>11	
102	F	8	8	>10	---	---	>10	
103	F	7	1	>11	---	---	>11	
104	F	7	1	>10	---	---	>10	
105	F	7	1	>12	---	---	>12	
106	F	6	9	>8	---	---	>8	
107	F	6	9	>11	---	---	>11	
108	F	6	9	>12	---	---	>12	
109	F	5	2	>8	---	---	>8	
110	F	5	2	>8	---	---	>8	
111	F	5	2	>11	---	---	>11	
112	F	4	4	>11	---	---	>11	
113	F	4	4	>11	---	---	>11	
114	F	4	4	>12	---	---	>12	
115	F	3	6	>12	---	---	>12	
116	F	3	6	>12	---	---	>12	
117	F	3	6	>13	---	---	>13	
118	F	10	7	>11	---	---	>11	
119	F	10	7	>12	---	---	>12	
120	F	10	7	>12	---	---	>12	

Laboratory 4

Critical Trials

Start Date 1/24/00 End Date 1/25/00

Conditioning Room Conditions:

Temperature 70°F
Humidity 56%

Test Room Conditions:

Temperature 70°F
Humidity 56%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.3psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	1	10	1	0	9	10	
122	E	1	10	1	0	8	9	
123	E	1	10	1	0	8	9	
124	E	2	3	0	0	9	9	
125	E	2	3	0	0	8	8	
126	E	2	3	0	0	8	8	
127	E	3	6	0	0	10	10	
128	E	3	6	0	0	11	11	
129	E	3	6	0	0	11	11	
130	E	4	4	0	0	9	9	
131	E	4	4	1	0	8	9	
132	E	4	4	0	0	9	9	
133	E	5	2	0	0	9	9	
134	E	5	2	6	0	3	9	
135	E	5	2	1	0	8	9	
136	E	6	9	1	0	8	9	
137	E	6	9	0	0	9	9	
138	E	6	9	0	0	9	9	
139	E	7	1	1	0	8	9	
140	E	7	1	0	0	9	9	
141	E	7	1	1	0	8	9	
142	E	8	8	0	0	8	8	
143	E	8	8	1	0	8	9	
144	E	8	8	1	0	8	9	
145	E	9	5	8	0	3	11	
146	E	9	5	0	0	10	10	
147	E	9	5	0	0	9	9	
148	E	10	7	0	0	10	10	
149	E	10	7	2	0	8	10	
150	E	10	7	0	0	9	9	

Laboratory 4

Critical Trials Dust Covers

Start Date 01/04/00 End Date 01/13/00

Conditioning Room Conditions:

Temperature 74°F

Humidity 46%

Test Room Conditions:

Temperature 74°F

Humidity 46%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	9	5	---	---	---	---	Reached edge before flame moved
152	A	1	10	---	---	---	---	"
153	A	2	3	---	---	---	---	"
154	A	4	4	---	---	---	---	"
155	A	5	2	---	---	---	---	"
156	A	6	9	---	---	---	---	"
157	A	7	1	---	---	---	---	"
158	A	8	8	---	---	---	---	"
159	A	10	7	---	---	---	---	"
160	A	3	6	---	---	---	---	"
161	B	1	10	0	0	0	0	
162	B	2	3	0	0	0	0	
163	B	3	6	0	0	0	0	
164	B	4	4	0	0	0	0	
165	B	5	2	0	0	0	0	
166	B	6	9	0	0	0	0	
167	B	7	1	0	0	0	0	
168	B	8	8	0	0	0	0	
169	B	9	5	0	0	0	0	
170	B	10	7	0	0	0	0	

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #5 _____

Apparatus ID SEAT FIXTURE #5 _____

Start Date 10/28/99 End Date 10/28/99

Conditioning Room Conditions:

Temperature 24°C
Humidity 49%

Test Room Conditions:

Temperature 70°F
Humidity 36%
Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig Gas Flowrate 157 ml/min
mass flow meter = 45ml/min

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	C	1	9	0	0	19	19	
	C	1	9	0	0	19	19	
	C	1	9	1	0	22	23	
P2	C	6	2	0	0	19	19	
	C	6	2	1	0	22	23	
	C	6	2	1	0	23	24	
P3	A	8	4	>53	---	---	>53	
	A	8	4	>51	---	---	>51	
	A	8	4	>54	---	---	>54	
P4	G	10	6	2	43	5	50	
	G	10	6	1	0	19	20	
	G	10	6	1	0	20	21	
P5	H	8	4	25	>95	---	>120	
	H	8	4	22	>98	---	>120	
	H	8	4	15	>105	---	>120	

Laboratory 5

Critical Trials

Start Date 10/28/99 End Date 10/28/99

Conditioning Room Conditions:

Temperature 24°C

Humidity 50%

Test Room Conditions:

Temperature 70°F

Humidity 37%

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig Gas Flowrate 157-160

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	1	9	>120	---	---	>120	
2	D	1	9	3	0	21	24	
3	D	1	9	3	0	16	19	
4	D	2	10	3	0	20	23	
5	D	2	10	>120	---	---	>120	
6	D	2	10	3	0	22	25	
7	D	3	1	2	0	17	19	
8	D	3	1	3	0	18	21	
9	D	3	1	3	0	19	22	
10	D	4	7	3	0	19	22	
11	D	4	7	4	0	18	22	
12	D	4	7	>120	---	---	>120	
13	D	5	8	4	4	13	21	
14	D	5	8	>120	---	---	>120	
15	D	5	8	4	6	8	18	
16	D	6	2	>120	---	---	>120	
17	D	6	2	>120	---	---	>120	
18	D	6	2	>120	---	---	>120	
19	D	7	5	3	0	19	22	
20	D	7	5	3	0	15	18	
21	D	7	5	3	0	21	24	
22	D	8	4	3	0	18	21	
23	D	8	4	>120	---	---	>120	
24	D	8	4	4	4	19	27	
25	D	9	3	>120	---	---	>120	
26	D	9	3	0	0	20	20	
27	D	9	3	4	7	15	26	
28	D	10	6	2	0	19	21	
29	D	10	6	3	0	22	25	
30	D	10	6	>120	---	---	>120	

Laboratory 5

Critical Trials

Start Date 11/2/99 End Date 11/2/99

Conditioning Room Conditions:

Temperature 24°C

Humidity 50%

Test Room Conditions:

Temperature 72°F

Humidity 52%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 157-160

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	1	9	34	>86	---	>120	
32	I	1	9	32	>88	---	>120	
33	I	1	9	25	>95	---	>120	
34	I	2	10	30	>90	---	>120	
35	I	2	10	45	>75	---	>120	
36	I	2	10	37	>83	---	>120	
37	I	3	1	53	>67	---	>120	
38	I	3	1	34	>86	---	>120	
39	I	3	1	0	0	25	25	
40	I	4	7	5	3	7	15	
41	I	4	7	22	>98	---	>120	
42	I	4	7	22	>98	----	>120	
43	I	5	8	3	5	25	25	
44	I	5	8	0	0	26	26	
45	I	5	8	0	0	26	26	
46	I	6	2	35	>85	---	>120	
47	I	6	2	26	>94	---	>120	
48	I	6	2	4	6	16	26	
49	I	7	5	4	3	17	24	
50	I	7	5	5	30	7	42	
51	I	7	5	26	>94	---	>120	
52	I	8	4	30	>90	---	>120	
53	I	8	4	0	0	24	24	
54	I	8	4	0	0	28	28	
55	I	9	3	24	>96	---	>120	
56	I	9	3	6	7	17	30	
57	I	9	3	0	8	16	24	
58	I	10	6	28	>92	---	>120	
59	I	10	6	26	0	42	68	
60	I	10	6	5	2	18	25	

Laboratory 5

Critical Trials

Start Date 11/3/99 End Date 11/3/99

Conditioning Room Conditions:

Temperature 24°C
Humidity 49%

Test Room Conditions:

Temperature 70°F
Humidity 44%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 157-160

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	1	9	0	0	13	13	
62	B	1	9	1	0	14	15	
63	B	1	9	0	0	14	14	
64	B	2	10	0	0	13	13	
65	B	2	10	0	0	12	12	
66	B	2	10	0	0	17	17	
67	B	3	1	0	0	13	13	
68	B	3	1	0	0	12	12	
69	B	3	1	0	0	10	10	
70	B	4	7	0	0	11	11	
71	B	4	7	1	0	10	11	
72	B	4	7	0	0	12	12	
73	B	5	8	0	0	10	10	
74	B	5	8	0	0	11	11	
75	B	5	8	0	0	11	11	
76	B	6	2	0	0	13	13	
77	B	6	2	0	0	12	12	
78	B	6	2	0	0	12	12	
79	B	7	5	0	0	12	12	
80	B	7	5	0	0	13	13	
81	B	7	5	1	0	13	14	
82	B	8	4	1	0	9	10	
83	B	8	4	1	0	10	11	
84	B	8	4	0	0	10	10	
85	B	9	3	1	0	11	12	
86	B	9	3	0	0	10	10	
87	B	9	3	0	0	10	10	
88	B	10	6	0	0	12	12	
89	B	10	6	0	0	12	12	
90	B	10	6	0	0	10	10	

Laboratory 5

Critical Trials

Start Date 11/5/99 End Date 11/5/99

Conditioning Room Conditions:

Temperature 24°C
Humidity 48%

Test Room Conditions:

Temperature 70°F
Humidity 34%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4 psig Gas Flowrate 157-160

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	1	9	>14	---	---	>14	*
92	F	1	9	>12	---	---	>12	*
93	F	1	9	>15	---	---	>15	*
94	F	2	10	>13	---	---	>13	*
95	F	2	10	>18	---	---	>18	*
96	F	2	10	>17	---	---	>17	*
97	F	3	1	>17	---	---	>17	*
98	F	3	1	>13	---	---	>13	*
99	F	3	1	>13	---	---	>13	*
100	F	4	7	>14	---	---	>14	*
101	F	4	7	>14	---	---	>14	*
102	F	4	7	>14	---	---	>14	*
103	F	5	8	>14	---	---	>14	*
104	F	5	8	>14	---	---	>14	*
105	F	5	8	>15	---	---	>15	*
106	F	6	2	>14	---	---	>14	*
107	F	6	2	>13	---	---	>13	*
108	F	6	2	>14	---	---	>14	*
109	F	7	5	>14	---	---	>14	*
110	F	7	5	>16	---	---	>16	*
111	F	7	5	>14	---	---	>14	*
112	F	8	4	>15	---	---	>15	*
113	F	8	4	>17	---	---	>17	*
114	F	8	4	>16	---	---	>16	*
115	F	9	3	>13	---	---	>13	*
116	F	9	3	>14	---	---	>14	*
117	F	9	3	>12	---	---	>12	*
118	F	10	6	>15	---	---	>15	*
119	F	10	6	>19	---	---	>19	*
120	F	10	6	>14	---	---	>14	*

* reached top of mockup, extinguished with CO2

Laboratory 5

Critical Trials

Start Date 11/8/99 End Date 11/8/99

Conditioning Room Conditions:

Temperature 24°C

Humidity 50%

Test Room Conditions:

Temperature 70°F

Humidity 32%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 157-160

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	1	9	8	0	16	24	
122	E	1	9	3	0	19	22	
123	E	1	9	2	0	22	24	
124	E	2	10	7	0	17	24	
125	E	2	10	8	0	13	21	
126	E	2	10	2	0	21	23	
127	E	3	1	1	0	25	26	
128	E	3	1	1	0	22	23	
129	E	3	1	3	0	21	24	
130	E	4	7	1	0	22	23	
131	E	4	7	1	0	24	25	
132	E	4	7	1	0	23	24	
133	E	5	8	11	0	12	23	
134	E	5	8	10	0	13	23	
135	E	5	8	1	0	22	23	
136	E	6	2	8	0	12	20	
137	E	6	2	3	0	20	23	
138	E	6	2	2	0	18	20	
139	E	7	5	7	0	17	24	
140	E	7	5	0	0	22	22	
141	E	7	5	1	0	20	21	
142	E	8	4	1	0	17	18	
143	E	8	4	0	0	23	23	
144	E	8	4	1	0	22	23	
145	E	9	3	3	0	18	21	
146	E	9	3	2	0	21	23	
147	E	9	3	1	0	22	23	
148	E	10	6	2	0	20	22	
149	E	10	6	2	0	26	28	
150	E	10	6	1	0	21	22	

Laboratory 5

Critical Trials Dust Covers

Start Date 10/18/99 End Date 10/18/99

Conditioning Room Conditions:

Temperature 25°C

Humidity 50%

Test Room Conditions:

Temperature 74°F

Humidity 49%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 159

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	1	9	---	---	---	---	*
152	A	2	10	---	---	---	---	*
153	A	3	1	---	---	---	---	*
154	A	4	7	---	---	---	---	*
155	A	5	8	---	---	---	---	*
156	A	6	2	---	---	---	---	*
157	A	7	5	---	---	---	---	*
158	A	8	4	---	---	---	---	*
159	A	9	3	---	---	---	---	*
160	A	10	6	---	---	---	---	*
161	B	1	9	0	0	0	0	1" hole
162	B	2	10	0	0	0	0	1" hole
163	B	3	1	0	0	0	0	1" and 1/2" holes
164	B	4	7	0	0	0	0	0.9"hole
165	B	5	8	0	0	0	0	0.8"hole
166	B	6	2	0	0	0	0	0.9"hole
167	B	7	5	0	0	0	0	0.9"hole
168	B	8	4	0	0	0	0	0.9" and 0.2" holes
169	B	9	3	0	0	0	0	1" and 1/2" holes
170	B	10	6	0	0	0	0	0.9"hole

* Flame rewached edge before 20 second flame application done. Extinguished with CO2

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID:#6 _____

Apparatus ID SEAT FIXTURE #5 _____Start Date 11/17/99 End Date 11/17/99

Conditioning Room Conditions:

Temperature _____

Humidity _____

Test Room Conditions:

Temperature _____

Humidity _____

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure _____Gas Flowrate 45 ml/min _____

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	G	10	2	0	37	0	37	
	G	10	2	0	0	11	11	
	G	10	2	0	0	12	12	
P2	H	10	2	20	>100	---	>120	
	H	10	2	18	101	>1	>120	
	H	10	2	28	>92	---	>120	
P3	C	10	2	0	0	16	16	
	C	10	2	0	0	16	16	
	C	10	2	0	0	14	14	
P4	A	10	2	>42	---	---	>42	
	A	10	2	>46	---	---	>46	
	A	10	2	>52	---	---	>52	
P5	C	9	7	0	0	13	13	
	C	9	7	0	0	15	15	
	C	9	7	0	0	14	14	

Laboratory 6

Critical Trials

Start Date 11/19/99 End Date 12/2/99

Conditioning Room Conditions:

Temperature 22°C
Humidity 40%-50%

Test Room Conditions:

Temperature 21-22°C
Humidity 15-27%
Barometric Pressure _____

Flame Ht 35 mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	7	4	2	0	8	10	
2	D	7	4	4	6	4	14	
3	D	7	4	3	0	7	10	
4	D	8	10	3	2	3	8	
5	D	8	10	4	0	5	9	
6	D	8	10	4	2	4	10	
7	D	2	6	3	0	5	8	
8	D	2	6	>120	---	---	>120	
9	D	2	6	1	0	7	8	
10	D	3	8	3	2	3	8	
11	D	3	8	6	5	3	14	
12	D	3	8	>120	---	---	>120	
13	D	5	9	33	60	10	103	
14	D	5	9	>120	---	---	>120	
15	D	5	9	>118	---	---	>120	
16	D	6	3	4	0	6	10	
17	D	6	3	>120	---	---	>120	
18	D	6	3	>120	---	---	>120	
19	D	7	2	>120	---	---	>120	
20	D	7	2	10	13	0	23	
21	D	7	2	5	5	2	12	
22	D	8	5	5	4	0	9	
23	D	8	5	>105	---	---	>105	
24	D	8	5	>100	---	---	>100	
25	D	9	7	>120	---	---	>120	
26	D	9	7	>120	---	---	>120	
27	D	9	7	4	4	4	12	
28	D	10	1	5	2	3	10	
29	D	10	1	>120	---	---	>120	
30	D	10	1	4	8	0	12	

Laboratory 6

Critical Trials

Start Date 12/2/99 End Date 12/2/99

Conditioning Room Conditions:

Temperature 22°C

Humidity 40%

Test Room Conditions:

Temperature 22°C

Humidity 22%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	2	6	42	>78	---	>120	
32	I	2	6	25	0	10	35	
33	I	2	6	50	>70	---	>120	
34	I	3	8	0	0	5	5	
35	I	3	8	29	>91	---	>120	
36	I	3	8	23	0	85	108	
37	I	4	9	28	>92	---	>120	
38	I	4	9	30	>90	---	>120	
39	I	4	9	0	20	0	20	
40	I	8	10	32	>88	---	>120	
41	I	8	10	35	>85	---	>120	
42	I	8	10	29	>91	---	>120	
43	I	7	4	37	>83	---	>120	
44	I	7	4	31	>89	---	>120	
45	I	7	4	53	>67	---	>120	
46	I	10	2	40	>80	---	>120	
47	I	10	2	39	>81	---	>120	
48	I	10	2	32	>88	---	>120	
49	I	1	1	38	>82	---	>120	
50	I	1	1	25	0	10	35	
51	I	1	1	37	>83	---	>120	
52	I	9	7	29	>91	---	>120	
53	I	9	7	48	>72	---	>120	
54	I	9	7	36	>84	---	>120	
55	I	6	5	4	0	6	10	
56	I	6	5	20	0	15	35	
57	I	6	5	17	0	15	32	
58	I	5	3	5	3	---	8	
59	I	5	3	34	>86	---	>120	
60	I	5	3	0	0	3	3	

Laboratory 6

Critical Trials

Start Date 12/3/99 End Date 12/3/99

Conditioning Room Conditions:

Temperature 22°C
Humidity 44%

Test Room Conditions:

Temperature 22°C
Humidity 19%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	2	6	0	0	5	5	
62	B	2	6	2	0	5	7	
63	B	2	6	0	0	5	5	
64	B	6	5	3	0	4	7	
65	B	6	5	0	0	5	5	
66	B	6	5	3	0	3	6	
67	B	3	8	1	0	4	5	
68	B	3	8	4	0	0	4	
69	B	3	8	0	0	4	4	
70	B	1	1	2	0	3	5	
71	B	1	1	0	0	5	5	
72	B	1	1	0	0	4	4	
73	B	4	9	0	0	5	5	
74	B	4	9	0	0	3	3	
75	B	4	9	0	0	4	4	
76	B	10	2	0	0	3	3	
77	B	10	2	>60	---	---	>60	
78	B	10	2	3	0	5	8	
79	B	5	3	0	0	5	5	
80	B	5	3	0	0	4	4	
81	B	5	3	0	0	4	4	
82	B	9	7	2	0	3	5	
83	B	9	7	3	0	3	6	
84	B	9	7	0	0	4	4	
85	B	7	4	3	0	3	6	
86	B	7	4	0	0	3	3	
87	B	7	4	0	0	4	4	
88	B	8	10	2	0	4	6	
89	B	8	10	3	0	4	7	
90	B	8	10	0	0	7	7	

Laboratory 6

Critical Trials

Start Date 12/6/99 End Date 12/6/99

Conditioning Room Conditions:

Temperature 22°C
Humidity 49%

Test Room Conditions:

Temperature 22°C
Humidity 50%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)
91	F	10	2	>22	---	---	>22
92	F	10	2	>21	---	---	>21
93	F	10	2	>21	---	---	>21
94	F	6	5	>25	---	---	>25
95	F	6	5	>23	---	---	>23
96	F	6	5	>22	---	---	>22
97	F	9	7	>23	---	---	>23
98	F	9	7	>18	---	---	>18
99	F	9	7	>26	---	---	>26
100	F	8	10	>21	---	---	>21
101	F	8	10	>19	---	---	>19
102	F	8	10	>23	---	---	>23
103	F	7	4	>24	---	---	>24
104	F	7	4	>24	---	---	>24
105	F	7	4	>24	---	---	>24
106	F	5	3	>25	---	---	>25
107	F	5	3	>26	---	---	>26
108	F	5	3	>22	---	---	>22
109	F	4	9	>32	---	---	>32
110	F	4	9	>22	---	---	>22
111	F	4	9	>22	---	---	>22
112	F	2	6	>23	---	---	>23
113	F	2	6	>30	---	---	>30
114	F	2	6	>20	---	---	>20
115	F	1	1	>25	---	---	>25
116	F	1	1	>20	---	---	>20
117	F	1	1	>26	---	---	>26
118	F	3	8	>30	---	---	>30
119	F	3	8	>24	---	---	>24
120	F	3	8	>26	---	---	>26

Special Notes

Laboratory 6

Critical Trials

Start Date 12/6/99 End Date 12/6/99

Conditioning Room Conditions:

Temperature 22°C
Humidity 49%

Test Room Conditions:

Temperature 22°C
Humidity 45%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	2	6	3	0	10	13	
122	E	2	6	2	0	8	10	
123	E	2	6	1	0	13	14	
124	E	5	3	2	0	12	14	
125	E	5	3	1	0	10	11	
126	E	5	3	1	0	12	13	
127	E	4	9	2	0	11	13	
128	E	4	9	5	0	9	14	
129	E	4	9	10	0	8	18	
130	E	8	10	2	0	10	12	
131	E	8	10	1	0	11	12	
132	E	8	10	1	0	11	12	
133	E	7	4	2	0	11	13	
134	E	7	4	1	0	13	14	
135	E	7	4	0	0	14	14	
136	E	1	1	2	0	15	17	
137	E	1	1	1	0	12	13	
138	E	1	1	2	0	12	14	
139	E	3	8	3	0	11	14	
140	E	3	8	3	0	12	15	
141	E	3	8	3	0	11	14	
142	E	10	2	2	0	13	15	
143	E	10	2	1	0	11	13	
144	E	10	2	2	0	10	12	
145	E	6	5	1	0	11	12	
146	E	6	5	2	0	14	16	
147	E	6	5	1	0	14	15	
148	E	9	7	2	0	12	14	
149	E	9	7	1	0	9	10	
150	E	9	7	1	0	12	13	

Laboratory 6

Critical Trials Dust Covers

Start Date 11/23/99 End Date 11/24/99

Conditioning Room Conditions:

Temperature 23°C
Humidity 49%

Test Room Conditions:

Temperature 22°C
Humidity 55%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure _____

Gas Flowrate 45

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	10	2	---	---	---	---	*
152	A	1	1	---	---	---	---	*
153	A	3	8	---	---	---	---	*
154	A	10	2	---	---	---	---	*
155	A	9	7	---	---	---	---	*
156	A	5	3	---	---	---	---	*
157	A	4	9	---	---	---	---	*
158	A	6	5	---	---	---	---	*
159	A	7	4	---	---	---	---	*
160	A	8	10	---	---	---	---	*
161	B	7	4	0	0	0	0	
162	B	8	10	0	0	0	0	
163	B	9	7	0	0	0	0	
164	B	10	2	0	0	0	0	
165	B	6	5	0	0	0	0	
166	B	5	3	0	0	0	0	
167	B	4	9	0	0	0	0	
168	B	3	8	0	0	0	0	
169	B	1	1	0	0	0	0	
170	B	2	6	0	0	0	0	

* Flame reached edge before 20 second flame application done. Extinguished with CO2

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #7 _____

Apparatus ID SEAT FIXTURE #4 _____

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature _____

Humidity _____

Test Room Conditions:

Temperature _____

Humidity _____

Barometric Pressure _____

Flame Ht _____ Gas Pressure _____

Gas Flowrate _____

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	C							
	C							
	C							
P2	C							
	C							
	C							
P3	A							
	A							
	A							
P4	G							
	G							
	G							
P5	H							
	H							
	H							

Laboratory 7

Critical Trials

Start Date 12/14/99 End Date 12/14/99

Conditioning Room Conditions:

Temperature 72°F
Humidity 55%

Test Room Conditions:

Temperature 72°F
Humidity 51%
Barometric Pressure _____

Flame Ht 35 mm Gas Pressure _____

Gas Flowrate 177
Flow meter 177 = 45 ml/min

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	10	9	---	---	---	---	
2	D	10	9	3	---	3	---	
3	D	10	9	>120	>120	---	>120	
4	D	9	4	---	---	---	---	
5	D	9	4	>120	>120	---	>120	
6	D	9	4	8	---	8	---	
7	D	8	3	11	---	11	---	
8	D	8	3	3	---	3	---	
9	D	8	3	>120	---	---	>120	
10	D	7	8	4	---	4	---	
11	D	7	8	4	---	4	---	
12	D	7	8	2	---	2	---	
13	D	6	1	>120	---	---	>120	
14	D	6	1	>120	---	---	>120	
15	D	6	1	5	---	5	---	
16	D	5	5	>120	---	---	>120	
17	D	5	5	3	---	3	---	
18	D	5	5	---	---	---	---	
19	D	4	10	>120	---	---	>120	
20	D	4	10	---	---	---	---	
21	D	4	10	6	---	6	---	
22	D	3	2	5	---	5	---	
23	D	3	2	3	---	3	---	
24	D	3	2	---	---	---	---	
25	D	2	7	10	---	10	---	
26	D	2	7	>120	---	---	>120	
27	D	2	7	>120	---	---	>120	
28	D	1	6	3	---	3	---	
29	D	1	6	---	---	---	---	
30	D	1	6	15	---	15	---	

Laboratory 7

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature _____
Humidity _____

Test Room Conditions:

Temperature _____
Humidity _____
Barometric Pressure _____

Flame Ht _____ Gas Pressure _____ Gas Flowrate _____

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	10	9	---	32	105	105	
32	I	10	9	23	>120	>120	>120	
33	I	10	9	---	3	3	---	
34	I	9	4	5	---	5	---	
35	I	9	4	32	>120	>120	>120	
36	I	9	4	---	5	---	5	
37	I	8	3	23	>120	>120	>120	
38	I	8	3	19	---	40	40	
39	I	8	3	---	---	3	---	
40	I	7	8	22	---	44	44	
41	I	7	8	28	>120	>120	>120	
42	I	7	8	28	>120	>120	>120	
43	I	6	1	6	---	6	---	
44	I	6	1	31	>120	>120	>120	
45	I	6	1	28	>120	>120	>120	
46	I	5	5	21	>120	>120	>120	
47	I	5	5	24	>120	>120	>120	
48	I	5	5	24	>120	>120	>120	
49	I	4	10	18	---	41	41	
50	I	4	10	24	>120	>120	>120	
51	I	4	10	30	>120	>120	>120	
52	I	3	2	28	>120	>120	>120	
53	I	3	2	28	>120	>120	>120	
54	I	3	2	32	>120	>120	>120	
55	I	2	7	4	---	4	---	
56	I	2	7	32	>120	>120	>120	
57	I	2	7	34	>120	>120	>120	
58	I	1	6	36	>120	>120	>120	
59	I	1	6	33	>120	>120	>120	
60	I	1	6	30	>120	>120	>120	

Laboratory 7

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature _____
Humidity _____

Test Room Conditions:

Temperature _____
Humidity _____
Barometric Pressure _____

Flame Ht _____ Gas Pressure _____ Gas Flowrate _____

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	10	9	---	---	3	3	
62	B	10	9	---	---	5	5	
63	B	10	9	---	---	3	3	
64	B	9	4	---	---	3	3	
65	B	9	4	---	---	3	3	
66	B	9	4	---	---	4	4	
67	B	8	3	---	---	8	8	
68	B	8	3	---	---	4	4	
69	B	8	3	---	---	4	4	
70	B	7	8	---	---	3	3	
71	B	7	8	---	---	4	4	
72	B	7	8	---	---	3	3	
73	B	6	1	>120	---	---	>120	
74	B	6	1	---	---	4	4	
75	B	6	1	---	---	3	3	
76	B	5	5	---	---	4	4	
77	B	5	5	---	---	3	3	
78	B	5	5	---	---	3	3	
79	B	4	10	---	---	4	4	
80	B	4	10	---	---	4	4	
81	B	4	10	---	---	4	4	
82	B	3	2	>120	---	---	---	
83	B	3	2	---	---	3	3	
84	B	3	2	>120	---	---	>120	
85	B	2	7	---	---	2	2	
86	B	2	7	---	---	4	4	
87	B	2	7	---	---	3	3	
88	B	1	6	---	---	3	3	
89	B	1	6	---	---	3	3	
90	B	1	6	---	---	4	4	

Laboratory 7

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature _____
Humidity _____

Test Room Conditions:

Temperature _____
Humidity _____
Barometric Pressure _____

Flame Ht _____ Gas Pressure _____ Gas Flowrate _____

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	10	9	>120	---	---	>120	
92	F	10	9	>120	---	---	>120	
93	F	10	9	>120	---	---	>120	
94	F	9	4	>120	---	---	>120	
95	F	9	4	>120	---	---	>120	
96	F	9	4	>120	---	---	>120	
97	F	8	3	>120	---	---	>120	
98	F	8	3	>120	---	---	>120	
99	F	8	3	>120	---	---	>120	
100	F	7	8	>120	---	---	>120	
101	F	7	8	>120	---	---	>120	
102	F	7	8	>120	---	---	>120	
103	F	6	1	>120	---	---	>120	
104	F	6	1	>120	---	---	>120	
105	F	6	1	>120	---	---	>120	
106	F	5	5	>120	---	---	>120	
107	F	5	5	>120	---	---	>120	
108	F	5	5	>120	---	---	>120	
109	F	4	10	>120	---	---	>120	
110	F	4	10	>120	---	---	>120	
111	F	4	10	>120	---	---	>120	
112	F	3	2	>120	---	---	>120	
113	F	3	2	>120	---	---	>120	
114	F	3	2	>120	---	---	>120	
115	F	2	7	>120	---	---	>120	
116	F	2	7	>120	---	---	>120	
117	F	2	7	>120	---	---	>120	
118	F	1	6	>120	---	---	>120	
119	F	1	6	>120	---	---	>120	
120	F	1	6	>120	---	---	>120	

Laboratory 7

Critical Trials

Start Date _____

End Date _____

Conditioning Room Conditions:

Temperature _____

Humidity _____

Test Room Conditions:

Temperature _____

Humidity _____

Barometric Pressure _____

Flame Ht _____ Gas Pressure _____

Gas Flowrate _____

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	10	9	---	---	---	12	
122	E	10	9	---	---	14	14	
123	E	10	9	3	---	14	---	
124	E	9	4	3	---	10	---	
125	E	9	4	---	---	12	12	
126	E	9	4	3	---	14	---	
127	E	8	3	---	---	14	14	
128	E	8	3	---	---	17	17	
129	E	8	3	---	---	15	15	
130	E	7	8	---	---	12	12	
131	E	7	8	---	---	15	15	
132	E	7	8	---	---	14	14	
133	E	6	1	---	---	15	15	
134	E	6	1	---	---	15	15	
135	E	6	1	---	---	15	15	
136	E	5	5	---	---	11	11	
137	E	5	5	---	---	12	12	
138	E	5	5	---	---	12	12	
139	E	4	10	---	---	14	14	
140	E	4	10	---	---	15	15	
141	E	4	10	---	---	15	15	
142	E	3	2	---	---	12	12	
143	E	3	2	---	---	11	11	
144	E	3	2	---	---	12	12	
145	E	2	7	---	---	15	15	
146	E	2	7	---	---	16	16	
147	E	2	7	---	---	14	14	
148	E	1	6	---	---	15	15	
149	E	1	6	---	---	13	13	
150	E	1	6	---	---	13	13	

Laboratory 7

Critical Trials Dust Covers

Start Date _____

End Date _____

Conditioning Room Conditions:

Temperature _____

Humidity _____

Test Room Conditions:

Temperature _____

Humidity _____

Barometric Pressure _____

Flame Ht _____ Gas Pressure _____

Gas Flowrate _____

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
151	A	10	9	<20	---	---	---	
152	A	9	4	<20	---	---	---	
153	A	8	3	<20	---	---	---	
154	A	7	8	<20	---	---	---	
155	A	6	1	<20	---	---	---	
156	A	5	5	<20	---	---	---	
157	A	4	10	<20	---	---	---	
158	A	3	2	<20	---	---	---	
159	A	2	7	<20	---	---	---	
160	A	1	6	<20	---	---	---	
161	B	1	6	<20	---	---	---	
162	B	2	7	<20	---	---	---	
163	B	3	2	<20	---	---	---	
164	B	4	10	<20	---	---	---	
165	B	5	5	<20	---	---	---	
166	B	6	1	<20	---	---	---	
167	B	7	8	<20	---	---	---	
168	B	8	3	<20	---	---	---	
169	B	9	4	<20	---	---	---	
170	B	10	9	<20	---	---	---	

Upholstery Flammability Test Interlaboratory Study Data Sheet

Laboratory ID: #8 _____

Apparatus ID SEAT FIXTURE #3 _____

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature _____

Humidity _____

Test Room Conditions:

Temperature _____

Humidity _____

Barometric Pressure _____

Flame Ht _____ Gas Pressure _____

Gas Flowrate _____

Practice Trials

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
P1	C							
	C							
	C							
P2	C							
	C							
	C							
P3	A							
	A							
	A							
P4	G							
	G							
	G							
P5	H							
	H							
	H							

Laboratory 8

Critical Trials

Start Date _____

End Date _____

Conditioning Room Conditions:

Temperature 70°F

Humidity 54%

Test Room Conditions:

Temperature 72°F

Humidity 51%

Barometric Pressure _____

Flame Ht 35 mm Gas Pressure 0.4 psig Gas Flowrate 178

Flow meter 178 = 45 ml/min

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
1	D	2	5	5	1	6	12	
2	D	2	5	6	1	4	11	
3	D	2	5	5	1	4	10	
4	D	1	3	3	0	7	10	
5	D	1	3	0	0	6	6	
6	D	1	3	2	0	5	7	
7	D	4	8	3	0	6	9	
8	D	4	8	5	0	6	11	
9	D	4	8	3	0	6	9	
10	D	3	7	3	0	5	8	
11	D	3	7	>120	---	---	>120	
12	D	3	7	1	0	6	7	
13	D	6	10	4	0	7	11	
14	D	6	10	3	0	7	10	
15	D	6	10	2	0	8	10	
16	D	5	9	>120	---	---	>120	
17	D	5	9	>120	---	---	>120	
18	D	5	9	2	0	8	10	
19	D	7	6	4	0	11	15	
20	D	7	6	4	0	9	13	
21	D	7	6	3	0	7	10	
22	D	8	2	>120	---	---	>120	
23	D	8	2	4	0	6	10	
24	D	8	2	3	0	5	8	
25	D	9	1	2	0	5	7	
26	D	9	1	2	0	5	7	
27	D	9	1	2	0	6	8	
28	D	10	9	4	0	6	10	
29	D	10	9	4	0	7	11	
30	D	10	9	3	0	5	8	

Laboratory 8

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature 68°F

Humidity 59%

Test Room Conditions:

Temperature 70°F

Humidity 50%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 178

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
31	I	10	4	0	3	1	4	
32	I	10	4	0	3	0	3	
33	I	10	4	0	4	1	5	
34	I	9	1	25	>95	---	>120	
35	I	9	1	0	13	6	19	
36	I	9	1	5	3	2	10	
37	I	8	2	28	0	24	52	
38	I	8	2	0	4	4	8	
39	I	8	2	7	2	4	13	
40	I	7	6	0	0	10	10	
41	I	7	6	2	0	6	8	
42	I	7	6	1	1	4	6	
43	I	6	10	0	0	6	6	
44	I	6	10	5	0	10	15	
45	I	6	10	28	>92	---	>120	
46	I	5	9	32	>88	---	>120	
47	I	5	9	2	0	3	5	
48	I	5	9	0	2	3	5	
49	I	4	8	32	>88	---	>120	
50	I	4	8	0	4	5	9	
51	I	4	8	38	>82	---	>120	
52	I	1	3	0	0	8	8	
53	I	1	3	2	4	6	12	
54	I	1	3	2	3	4	9	
55	I	3	7	45	>75	---	>120	
56	I	3	7	4	0	3	7	
57	I	3	7	4	2	3	9	
58	I	2	5	41	>79	---	>120	
59	I	2	5	40	>80	---	>120	
60	I	2	5	0	6	3	9	

Laboratory 8

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature 68°F

Humidity 59%

Test Room Conditions:

Temperature 73°F

Humidity 44%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 177

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
61	B	1	3	0	0	6	6	
62	B	1	3	0	0	6	6	
63	B	1	3	0	0	5	5	
64	B	3	7	0	0	6	6	
65	B	3	7	1	0	8	9	
66	B	3	7	0	0	8	8	
67	B	2	5	0	0	6	6	
68	B	2	5	0	0	6	6	
69	B	2	5	0	0	6	6	
70	B	4	8	0	0	7	7	
71	B	4	8	0	0	7	7	
72	B	4	8	0	0	7	7	
73	B	6	10	0	0	7	7	
74	B	6	10	0	0	8	8	
75	B	6	10	1	0	7	8	
76	B	5	9	0	0	6	6	
77	B	5	9	0	0	8	8	
78	B	5	9	0	0	6	6	
79	B	8	2	0	0	7	7	
80	B	8	2	0	0	8	8	
81	B	8	2	0	0	7	7	
82	B	7	6	0	0	9	9	
83	B	7	6	0	0	7	7	
84	B	7	6	0	0	8	8	
85	B	10	4	0	0	7	7	
86	B	10	4	0	0	8	8	
87	B	10	4	0	0	7	7	
88	B	9	1	0	0	6	6	
89	B	9	1	0	0	6	6	
90	B	9	1	0	0	5	5	

Laboratory 8

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature 73°F
Humidity 55%

Test Room Conditions:

Temperature 66°F
Humidity 50%
Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4 psig Gas Flowrate 177

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
91	F	2	5	>120	---	---	>120	
92	F	2	5	>120	---	---	>120	
93	F	2	5	>120	---	---	>120	
94	F	3	7	>120	---	---	>120	
95	F	3	7	>120	---	---	>120	
96	F	3	7	>120	---	---	>120	
97	F	1	3	>120	---	---	>120	
98	F	1	3	>120	---	---	>120	
99	F	1	3	>120	---	---	>120	
100	F	5	9	>120	---	---	>120	
101	F	5	9	>120	---	---	>120	
102	F	5	9	>120	---	---	>120	
103	F	4	8	>120	---	---	>120	
104	F	4	8	>120	---	---	>120	
105	F	4	8	>120	---	---	>120	
106	F	7	6	>120	---	---	>120	
107	F	7	6	>120	---	---	>120	
108	F	7	6	>120	---	---	>120	
109	F	6	10	>120	---	---	>120	
110	F	6	10	>120	---	---	>120	
111	F	6	10	>120	---	---	>120	
112	F	8	2	>120	---	---	>120	
113	F	8	2	>120	---	---	>120	
114	F	8	2	>120	---	---	>120	
115	F	10	4	>120	---	---	>120	
116	F	10	4	>120	---	---	>120	
117	F	10	4	>120	---	---	>120	
118	F	9	1	>120	---	---	>120	
119	F	9	1	>120	---	---	>120	
120	F	9	1	>120	---	---	>120	

Laboratory 8

Critical Trials

Start Date _____ End Date _____

Conditioning Room Conditions:

Temperature 75°F

Humidity 45%

Test Room Conditions:

Temperature 68°F

Humidity 56%

Barometric Pressure _____

Flame Ht 35mm Gas Pressure 0.4psig Gas Flowrate 177

Test Order	Fabric Type	Block No.	Specimen No.	After Flame Time (sec)	After Glow Time (sec)	Smolder Time (sec)	Combustion Time (sec)	Special Notes
121	E	2	5	0	0	16	16	
122	E	2	5	1	0	16	17	
123	E	2	5	1	0	16	17	
124	E	1	3	17	>103	---	>120	
125	E	1	3	0	0	18	18	
126	E	1	3	0	0	18	18	
127	E	4	8	1	0	18	19	
128	E	4	8	1	0	17	18	
129	E	4	8	1	0	16	17	
130	E	3	7	7	0	18	25	
131	E	3	7	1	0	21	22	
132	E	3	7	13	0	16	29	
133	E	6	10	4	0	17	21	
134	E	6	10	5	0	14	19	
135	E	6	10	1	0	17	18	
136	E	5	9	1	0	19	20	
137	E	5	9	1	0	16	17	
138	E	5	9	1	0	17	18	
139	E	7	6	1	0	17	18	
140	E	7	6	10	0	13	23	
141	E	7	6	2	0	18	20	
142	E	8	2	1	0	17	18	
143	E	8	2	1	0	18	19	
144	E	8	2	1	0	17	18	
145	E	9	1	5	0	16	21	
146	E	9	1	6	0	14	20	
147	E	9	1	2	0	17	19	
148	E	10	4	0	0	18	18	
149	E	10	4	0	0	18	18	
150	E	10	4	1	0	18	19	