FLAMMABLE FABRICS AMENDMENTS

HEARING

BEFORE THE

SUBCOMMITTEE ON COMMERCE AND FINANCE

OF THE

COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE

HOUSE OF REPRESENTATIVES

NINETY-FIRST CONGRESS

SECOND SESSION

ON

H.R. 16824

A BILL TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEARS 1971, 1972, AND SUCCEEDING FISCAL YEARS TO CARRY OUT THE FLAMMABLE FABRICS ACT, AS AMENDED

SEPTEMBER 10, 1970

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FLAMMABLE FABRICS AMENDMENTS

THURSDAY, SEPTEMBER 10, 1970

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COMMERCE AND FINANCE,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 2123, Rayburn House Office Building, Hon. John E. Moss (chairman) presiding.

Mr. Moss. The committee will be in order.

This morning the Subcommittee on Commerce and Finance will commence hearings on H.R. 16824, which was introduced by the chairman of the full committee, Mr. Staggers, and the ranking minority member, Mr. Springer. The bill would authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act. In conducting hearings on this legislation it will be the purpose of the subcommittee to review briefly the activities of the principal agencies which have responsibilities to enforce the Flammable Fabrics Act; namely, the Department of Commerce, the Department of Health, Education, and Welfare, and the Federal Trade Commission.

Additionally, it will be the purpose of the subcommittee to secure the views of these agencies on similar legislation, namely, S. 3765, which was reported on July 29, 1970, by the Senate Commerce Committee. In addition to providing authorizations for appropriations, the Senate legislation would amend the Flammable Fabrics Act with regard to penalties and by requiring certifications of manufacturers with regard to the conformity of products with existing flammable standards.

Finally, it will be the purpose of the subcommittee to secure from the witnesses their comments concerning the criticisms which have been advanced by the National Commission on Product Safety with regard to the enforcement of the Flammable Fabrics Act.

I trust the witnesses who will be appearing before the subcommittee will keep these several purposes in mind and address themselves to all of these subjects.

(The text of H.R. 16824 and departmental reports thereon follow:)

[H.R. 16824, 91st Cong., second sess., introduced by Mr. Staggers (for himself and Mr. Springer) on April 7, 1970]

A BILL To authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there are authorized to be appropriated such sums as may be necessary for the fiscal years of 1971 and 1972, but not to

exceed a total of $6,000,000, and such sums as may be necessary for succeeding fiscal years, to carry out the purposes of the Flammable Fabrics Act, as amended (15 U.S.C. 1191–1204).

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., May 14, 1970.

Hon. HARLEY O. STAGGERS,
Chairman, Committee on Interstate and Foreign Commerce, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request of April 9, 1970, for the views of the Bureau of the Budget on H.R. 16824, a bill to authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended.

The Bureau of the Budget concurs in the April 17, 1970, report of the Department of Commerce on this legislation. Its enactment would be consistent with the Administration's objectives.

Sincerely,

WILFRED H. ROMMEL,
Assistant Director for Legislative Reference.

DEPARTMENT OF COMMERCE,
OFFICE OF THE GENERAL COUNSEL,
Washington, D.C., April 17, 1970.

Hon. HARLEY O. STAGGERS,
Chairman, Committee on Interstate and Foreign Commerce,
House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request for the views of this Department concerning H.R. 16824, a bill to authorize appropriations for fiscal years 1971, 1972 and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended.

H.R. 16824 is identical to draft legislation submitted to the Congress on March 25, 1970, by the Secretary of Commerce.

Enclosed is a copy of the Statement of Purpose and Need, which accompanied our draft legislation. For the reasons set forth therein, this Department recommends enactment of H.R. 16824.

We have been advised by the Bureau of the Budget that enactment of this legislation would be consistent with the Administration's objectives.

Sincerely,

JAMES T. LYNN,
General Counsel.

STATEMENT OF PURPOSE AND NEED

In 1967 Congress enacted significant amendments through Public Law 90–189 to the Flammable Fabrics Act. The original Act was passed in 1953 and except for a relatively minor amendment in 1954 had remained unchanged through the years.

The 1967 amendments to the Act make certain provisions for a more effective attack on the overall problem of deaths, injuries, and economic losses resulting from fires involving fabrics and related materials, and products made from them. Coverage of the Act, by virtue of these amendments, now includes all articles of wearing apparel and interior furnishings.

Under the Act, the Department of Commerce, mainly through the National Bureau of Standards, is responsible for research into the flammability of materials and the feasibility of reducing that flammability, for the development of flammability test methods and apparatus, for appropriate training in the use of such methods and apparatus, and for the establishment of standards and regulations concerning fabrics and related materials as used in wearing apparel or interior furnishings. The legislation requires the Secretary of Commerce to consider the results of research or investigations in determining that a hazard exists and that a standard or regulation, or a revision thereof, is needed to protect the public.

The Act calls upon the Secretary of Health, Education, and Welfare, in cooperation with the Secretary of Commerce, to conduct a continuing study and investigation of the deaths, injuries, and economic losses resulting from acci-

dental burning of products, fabrics, or related materials. The Federal Trade Commission is charged with the enforcement of this Act through the administrative procedures provided for under the Federal Trade Commission Act together with injunction, condemnation and criminal penalty proceedings in the Federal courts where such action is necessary to protect lives and property.

Section 9 of the mentioned Public Law 90–189 authorized appropriations for the fiscal years ending June 30, 1968, June 30, 1969, and June 30, 1970. Accordingly, it is the purpose of this bill to seek an authorization for appropriations for the fiscal years ending June 30, 1971 and June 30, 1972, and for succeeding fiscal years in order that the Secretary of Commerce, the Secretary of Health, Education, and Welfare, and the Federal Trade Commission may continue to carry out the responsibilities with which they are charged under the Flammable Fabrics Act. The amount sought in this authorization for fiscal years 1971 and 1972 for these 3 agencies is a total of $6.0 million.

A breakdown of the amounts sought by each of the three mentioned agencies under this authorization is provided in the table set out below:

ESTIMATED OBLIGATIONS

Agency	Fiscal year 1971	Fiscal year 1972	[1] Total
Commerce	813	1.587	2.400
Health, Education, and Welfare	1.175	1.175	2.350
Federal Trade Commission	500	750	1.250
Total	2.488	3.512	6.000

[1] Figures shown are in thousands of dollars.

The requested authorization of $2.4 million for the Department of Commerce will permit the continued orderly buildup of the standards and test method efforts required for the effective implementation of the Flammable Fabrics Act. The major use of such funds will be for the expanded development of test methods and standards, the carrying out of research in the flammability of fabrics, and conducting studies on the feasibility of reducing the flammability of fabrics. Under the procedures of establishing standards of flammability, action has been started on standards for wearing apparel and on rugs and carpets. These standards, however, are expected to be only of an interim nature in order that needed protection to the public may be given promptly. Test method development will have to continue. For example, the initial wearing apparel standards will only apply to a few categories representing the greatest hazard. Different garments represent different levels of risk to the public and, therefore, all garments would not be subject to the same standard. Different standards or a series of standards will be required. These different standards are based on various levels of performance in the same test or tests, or may require different tests. Thus, standards and tests for children's sleepwear, or little girls' dresses will differ significantly from those required for adult sleepwear or men's clothing.

A proposed flammability standard for carpets and rugs was published by the Department of Commerce in the Federal Register on December 18, 1969. This standard, based on a cooperative development effort between the National Bureau of Standards and the carpet and rug industry, is a "first generation" standard. It is intended to provide protection from high-risk carpets and rugs that will propagate flame from a small ignition source under conditions of controlled draft. Continued development of carpet and rug flammability tests will be needed however, because the "first generation" test does not stimulate conditions of air movement that exist in corridors and stairwells, nor does it deal with the hazards of smoke and toxic gases.

The funds will also be used by the Department of Commerce for research activities associated with these efforts in setting standards. Investigations will be conducted to determine how retardants inhibit flames. Although much is known about what materials keep cotton and other cellulosic materials from burning, the reasons why these materials behave in this manner are not fully understood. In addition, good substances to reduce the combustibility of non-cellulosic materials are not available. Improvements in retardant materials for cellulosics will come about when the reasons for their behavior are better known.

Moreover, such knowledge will help the development of flame-retardant treatments for non-cellulosic materials as well.

Research will also be done to extend our understanding of the mechanism of the combustion of fabrics. In establishing tests for flammability standards it is necessary to know what the tests are measuring and to relate these measurements to assessment of the ultimate hazard in apparel or interior furnishing fires. Knowledge of the physical and chemical properties of materials involved is important in determining the rate of burning, toxic gas production, heat transfer to the skin, and so forth, all of which are factors to be considered in flammability test measurements.

Research has been conducted the past year in this program to relate flammability tests to ultimate hazard use. Funds requested under this authorization would be used to extend ongoing research of test burning of children's sleepwear on instrumented manikins to stimulate actual fire conditions and thus determine the relationship of laboratory tests to hazard.

This past year research was also started into the hazards resulting from bedding fires. Hazards from such fires are primarily smoke and toxic gases which can cause fatalities. The funds requested for authorization would be used to develop test methods that would reflect these hazards clearly.

A further use of the funds sought under this authorization by the Departments of Commerce and Health, Education, and Welfare will be to investigate the deaths, injuries, and economic losses due to flammable fabrics. This statutory responsibility is shared by the Secretaries of those Departments. Data collection on injuries and deaths and the acquisition of apparel items actually involved in fires has been carried out through a coordinated program by both Departments. The data have been used to help determine what apparel and interior furnishing items constitute unreasonable risks in public use. For example, data on age of victims, frequency of events, and types of garments involved has provided the basis for assignment of first priority to development of flammability standards for children's nightwear. The information is also used for assessing the relationship between test methods and actual hazards encountered in the cases reported. This has been done by testing the materials collected at the scene of the accidents or from the fire victims.

While the Department of Health, Education, and Welfare has expertise in obtaining data on deaths and injuries, the Department of Commerce has competence in assessing the economic losses as a result of fires involving flammable fabrics. Data from sources such as the National Safety Council, the National Fire Protection Association, the American Association of Pediatrics, State and local governments, and fire departments need to be marshaled and used. Besides being used to determine the need for standards and the relationship between test method results and hazards, this information will be disseminated for the use of industry, the research community and individuals concerned with the flammability of fabrics problems.

The funds sought by the Department of Health, Education, and Welfare under this authorization will enable that Department to field eight teams of investigators plus a small clerical support staff to obtain national data on deaths, injuries and economic losses. The field investigation will be supplemented by computer analysis of the data obtained from such investigation. As the table set out earlier herein shows, the requested authorization for the Department of Health, Education, and Welfare in each of fiscal years 1971 and 1972 is $1.175 million.

The table also shows that the Federal Trade Commission seeks $.5 million for fiscal year 1971 and $.75 million for fiscal year 1972 to carry out its enforcement responsibilities under the Flammable Fabrics Act, as amended. The funds sought by the Commission are required to provide additional personnel, particularly investigators, attorneys and scientific and laboratory staff for activities related to carpets and rugs. The Commission also anticipates that additional space and equipment, particularly special laboratory equipment designed to specifically test carpets and rugs and other products within the purview of the Act, will be required.

Mr. Moss. Before recognizing our first witness this morning, I would like to recognize Mr. Keith, the ranking minority member, for any comments he might have.

Mr. KEITH. I have no particular comments, Mr. Chairman, except I have amongst the witnesses this morning a constituent and I trust that the information that we will get from him and his associates will be very helpful to us in our deliberations. Thank you.

Mr. Moss. We are very pleased this morning to recognize as our first witness the Assistant Secretary for Science and Technology of the Department of Commerce, Assistant Secretary Dr. Myron Tribus.

STATEMENT OF HON. MYRON TRIBUS, ASSISTANT SECRETARY FOR SCIENCE AND TECHNOLOGY, DEPARTMENT OF COMMERCE; ACCOMPANIED BY JOSEPH E. CLARK, NATIONAL BUREAU OF STANDARDS; MALCOLM W. JENSEN, ACTING DIRECTOR, INSTITUTE FOR APPLIED TECHNOLOGY, NATIONAL BUREAU OF STANDARDS; AND ROBERT B. ELLERT, ASSISTANT GENERAL COUNSEL, DEPARTMENT OF COMMERCE

Mr. TRIBUS. Thank you, Mr. Chairman, and members of the subcommittee.

My name is Myron Tribus. I am Assistant Secretary for Science and Technology of the Department of Commerce. I am here today to urge enactment of H.R. 16824, to authorize appropriations to carry out the Flammable Fabrics Act, as amended.

I have with me several associates. On my extreme right is Dr. Clark of the National Bureau of Standards, who is in charge of the work there which I will describe as my testimony is presented. On my near right is Malcolm Jensen, who is Acting Director of the Institute for Applied Technology in the National Bureau of Standards, and on my left is Mr. Robert Ellert, who is Assistant General Counsel in the Department of Commerce.

The Flammable Fabrics Act is a major step toward the reduction of loss of life, injury, and property damage from unwanted fires. The responsibilities of the Department of Commerce under the Flammable Fabrics Act have been assigned to me by the Secretary. The research and test method and standards development are conducted by the National Bureau of Standards, which is under my jurisdiction. Other members of my immediate staff participate in discussions with industry and consumer representatives in the matter of standards to protect against flammable fabrics. Later in this statement, I will describe in more detail activities at NBS under the act.

During the past year and a half the flammable fabrics program has been one of the high priority activities at the Department of Commerce and at the National Bureau of Standards. I know that you have great interest in this program, and it is for that reason that we wish to tell you of our recent progress. I also want to take this opportunity to assure you of my personal interest in this subject.

The day following my appointment as Assistant Secretary in April 1969, I asked for a review of the flammable fabrics program of the Department.

As a result of that review, I conferred with the Secretary. With his support, the following actions were taken:

1. The Department requested increased funds for fiscal years 1971 and 1972 for use in implementation of the act;

2. The staff at the National Bureau of Standards working on this program was reorganized, increasing the number of personnel working on the program.

3. Action was initiated to increase the flow of data concerning deaths, injuries, and economic losses resulting from the accidental

burning of products, fabrics, or related materials from the Department of Health, Education, and Welfare that was envisioned by section 14(a) of the act.

4. Research contracts were let by the National Bureau of Standards to supplement the research work being performed in-house on flammable fabrics.

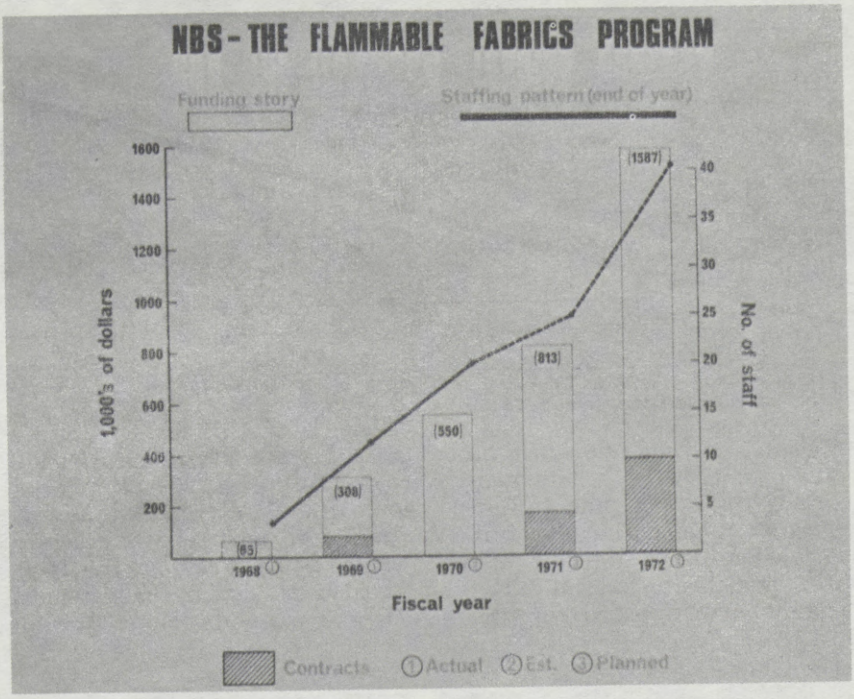
5. The entire program of the Department was reorganized to provide a systematic approach to the identification and evaluation of common problems of flammable fabrics and development of test methods to deal with these problems. Examples of these problems are the identification and measurement of by-products of combustion, measurements of heat transfer from burning garments, and investigation of the operation of flame retardants, not only to see if they work but to see if they can release poisonous materials. Such research provides methods and techniques to determine the flammability characteristics of fabrics and interior furnishings.

6. The first meeting of the National Advisory Committee for the Flammable Fabrics Act was called for May 2, 1969, 1 month after my appointment. Prior to my appointment the committee had not once met.

The results of these actions are beginning to show. Since that time, we have issued a flammability standard for large carpets and rugs, a proposed standard for small carpets and rugs, and notices of proposed need for flammability standards for children's wearing apparel, for blankets, and for mattresses.

In the new emphasis on the subject, the flammable fabrics program has received unusually high priority in the allocation of the resources of the National Bureau of Standards during the past year and a half. For example, the President's budget for fiscal year 1970 contained a requested increase of $2.25 million for all NBS programs, including an increase of $150,000 for work on flammable fabrics. The fiscal year 1970 appropriation that was finally approved provided an increase of only $550,000 for the Bureau as a whole, or about one-fourth of what had been requested. Nonetheless, NBS obligations for the flammable fabrics program during the past fiscal year increased by $242,000, which is more than 1½ times the increase originally planned. This, of course, means that other worthwhile programs must be funded at lower levels and is in itself an indication of the high priority which we place on the flammable fabrics program.

EXHIBIT 1



As you can see from exhibit 1—we have a chart to your left—the National Bureau of Standards supported the initiation of the flammable fabrics program out of its regular appropriation, at a level of $65,000 during fiscal year 1968. The first appropriation for flammable fabrics—$308,000—became available in fiscal year 1969. During fiscal year 1970 our obligations were about $550,000. For this fiscal year we plan to obligate $813,000 based on the recent House action on our fiscal year 1971 appropriation request. H.R. 16824 would authorize another $1,587,000 for obligation in fiscal year 1972. The actual level of obligations for fiscal 1972 would of course be subject to further review by the Department of Commerce, the Office of Management and Budget, and the Congress. Table 1 provides a breakdown of actual and planned obligations for fiscal years 1968 through 1971. You have that table attached to the statement that has been prepared for you.

TABLE 1.—DEPARTMENT OF COMMERCE, NATIONAL BUREAU OF STANDARDS—FLAMMABLE FABRICS ACT AS AMENDED

[In thousands of dollars]

	Distribution of appropriated funds						Proposed distribution of authorized funds	
	Fiscal year 1968		Fiscal year 1969		Fiscal year 1970 [1]		Fiscal year 1971 [2]	
	In-house	Contract	In-house	Contract	In-house	Contract	In-house	Contract
Research			19	41	170		215	35
Standards and test development	32		114		235	6	290	50
Information			38		40		40	
Accident data analysis and tests	31		38	25	60		60	40
Special-purpose equipment	2		33		39		83	
Total	65	0	242	66	544	6	688	125
Total	65		308		550		813	

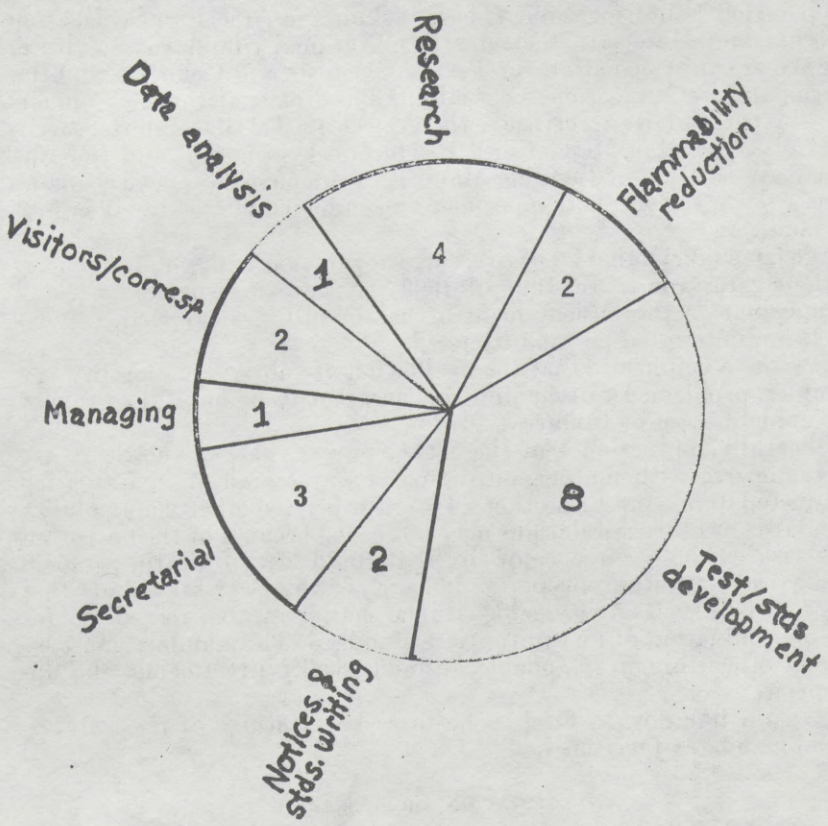
[1] Projected estimate.
[2] Fiscal year 1971 budget request before the Congress.

Using the funds shown in table 1 NBS has built from a nucleus of four people, which is how many were on the project when I arrived, to the present full-time staff of 20 people directly engaged in the program. Supplementing our full-time staff with part-time help of experts from other divisions at NBS allows us to carry out the functions described in exhibit 2. Exhibit 2 is also attached to the statement that I have prepared for this session and is on the chart to your left.

EXHIBIT 2

NBS - THE FLAMMABLE FABRICS PROGRAM

Our current program — 23 man years of effort



Our current program represents 23 man-years of effort. The major effort was the development of test methods necessary in standards for flammability with at least 8 full man-years of effort devoted to this work during the past year. Supporting the test method development were 4 man-years of research and 2 man-years devoted to feasibility studies on reducing the flammability of fabrics. Less than 5 percent is devoted to the management of our program, including the preparation of notices and standards for the Federal Register, handling the hundreds of visitors that we have each year, and finally analyzing accident data received from the Department of Health, Ed-

ucation, and Welfare and from other sources. The progress we make depends on the teamwork of dedicated groups of from one to eight NBS staff members, carrying on each of these functions.

In addition, many organizations, both in and out of Government, have assisted us. HEW and the Federal Trade Commission cooperate as provided in the law. Our national advisory committee was established in 1969 to give advice and comments. We received useful input from the National Commission on Product Safety, from Mrs. Virginia Knauer, Special Assistant to the President on Consumer Affairs, and from the National Safety Council. We have received fine cooperation from Consumers Union and Underwriters' Laboratories. Voluntary standards groups have worked closely with us. Indeed their cooperation is indispensable. These include the American Society for Testing and Materials, the American National Standards Institute, the American Association for Textile Chemists and Colorists, and the National Fire Protection Association. The National Cotton Council, the Carpet and Rug Institute, the American Textile Manufacturers Institute, the Man-Made Fiber Producers Association, and the National Association of Bedding Manufacturers have been very cooperative. As you can see, both consumer and industry views are taken into account.

We have taken other steps to assure cooperation with public agencies and private groups. In June of 1969 the Bureau sponsored a 2-day symposium on the measurement of flammability. More than 600 experts and interested persons attended.

I wish to emphasize that the evaluation of fabric flammability is a complex problem. In discussing this act, it may be helpful to review the guidelines set by Congress.

Generally, in section 4 of the act, Congress charged the Secretary of Commerce with finding, on the basis of research or investigation conducted pursuant to section 14 of the act, whether flammability standards or other regulations may be needed because of the unreasonable risk of the occurrence of fire that could lead to death, personal injury, or significant property damage. If the Secretary finds that there may be such unreasonable risk, he shall institute proceedings for the determination of an appropriate standard. The standard must be, among other things, reasonable, technologically practicable, and appropriate.

I would like now to discuss the three key features of the congressional mandate of section 4.

INVESTIGATION OR RESEARCH

First, as to the finding of the Secretary of Commerce that a flammability standard may be based upon investigations or research conducted pursuant to section 14 of the act. We believe that either statistical investigation or laboratory research or some combination of these will afford an adequate legal basis for a standard issued under the act.

Section 14 authorizes the Secretary of Commerce to conduct research in flammability of fabrics. The same section places primary responsibility for the statistical investigation of deaths, injuries, and economic losses resulting from the accidental burning of products, fabrics, or related materials on the Secretary of Health, Education,

and Welfare. To date, only about 200 investigations per year have been reported to Commerce.

To remedy the lack of case data the National Bureau of Standards contracted with the Denver Research Institute at the University of Denver to design a sampling plan and develop a questionnaire for the collection of burn-case data. The plan would identify cases, based on a random national sample, which involve fabric related fires. We hope this plan will both provide more useful data now and also serve as a model for future data collection efforts.

We have had consultation with HEW concerning the collection of data and a copy of the report from the Denver Research Institute has been forwarded to HEW for its consideration and possible implementation. HEW has assured us that it intends to increase significantly the collection of information on in-depth investigations. I will speak more about this later.

In view of the problems encountered by HEW in the collection of meaningful data, we have relied mainly upon research efforts to develop flammable fabrics standards that meet the requirements of the act. This is a sound way to solve the problem, but it is expensive and time consuming. Although there has been much written about burn injuries in medical journals, there has been little written about the technical aspects of fabric flammability that would aid in establishing standards. We, therefore, had to channel into research some of our resources which we otherwise would have been able to utilize in the development of standards on specific fabric items. Research went into such things as the variables affecting the transfer of heat from burning fabrics to skin. Such information is valuable in understanding just what the hazard presented by a burning fabric may be and, more importantly, how to establish a test method to eliminate the heat transfer found to be injurious.

Recently, at my suggestion, the American Textile Manufacturers Institute, the National Cotton Council, and the Man-Made Fiber Producers Association each pledged $25,000 to a fund for research into the quantitative definition of hazards relating to wearing apparel. Dr. McElroy, director of NSF, and I met and agreed that matching funds should be pledged by the National Science Foundation. The total of $150,000 is to be used for support of research at universities or other appropriate institutions. The National Bureau of Standards will provide technical guidance on the type of research to be done. A committee was formed of representatives of these several groups. They developed a work statement, solicited proposals responsive to that statement, and reviewed 42 proposals. The committee meets this week to make the final selection of the proposals to be funded. I am pleased that the Department of Commerce, industry, and the NSF have developed this means for collaboration. We are exploring ways to use this style in the future.

As a result of the research performed this past year and our own increasing knowledge, we now have a much better foundation of information from which we can develop standards. I would like to submit for the record a copy of NBS Technical Note 525, a publication of our reports to the Congress which describes in more detail work done at the Bureau on the flammable fabrics program in 1968 and 1969.

Mr. Moss. Without objection, the item referred to will be received for the record. Is there objection? Hearing none, it is so received.

(See p. 17, for publication referred to.)

UNREASONABLE RISK

Mr. TRIBUS. The second feature of the act that I would like to discuss is the requirement that the Secretary of Commerce determine that there is an unreasonable risk from which the public should be protected. There was no explanatory material concerning the interpretation of the term "unreasonable risk" in the reports accompanying the amendments to the act.

The Department has chosen not to attempt to establish a general rule as to what constitutes an "unreasonable risk" applicable to all cases. Each determination is made on a case-by-case approach after weighing all of the evidence in each case. I have prepared a discussion of the kind of analyses that I believe are useful in determining unreasonable risk and I have prepared a paper, a decision analysis approach to satisfying the requirements of the Flammable Fabrics Act.

In leaving a career in research for one in Government, I found that it still was necessary for me to engage in some form of personal research in order to carry out the responsibilities given me by the Secretary of Commerce, in particular, the work on this publication, done oftentimes late into the night, represents that kind of an effort and I offer it also for the record.

Mr. Moss. Is there objection? Hearing none, the item will be received and included for the record.

(See "Decision analysis approach to satisfying the requirements of the Flammable Fabrics Act," p. 101, this hearing.)

REASONABLE, TECHNOLOGICALLY PRACTICABLE, AND APPROPRIATE

Mr. TRIBUS. A final point that I would like to make concerning the section 4 requirements of the act is that any standard issued pursuant to the act must be among other things, "reasonable, technologically practicable, and appropriate." It is clear that the Secretary should consider all pertinent factors, such as but not limited to, reduction of hazard, cost to the public, incentives to industry, effect on durability and wearability, and particularly in the wearing apparel field where claims of durable, practical flame-retardant treatments are widely contested, require the Department to conduct extensive study. It has been necessary that we establish means of independently evaluating such claims regarding fabrics and fabric products that may be affected by standards.

This means, for example, that we must take into account the effects, if any, of the treatment on the durability of garments. If the cost of the treatment causes the sale price to rise 25 percent and the life of the garment is reduced to a quarter, the consumer would be paying five times as much for his clothing as he does now. We must also be sure that the chemical treatment does not wash out in the various kinds of water and cleaning products used in different parts of the country and that it does not cease to protect when exposed for long times in sunlight. Each of the troubles I have indicated has been encountered

by one or another manufacturer. We have received information that the textile industry spends about $2½ million per year on the development of flame-retardant treatments. This estimate does not take into account the efforts of the synthetic fiber manufacturers or the chemical industry. If their efforts were added in, the total would be in excess of $10 million. While I am confident of the ability of the textile manufacturers to meet and overcome this challenge, it nevertheless has been and continues to be a tough problem. Within the limitations of our budget, we intend to assist in the solution of this problem through encouragement of industry and appropriate research efforts on our own part.

It is not always easy to accord the proper weight to each of the factors involved. In order to put the various claims concerning consumer and industry cost into perspective we recently obtained independent cost evaluation of flame-retardant finishes. Although we now believe that we have an appropriate mechanism to obtain independent evaluation of conflicting claims, the determination of "reasonable, technologically practicable, and appropriate," will continue to be a problem which will require a considerable portion of our resources. Moreover, we must be guided by the importance of protection to the public in making these trade-offs and decisions. We are mindful of the statement in House of Representatives Report No. 972, 90th Congress, first session, that "The words 'technologically practicable,' as used in section 4(b), would not prevent the Secretary from finding under appropriate circumstances that the reasonable and appropriate way to protect the public from a particular unreasonable risk is to, in effect, remove a fabric, related material, or product from the market."

PROCEDURES

In implementation of the act, the Department established a set of procedures in 1968.

We are in the process of reevaluating these procedures on the basis of our experience thus far under the act. We have noted the critical comments on several aspects of these procedures contained in the study contracted for by the National Product Safety Commission. These comments will be carefully considered in our reevaluation.

NACFFA

Another matter that I would like to mention is the National Advisory Committee for the Flammable Fabrics Act. I believe very strongly in the use of advisory committees in Government. Prior to joining this administration, I served in such an advisory capacity and I know firsthand, the influence that such groups can have, provided their advice is heeded. Accordingly, within a month after I assumed office I had my first meeting with the National Advisory Committee for the Flammable Fabrics Act. Since that time there have been three other meetings, the most recent last July 10. The discussions at our meetings are broad in scope and deep in character. In keeping with the intent of Congress, manufacturers, distributors, and representatives of the consuming public are all represented on this committee. The attendance has been near perfect. At no time has more than one member been absent. I intend to continue to utilize this body as a sounding board and a source of advice.

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SETTING OF PRIORITIES

Our criterion for setting priorities is to seek the area or areas where the need can be demonstrated, either by statistical investigation or laboratory research or both, to be the most critical. For example, an analysis of data available to us showed that in the area of wearing apparel, young children are 3½ times more likely to die in a fire than other segments of our population. We have found that a significant portion of building fires originates in bedding.

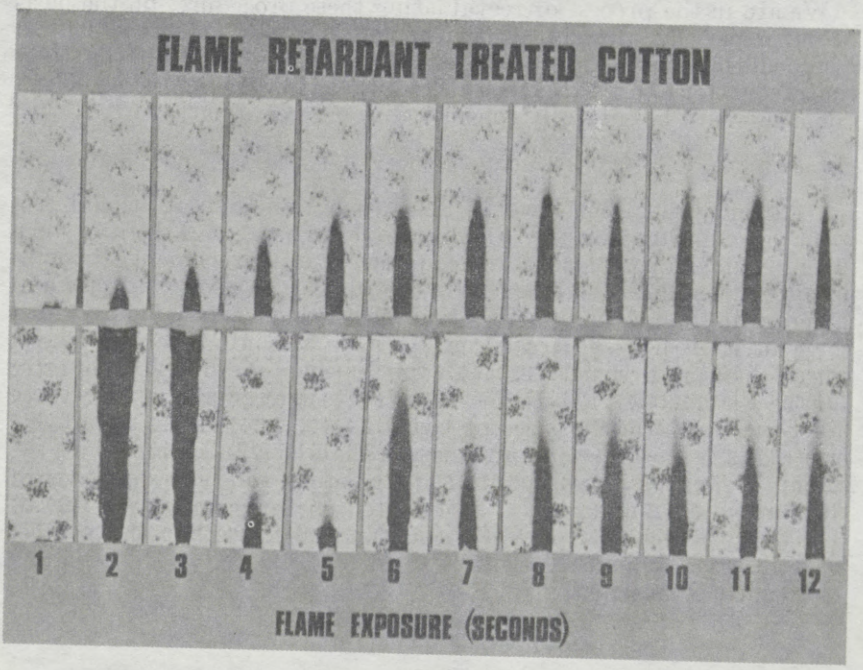
These data showed us that in wearing apparel we should concentrate our efforts on these young children who could not care for themselves, and in interior furnishings we should concentrate on bedding fires. Accordingly, we have issued findings of possible need for flammability standards on children's wearing apparel and mattresses and blankets and are concentrating our efforts on these subjects. I should also add that this was the sum and substance of the advice given us by the Flammable Fabrics Advisory Committee.

What prevents more rapid progress? This is a tough technical problem. There are occasional surprises, too. One problem which we have solved is illustrated in the film that I should now like to show you.

In this film we show a treated flannel fabric of a type intended for a child's nightgown. The test under investigation is a vertical flame test in which a sample of the material is held in a standard frame and the flame of a bunsen burner is applied 12 seconds, and when removed the flame goes out—an apparently successful flame retardant. But if the burner flame is applied for only 3 seconds, the fabric exhibits self-sustained flaming.

May we have that film, please. We have on the exhibit board to your left samples of the same fabric that you saw in the film (exhibit 3).

EXHIBIT 3



We have found that exposing this fabric to flame for short periods—2 or 3 seconds—results in its destruction, yet when exposed for longer times—up to 12 seconds—self-sustained burning does not occur. This is because the source flame, when it is applied for longer times, is consuming the oxygen that the fabric needs to burn. This critical dependence on oxygen supply has been seen only in fabrics treated with inadequate amounts of flame-retardant chemicals, such as the red-print one. Properly treated cottons such as the blue-print one, are flame-resistant.

I would simply like to point out that had we not conducted this research we would have encouraged the industry to put out materials which would meet the existing tests but which would not have provided protection to the public, and it is only through research and study we could find this. In retrospect when you have the answer to the problem it always looks very simple and you wonder why didn't we know this in the beginning. But in actuality, it takes a lot of hard work to find and expose these effects and phenomena.

With this understanding of the problem, we are in a better position to protect against flammable nightwear which classical test methods show to be safe. We might propose to precede the longer 12-second exposure which is commonly used in these tests with a brief 3-second exposure, and thus protect both the manufacturer and the consumer from being misled.

Clearly, things are not always what they seem at first glance to be in the flammability of fabrics. Accordingly, our program ranges from research on the factors that determine flammability to the analysis of burn-case data. Our research base is now too thin—it must be increased to insure that we develop test methods and standards from a base of sound knowledge.

Hard information on actual burn cases is essential for the entire program. Such data are the basis for determining that there is a public hazard, one that involves unreasonable risk. Beyond this, facts are needed—facts such as the nature of a fire, its cause, the extent of injury inflicted, and the kind of fabric or material involved. These facts are needed to determine what flammability measurements are relevant to the hazard involved. For example, it is not enough to know how many people die in the bed fires. We must know if the deaths resulted from burns or fumes produced by the fire. A standard protecting against flame-spread in mattresses would offer little protection if most deaths from such fires resulted from smoke or toxic gases where there is smouldering but no flame.

As I have indicated, if the test methods we are developing are to be useful, they must relate to actual use conditions. In order to develop such tests, we must have information on the details of accidents, involving fabrics, as well as samples of the fabrics involved, so that we may correlate the behavior in a given test method.

The Department of Health, Education, and Welfare has been providing us with case histories containing such information, based on their in-depth investigation of flammable fabrics accidents. According to our records, NBS had received a total of 708 in-depth case reports through September 1, 1970. Of these, 108 were received in calendar 1969, and 267 so far, in calendar 1970. I have been assured that HEW is increasing its in-house data collection effort by an additional 17 man-years during the present fiscal year. We have been consulting with

HEW about maintaining the quality of the reports as the quantity is increased. Case history reports must provide details of what transpired during the accident, or samples of fabrics involved in the accident, or else they are of little value for the purposes of test development.

In addition to the need for detailed information on fabric fires, NBS needs data on the frequency and the effects of fabric fires, in order to identify areas in which there may be a need for a new or improved standard. We need information to help establish priorities, and to determine the effects of the promulgation of any standard. But while such data need not be as detailed as that required for test development, they must reflect what is happening in the entire country; they must be representative of the total U.S. population.

In conclusion, Mr. Chairman, we are making progress and expect to see our test development program lead to a series of successively more effective standards. There are many unresolved technical problems; there is a need for more information on how, where, and when fabric flammability hazards are a peril to the public. The law cannot protect the consumer from his own carelessness. On the other hand, the consumer must be assured that the fabrics he buys are as safe as modern technology can make them. Unfortunately, technical progress in reducing fabric flammability is slow, but it is the only effective solution to the hazard other than eliminating ignition sources. We have been developing, and with the funds for which we seek authorization, we will continue to develop significant standards and test methods to provide the consumer the best protection today's technology permits, as well as to stimulate further progress in flammability reduction.

Thank you, Mr. Chairman. This completes my prepared testimony.

(The attachments to Mr. Tribus' prepared statement follows:)

UNITED STATES DEPARTMENT OF COMMERCE
Maurice H. Stans, Secretary
NATIONAL BUREAU OF STANDARDS • Lewis M. Branscomb, Director

NBS TECHNICAL NOTE 525

ISSUED APRIL 1970

Nat. Bur. Stand. (U.S.), Tech. Note 525, 84 pages (Apr. 1970)
CODEN: NBTNA

The Flammable Fabrics Program 1968-1969

U.S. Department of Commerce Report of Activities Under the Flammable Fabrics Act 1968-1969

NBS Technical Notes are designed to supplement the Bureau's regular publications program. They provide a means for making available scientific data that are of transient or limited interest. Technical Notes may be listed or referred to in the open literature.

PREFACE

The 90th Congress amended the Flammable Fabrics Act of 1953 to authorize the Secretary of Commerce to conduct research on the flammability of fabrics, related materials, and products; to conduct studies on the feasibility of reducing their flammability; to develop test methods and devices; and to offer training in the use of these devices. The responsibility for these activities was delegated by the Secretary to the National Bureau of Standards.

The amended Act (PL 90-189) requires annual reports to the Congress on the above activities. The first such report was transmitted to the Congress on March 23, 1970. It is believed that the information in this report is of interest to the public and should be made readily available. This Technical Note is thus a publication of that report.

Summary

This report describes the work carried out during 1968 and 1969, by the Department of Commerce to fulfill the responsibilities delegated to that Department under Section 14(b) of the Flammable Fabrics Act as amended (81 Stat. 568) December 14, 1967. This section of the Act states:

"Sec. 14(b) In cooperation with appropriate public and private agencies, the Secretary of Commerce is authorized to---

(1) conduct research into the flammability of products, fabrics, and materials;

(2) conduct feasibility studies on reduction of flammability of products, fabrics, and materials;

(3) develop flammability test methods and testing devices; and

(4) offer appropriate training in the use of flammability test methods and testing devices.

The Secretary shall annually report the results of these activities to the Congress."

This report describes the activities carried out under the above responsibilities and in addition describes cooperation with public and private agencies.

1. Under Research into the Flammability of Products, Fabrics, and Materials, Sec. 14(b)(1), work is described on seven projects being carried out in-house, and on three projects carried out under contract with outside research organizations.

In-house research is being carried out on the following items:

1.1 Products of combustion - This project is to learn the amounts and nature of combustion products (some of which are toxic) to be expected from fabrics during normal burning. The study is directed primarily at interior furnishings. Fires from such furnishings often are dangerous because of the toxic products produced.

1.2 Calorimetry - The amount of heat released from a burning fabric, and the rate at which it is released are basic in determining the hazard from the fabric. It is important to know these quantities when designing new and meaningful standards. In addition, these quantities are important to the nature of the flammability of fabrics.

1.3 Full Scale-Garment Burning - This research effort is an attempt to reproduce in the laboratory what happens in actual accidents. Measurements of such quantities as ease of ignition, heat transferred to the body, and the temperatures developed, with various garment configurations and with various materials, are important in determining the hazards from apparel fabrics. This information is necessary to develop meaningful test methods and reasonable and appropriate standards.

1.4 Analysis of Burn Case Data - A significant effort has been devoted to the analysis of burn case data supplied to NBS by the Department of Health, Education, and Welfare, as well as to the testing of garments recovered by that Department from some of the cases investigated. This analysis has been used to substantiate in part a finding of probable need for a new standard for apparel published on October 23, 1968. A finding of probable need for certain items of children's apparel, published on January 24, 1970, (shortly after the close of the reporting period) was also based on the analysis. In addition, the results of tests on the recovered garments, and the relationships of these results to the accident cases have yielded important information about what constitutes meaningful apparel standards.

1.5 Analysis of Data from Outside Laboratories - Data on the testing of carpets and rugs using the present Federal purchase specification DDD-C-95 were provided to NBS by Consumers Union, an organization located in Mount Vernon, New York, specializing in the testing of consumer products. After analysis, these data were used to substantiate in part a finding of probable need for standards for carpets and rugs published December 3, 1968.

1.6 Investigation of the Mechanism of Flame Retardants - One of the most important means of reducing the flammability of fabrics is by the addition of flame retardants. These are presently available for cellulosic fabrics, but are useful only for certain types and constructions. This effort is to understand the means by which the flammability is reduced.

Contract Research was carried out in the following three areas:

1.7 Characterization of Actual Hazards from Interior Furnishings Fires - Full-scale assemblies of beds were burned in a normal sized room, and temperature increase, smoke, and toxic gas concentrations were measured. These were related to the bedding materials and the means of ignition. Similar studies were carried out with upholstered chairs. The work was carried out by the Southwest Research Institute in San Antonio, Texas.

1.8 Heat Transfer from Burning Fabrics - Heat transferred from a burning fabric to the body, and the rate at which it is transferred are what ultimately cause injury in apparel fires. To determine the important factors in determining this heat transfer, a contract was funded at the Cornell Aeronautical Laboratory in Buffalo, New York.

1.9 Sampling Plan and Model Questionnaire - Data on burn statistics are important in assessing unreasonable risk. A project to develop a system to obtain such data was funded under contract with the Denver Research Institute of the University of Denver, in Denver, Colorado. This is expected to be completed in early 1970.

2. The activities carried out under Feasibility Studies, Sec. 14(b)(2), were all carried out in-house. These are grouped under the following headings:

2.1 Pyrolysis Products - A study of the pyrolysis products is a way of determining the manner in which flame-retardants act, and thus of improving present flame-retardant treatments, and aiding in the development of new flame retardants. This project was begun late in 1969.

2.2 Industry and Other Government Developments - Considerable effort has gone into keeping abreast of outside efforts in this area, for these efforts are important in determining what standards are reasonable.

2.3 Evaluation of Durability of Existing Treatments - Considerable effort has gone into the evaluation of the durability to laundering and drying existing treated fabrics. Some treatments were found to be quite durable.

3. The activities carried out in Test Method Development, Sec. 14(b)(3), were all carried out in-house. These activities were as follows:

3.1 Development of a standard for Carpets and Rugs - A test method and standard based on the Federal purchase specification DDD-C-95 was developed and published as a proposed standard on December 18, 1969. Comments on this standard were being received at the end of 1969.

3.2 Revision of Apparatus in CS 191-53 - The present mandatory standard for flammable fabrics has several technical deficiencies. Foremost among these are the inability to distinguish between time to ignition and rate of burning. To correct this, an ignition test and a rate of burn test were developed.

3.3 Vertical Test Method - The vertical test is the most stringent of those in present use, and is used for those special circumstances when maximum protection is required and other considerations are secondary. Considerable work was done with this test method.

3.4 Tests on Bed Materials - A program was begun during 1969, to develop methods for testing the flammability of bed materials. Mattresses are receiving considerable attention, using cigarettes as a source of ignition.

3.5 Heat Release Test - No present test method measures the heat released by a burning fabric, despite the importance of this quantity in determining the hazard from the fabric. Work was begun in 1969, to develop a test for measurement of heat released during burning.

4. Activities under Training, Sec. 14(b)(4), were carried out in these ways:

4.1 Research Associates - The Research Associate program of NBS is a direct means of providing training. One Research Associate (from Consumers Union) was on board during part of the reporting period, and discussions for others were held with various interested organizations.

4.2 Bibliographies and Information Center - Three bibliographies, quoting pertinent literature references in the areas of Wearing Apparel, Fabrics Used on Beds, and Carpets and Rugs were completed during 1969, and were scheduled to be published early in 1970. Other bibliographies are scheduled for preparation, and an information center for flammable fabrics has been set up at NBS.

In addition to the above, there have been numerous formal and informal contacts with outside organizations and individuals, either by talks given by Department of Commerce personnel or visits by interested parties.

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1. Introduction

The Flammable Fabrics Act was enacted in 1953, amended in 1954, and further amended in 1967, in order ". . . to protect the public against unreasonable risk of the occurrence of fire leading to death or personal injury, or significant property damage . . ." resulting from the accidental burning of fabrics, related materials or products.

The Act, as amended, states in part:

"Sec. 14(b) In cooperation with appropriate public and private agencies, the Secretary of Commerce is authorized to--

(1) conduct research into the flammability of products, fabrics, and materials;

(2) conduct feasibility studies on reduction of flammability of products, fabrics, and materials;

(3) develop flammability test methods and testing devices; and

(4) offer appropriate training in the use of flammability test methods and testing devices.

The Secretary shall annually report the results of these activities to the Congress."

The Secretary of Commerce delegated responsibility for activities under Section 14(b) to the National Bureau of Standards by revision of Department Organization Order 30-2A dated October 1, 1968.

Funds to carry out these activities were not made available to the Department of Commerce until October 1968. As a result, progress in calendar year 1968 was minimal, and this report covers both years 1968 and 1969.

At the end of calendar year 1969, the National Bureau of Standards had 17 staff members directly employed in the implementation of the Department's responsibilities under the amended Act, plus the partial efforts of other staff members equivalent to a rate of another three man-years. This is in contrast to a full time staff of five at the end of calendar 1968. In addition, three contracts with outside research organizations had been negotiated and initiated in 1969, to complement the in-house effort.

2. Activities Under Sec. 14(b)(1): Research

Although many thousands of persons have been injured or killed as a result of the burning of flammable fabrics, adequate details have not been available as to the causes of the accidents, the frequency of ignition of different kinds of garments and interior furnishings, the nature, extent and severity of injury, and the nature of the hazards to which the public is exposed from burning fabrics. Much of the emphasis in research has been to identify these hazards and obtain quantitative information about them. In addition to in-house research, three contracts with outside research organizations have been funded. The two types of research are complementary, but for clarity they will be described separately.

2.1 In-House Research

2.1.1 Products of Combustion

Both actual fire reports and laboratory studies indicate that interior furnishings frequently become involved in slow, smoldering combustion with production of large quantities of smoke and fumes, but without open flaming. Moreover, in a large percentage of interior furnishing fires, fatalities are believed to have resulted from oxygen depletion, toxic gases, smoke inhalation, heat, or combinations of these, rather than burns. It is known that burning fabrics may produce toxic gases such as carbon monoxide, particulate smoke, and non-burned residues, but it is not known how much of each particular kind of product a burning fabric will produce during normal combustion. The amounts and kinds of combustion products are clearly related to the hazard from the burning of the fabric, and the amounts and kinds can be determined by performing a material balance for the burning of the fabric.

A research project has been started to carry out such a material balance on interior furnishing materials. This project involves the collection of the solid, liquid, and gaseous products of combustion, as well as any solid residues. Typical gases expected from the combustion of most materials are carbon monoxide, carbon dioxide, and water. These are invisible and odorless. However, other products of combustion are liquids such as tarry aerosols, and solids such as carbon particles. Excessive inhalation of these can and does cause death. Some materials give off other, less common but still highly toxic, gases during combustion. These products, which often act as

lachrymators, must be collected, identified, and the amounts measured quantitatively.

The technique involves ignition of representative specimen materials in a sealed chamber, in the presence of a carefully controlled atmosphere, and gathering of the combustion products and residue for analysis. Preliminary results indicate that the visible smoke from burning mattress materials is composed mainly of tarry aerosols. To date, there has been no attempt to further characterize these tars, which would be a long and tedious task. In experiments with polyurethane bedding materials, special emphasis will be placed on the detection and identification of types and amounts of toxic gases, particularly hydrogen cyanide.

2.1.2 Calorimetry

The principal aim of test method research is to determine what fabric parameter is representative of the hazard from the burning fabric. It is tacitly assumed in the present mandatory standard (CS 191-53) that those materials that burn more rapidly are more dangerous. It is known, however, that the total amount of heat given off as well as the rate of burning are important in determining the hazard from a burning fabric; in order to be dangerous, a fabric must give off a significant amount of heat and must do this in a short time. Thus, in order to characterize the hazard from a burning fabric, the amount of heat given off must be known, as well as the rate at which it is given off.

A research study is in progress to measure the total amount of heat released from burning fabrics, by calorimetric techniques. The apparatus, shown in Figure 1, is currently capable only of measurement of total heat release, but further refinement will permit measurement of the rate of heat release as well. While calorimetry may be carried out in various atmospheres, and pure oxygen is used frequently, in this study, the atmosphere was air, as in normal use conditions. Preliminary results indicate the combustion of cotton flannelette in air is about 80 percent complete, in terms of the ratio of actual heat release to the theoretical heat release.

2.1.3 Full Scale Garment Burning

The measurements of flame spread, heat, and other parameters with small fabric specimens in a laboratory test device are of greatest value only if they can be related to the burning behavior of the materials in

actual fire conditions. Therefore, considerable work has been done on the burning of actual garments on mannequins (Figure 2). The initial phase of this study involved primarily visual observations of the pattern of burning as related to the design of the garment, the point of ignition, and the materials from which the garment was made. The second phase of the study involved the measurement of temperatures at various locations near the surface of the mannequins.

The results showed that temperatures of 600-700°C were attained near the surface of the mannequin shortly after ignition of the garment. They also showed that heat may concentrate in certain areas, such as the axilla (armpits) and that temperatures are lower where the garment is relatively close fitting. These results were compared with the experience of physicians specializing in the treatment of burn victims, and were found to be consistent with their observations.

The third phase of the study, still in progress at the end of 1969, involves an attempt to estimate the probability that the wearer of a garment will become aware that he is dangerously close to a source of ignition before the garment is ignited. This is accomplished by placing a series of temperature sensing devices along the surface of the body of the mannequin near the point at which the ignition of the garment takes place. Concurrent records are made of the temperature at the "skin" surface and of the time for the garment to become ignited. The temperature data will be related to the heat sensitivity reaction of humans, as given in the literature. Clearly, if garments are so designed, and are made of such materials that the wearer feels the heat of the ignition source before the garment is ignited, the wearer has a good chance of avoiding a burn injury. The object of this study is to determine how such factors as garment material and garment design influence probability of ignition, and relate these factors to possible laboratory tests on fabric specimens.

2.1.4 Research Associate

In May of 1968, a Research Associate was placed at the National Bureau of Standards by Consumers Union to study the flammability characteristics of blankets and other products used on beds, to study the applicability of existing flammability tests to these products, and, if existing tests proved to be inadequate, to identify the parameters that should be considered in the development of a new test. Figures 3, 4, 5 and 6 illustrate some

of the test methods studied. These studies will be of value in future test method development.

2.1.5 Analysis of Burn Case Data

During 1968, the primary research effort was devoted to the analysis of data provided to the Bureau by other agencies, or developed by the Bureau in cooperation with the Department of Health, Education and Welfare. The latter data are derived from the field investigations carried out by teams of HEW accident investigators. Data from the first 153 cases reported to the Bureau were analyzed in mid 1968, to identify the extent of risk in terms of sex and age of the wearer, and type of garment. In approximately half the cases investigated by HEW, garments involved in the accident were recovered. The flammability of these garments was measured using the present mandatory standard (CS 191-53). All the garments passed the present requirements of the Flammable Fabrics Act. Over half the garments did not ignite in the one-second exposure specified in that test. Figure 7 illustrates a garment recovered from one of the burn cases.

As a result of the above described research, the Department published, in the Federal Register of October 23, 1968, (33 F.R. 15662), a notice of finding that there may be a need for new or amended flammability standards for wearing apparel. The notice also instituted proceedings for the development of such standards.

During 1969, analysis was continued of data from burn cases reported by the Food and Drug Administration, Department of Health, Education, and Welfare, as was testing and fiber analysis of the materials recovered by that agency and sent to the National Bureau of Standards. Reports were received on 109 cases during 1969; 74 of these were accompanied by samples of items ignited. Of these 109 cases, 83 were cases involving only wearing apparel, 11 were cases involving interior furnishings, and 14 were cases involving both wearing apparel and interior furnishings. One case was reported in which no fabrics were involved. At the end of 1969, the FDA had reported 417 cases to NBS.

Analysis of the data from the wearing apparel cases and the testing of the garments recovered from them showed that the general results derived from the first analysis, carried out in mid 1968, were modified somewhat on the basis of the larger total number of cases reported through 1969. Whereas 24 percent of the cases in the initial analysis had involved contamination of the garment(s)

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with flammable liquids, this percentage was raised to 28 on the basis of the cases in the latest analysis. Whereas 54 percent of the garments recovered from the initial group of cases did not ignite in the one-second exposure of the present test, 63 percent of the 1968-69 total did not ignite. These, and other changes in the overall averages, show the need for the continuation of the accumulation and analysis of such data. Even more, they indicate the need for the accumulation of data at a greatly increased rate, so as to develop a statistically valid data base.

With the enlarged body of data, it was possible to identify more clearly those categories of garments that represented particularly unreasonable risks. Some categories of garments were found to be involved in accident cases more frequently than other categories. Moreover, some categories of garments were found to be involved in accidents more frequently in certain age groups than in other age groups. For example, the frequency with which children's sleepwear, underwear, and dresses were involved in burn cases of children from 1 through 5 years of age, compared to all burn cases reported for those garments, was found to be 2.5 to 3.9 times as great as the frequency with which children of that age group occur in the total population.

As a result of the above described research, the Department had in preparation at the end of 1969, a notice of finding that there may be need for new or amended flammability standards for children's sleepwear, underwear, and dresses in the size range up through 6X, and instituting proceedings for the development of such standards. (Such a notice was published in January 1970.)

2.1.6 Analysis of Data from Outside Laboratories

In 1968, Consumers Union, an independent organization specializing in the testing of consumer products, provided the National Bureau of Standards with flammability test results for carpets and rugs. The Consumers Union had made a market analysis and had selected and tested carpets that the analysis indicated were representative of production. They found that several carpets failed the test presently used by the Federal Government as a purchase specification (DDD-C-95) for carpets, and recommended to the Secretary of Commerce that the data be the basis for development of a standard. To examine the basis for that recommendation, the data presented by Consumers Union were examined

critically, and their facilities and capabilities were investigated. The Bureau was satisfied that the experiments were well carried out and the data sound.

Figures 8 and 9 illustrate the test used and a burning specimen tested thereby.

As a result of this research, the Department published, in the Federal Register of December 3, 1968, (33 F.R. 17921), a notice of finding that there may be need for flammability standards for carpets and rugs, and instituting proceedings for the development of such standards. That proceeding has advanced to the publication of a proposed standard. This will be reported in more detail in the section on Test Development later in this report.

Other data provided by Consumers Union were the results of flammability tests of regular, electric, and children's receiving blankets. The tests were made in conformance with the present method for wearing apparel, but with a slightly different criterion of failure. Consumers Union selected the blankets on the basis of a market analysis in order to select representative samples and found that several blankets failed the test, and recommended to the Secretary that the data be the basis for development of a standard.

A finding that there may be need for a standard for blankets is presently under preparation, using these data as well as other data developed by in-house research.

2.1.7 Investigation of the Mechanism of Flame Retardants

Cellulosic fabric materials, such as cotton or rayon can be treated chemically to make them non-burning, although this is not esthetically or economically possible for all types of cellulosic fabrics. The chemicals which are used in this treatment are called "flame retardants."

There is surprisingly little that has been firmly established as to the chemical mechanism by which these retardants act. The thermal decomposition reactions involved have been studied conventionally by "thermal analysis" methods, such as thermogravimetric analysis, where the rates of the pyrolysis reactions are deduced from weight records of the reacting solids. Another method is differential thermal analysis, where the course of pyrolysis is determined from measurements of heat evolved or absorbed by the reactions. These methods have serious limitations in sensitivity, in permissible heating rates, and in ability to differentiate among concurrent reactions.

To circumvent these limitations, a new method was developed for deriving reaction kinetics through measurements of the rate of evolution of volatiles from pyrolyses. At the end of 1969, the apparatus for this purpose had been assembled, consisting of a tube furnace with appropriate power controls and temperature recording devices, a flow system for an inert carrier gas, and a continuous analyzer for detecting one or more constituents of the effluent gas flowing from the tube furnace. This apparatus is shown in Figure 10. The apparatus has been designed so that several different types of analyzers may be used interchangeably, thereby making it possible to study a wide range of materials. The system has been demonstrated to be operable and experimental test work has been initiated.

2.2 Contract Research

The program of research for the Flammable Fabrics Act is a new program for the National Bureau of Standards. In order to implement this program, it was necessary to recruit staff, obtain equipment, and modify facilities. During this period, it was desirable that research be initiated under contract with outside research organizations that were equipped to undertake relevant projects immediately. In this way, pertinent research could be undertaken with a minimum of delay. Three contracts were negotiated during 1969; all three were still in progress at the end of the year.

2.2.1 Characterization of Actual Hazards from Interior Furnishings Fires

Assumptions have been made concerning the actual life hazards that occur in a room as the result of the burning of interior furnishings. These assumptions were based on the limited evidence remaining after many fires, and have not been verified by sufficient laboratory experimentation. A contract was negotiated with the Southwest Research Institute for study of the actual life hazards occurring from interior furnishing fires. The study was accomplished by experiments in an instrumented room. The room, which had dimensions of 14 x 12 x 8 feet, was equipped for continuous measurements of smoke density (by light obscuration along a horizontal path), of temperatures (at several locations and levels in the room), and of concentrations of carbon monoxide, carbon dioxide, and oxygen (also at several locations and levels). Spot checks were made for other toxic fumes in some of the experiments.

A total of 30 experiments were conducted, 22 involving the ignition of a bed and the other eight involving the ignition of an upholstered chair. In each experiment,

The beds were furnished with a mattress, plus sheets, blankets, or spreads, the particular combination being one of the variables in the study. Of particular importance in the study was the variation among the types of materials used in the construction of the mattresses, and for the other bed items. One experiment involved treated mattress, sheets, and blanket, of types used by the Veteran's Administration in their hospitals. Similarly, the chairs were of standardized design, but the materials used for the upholstery varied among the experiments. Figure 11 shows the bed in a typical experiment.

The experimental work has been completed at the end of 1969, and the final report was under review. The preliminary results clearly showed that smoke was developed in all experiments but one in sufficient quantity to obscure completely a strong light source across the 13-foot room. Temperatures in the room sometimes did not rise appreciably above the starting temperature and, in some cases, were not high enough to constitute a hazard in themselves. However, previous studies have shown that even moderate elevations of temperature cause the body to become more susceptible to effects of toxic gases. Significant concentrations of carbon monoxide and of carbon dioxide were measured, and the oxygen content of the air was lowered by several percent. Lethal conditions were developed in all experiments with the possible exception of one.

It is expected that this study will provide guidance for research with reduced scale apparatus and specimens, and for the development of test methods related to life hazard conditions.

2.2.2 Heat Transfer from Burning Fabrics

A contract was negotiated with the Cornell Aeronautical Laboratories for a study of the variables affecting the transfer of heat from burning fabrics to skin. The study has two goals, the first being an understanding of the heat transfer parameters, and the second being the development of a test apparatus for the measurement of both amount and rate of heat transfer from various materials that might be used in apparel.

A test chamber with a flat vertical test surface has been constructed. Figure 12 shows the chamber with four heat meters mounted on a vertical center-line of an asbestos board. Figure 13 is a diagram of the heat meter. The meter output is dependent on the temperature gradient between the edge and center of the stainless steel disc.

As noted in Figure 12, the meters are spaced a known distance apart, and it is possible to measure the rate of heat released as well as the rate of upward progression of the flame front.

Ignition takes place across the bottom of the fabric and the air flow through the test chamber is maintained at a constant known value and is such as to approximate "open air" burning. The fabric is held between thin wire grids, to maintain a fixed distance from the meters. The grids are made of 0.025 inch diameter wire spaced six inches apart. Without these grids, thermal drafts changed the separation between the meters and the burning fabric and gave results that were not reproducible.

Figure 14 shows the results of burning a 5.44 oz/sq. yd. cotton fabric one inch from the heat meters. The ignition (by a quartz-iodide lamp), required about 17.5 seconds. Meters A, B, C, and D are 4, 10, 16, and 22 inches above the bottom of the fabric where ignition took place. Overlaid on the heat meter curves is the threshold curve for second degree burns taken from Derkson, et. al.[1] The data have been plotted from the time of ignition, and one can read directly from the curves the time required to achieve a second degree burn after ignition takes place. Heat meter A indicates that an individual has approximately eight seconds after ignition before a second degree burn results four inches above the ignition point.

The heat transfer data obtained will be related to available data in the literature on the thermal damage of skin. The literature data appear to be adequate, so that it will not be necessary to conduct experiments with actual skin or skin simulants.

The anticipated work was about half completed at the end of 1969.

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[1] Derkson, W. L., Monahan, T. I., and de Lhery, G. P., "The Temperature Associated with Radiant Energy Skin Burns in Temperature, Its Measurement and Control in Science and Industry." Vol. III, Reinhold (1963).

2.2.3 Data Collection

Mention has been made, under In-House Research, of the analysis of the data derived from the burn cases investigated by the HEW field investigators. However, as emphasized there, there is need for more and better data. This fact has led to additional efforts of a research nature, specifically a contract with the Denver Research Institute described below.

2.2.3.1 Cooperation With HEW in Data Collection Improvement

The number of cases investigated by HEW, and the nature of the sample represented in the cases investigated, are such as to limit their usefulness in making meaningful extrapolations to the total population. Nearly all the cases have been those of individuals brought to emergency rooms of hospitals. Such a sampling clearly is not representative, for example, of the cases that are treated by first aid, by a doctor in his office, or result immediately in death. Moreover, the FDA sampling plan, based essentially in Denver and Boston, is such that it does not lead to a knowledge of what happens in all hospital emergency rooms in the country. Therefore, the Office of Flammable Fabrics, NBS, and the Office of Product Safety, FDA, HEW have instituted a program to explore means to make the present data collection effort more effective. The discussions have involved not only those trained in investigation, but also persons trained in statistics, economics, and social behavior. This effort is expected to be a continuing joint effort.

2.2.3.2 Sampling Plan and Model Questionnaire

In addition to the joint effort by NBS and FDA, a contract was let to the Denver Research Institute for the design of a sampling plan and the development of a model questionnaire for the collection of burn case statistics. The plan is intended to provide for identification of cases of individuals involved in a fire, on a random sample out of a defined segment of the national population. Since the sample will be well defined in relation to the total population, extrapolation of the data will be possible, to make estimates of national totals with reasonable degrees of accuracy. The model questionnaire is intended to provide for an in-depth investigation of the accident identified by the sampling.

The study involves design of the sampling plan and testing it on a limited basis. This has been done within the city of Denver. The results indicate that to obtain meaningful results in a final study, a larger sample will be necessary. The people who suffer burn accidents represent a small percentage of the total population. Therefore, large numbers of individuals must be contacted in order to find statistically meaningful numbers of persons who have experienced a fire within a reasonably recent time period.

The questionnaire to be used in the study had been designed by the end of 1969, but had not been tested. The work is continuing into 1970.

3. Activities Under Sec. 14(b)(2): Reduction of Flammability

Present knowledge indicates that flammability of a material is influenced by its chemistry, construction, weight per unit area, moisture content, and the presence of chemical treatments. Reduction of flammability might be accomplished by variations of any of these parameters. However, past experience suggests that construction, chemical treatments, and the chemistry of the basic material are the parameters that may be varied with the greatest prospects for significant improvement. Mention has been made earlier in this report, under Research, of in-house efforts toward fundamental understanding of the mechanisms by which retardants are effective in reducing flammability. It is expected that this understanding will provide guidance for the development of new and better retardants.

3.1 Pyrolysis Products

A variety of chemical fire-retardant treatments has been developed for cellulosic fabrics, mainly on an empirical basis. Many of the details of the chemical action of flame retardants remain obscure and a better understanding is required to provide a basis for the development of more effective retardants, and to advance the art of flame retardancy in man-made fibers.

In order to elucidate the detailed mechanism of the action of retardants, the Inorganic Chemistry Section of the National Bureau of Standards has initiated a program that will apply the techniques of measurement and characterization that have proven effective in related areas, such as high temperature chemistry, and vaporization phenomena. These techniques include electron spin resonance (ESR) to monitor free radicals produced during pyrolysis, mass

spectrometry for the identification of reactive decomposition products, and infrared spectrometry and gas chromatography.

This work will consist of an intensive investigation of a few carefully selected systems to elucidate the mechanism on a molecular level. This program will also study the thermal behavior of a few selected retardants of commercial importance, such as tetrakis(hydroxymethyl)phosphonium derivatives (THPC, THPOH) and tris(aziridyl)phosphine oxide (APO)

The chemical nature of many of the retardants (mainly phosphorous, halogen and nitrogen compounds) is such that many of their decomposition products may be toxic. Their use may, in effect, replace the flammability hazard with the danger of toxicity. Therefore, identification of toxic products will be emphasized.

The initial phase of this project was the development of general capabilities. A commercial quadrapole mass spectrometer is available, as is the ESR and infrared equipment. However, a differential high pressure/high temperature sampling system must be assembled. Development of this system was under way at the end of 1969.

3.2 Industry and Other Government Developments

Considerable work in the development of retardants has been done by the Southern Utilization Research and Development Laboratories, U. S. Department of Agriculture, where many of the currently available permanent flame-retardant treatments for cotton were developed. Advances have also been made by industry in the development of treated cellulosic fabrics which retain a large measure of the esthetic and other characteristics that make fabrics acceptable for wearing apparel and other uses. Several different treated garments made from cellulosic materials have been offered for sale to the consuming public by major distributors. No information is available on the public reaction to the garments, and the number of different types offered is still small in proportion to the total market. The Department of Commerce has been advised by several manufacturers of their efforts and progress toward the development of new treatments, or improvements on existing treatments, not yet marketed.

In view of the substantial efforts of other government agencies and industry, the level of effort toward the reduction of flammability was limited to that already described under Research, and to active liaison.

3.3 Evaluation of Durability of Existing Treatments

A limited study was initiated, late in 1969, to investigate the durability of the more common "permanent" treatments now available for cotton and other cellulosic fabrics. The objective of the study is to expose the various treated fabrics to controlled standard washing and drying cycles. Washing is carried out by standard machine washing technique. Drying is carried out in normal household dryers; in simulated sunlight; and in actual sunlight. In addition, testing is carried out in an instrument called a "weatherometer," in which the material is subjected to exposure to simulated sunlight (light from a xenon arc lamp) with intermittent water spray.

A limited supply was obtained of a few treated fabrics. Repeated cycles were carried out for machine washing and drying, and in the "weatherometer". The results indicate that commercial treatments for cellulosic materials are durable under these tests.

The weather has been unsuitable for outdoor drying in actual sunlight. This work will be undertaken as soon as feasible.

4. Activities Under Sec. 14(b)(3): Test Method Development

4.1 Proposed Carpet and Rug Standard

During 1968, notice was published instituting proceedings for the development of a standard for carpets and rugs. Such development was completed during 1969.

As the initial step, in this development, careful consideration was given to the various circumstances under which carpets or rugs might be exposed to ignition, and to the nature of the resulting hazard. These circumstances are:

(1) A carpet or rug might be exposed to a small ignition source, (such as a dropped match, cigarette, or an ember from a fireplace) become ignited therefrom, and cause fire spread to other combustible contents of the room or building.

(2) A carpet or rug might be exposed to a moderate to large source of thermal energy, and in the presence of significant air movement, become ignited, and cause fire spread to other parts of the room or building.

(3) A carpet or rug might become ignited, or be exposed to a moderate to large energy source, and give off smoke or toxic fumes in dangerous quantities.

Consideration of the above circumstances, and of the comments received in response to the published notice, led to the conclusion that circumstance (1) was the most appropriate for simulation in a first-generation standard, but that (2) and (3) should receive attention for second-generation tests.

A modification was developed of an existing flammability test for carpets and rugs, namely, that given in Federal Specification DDD-C-95, Carpets and Rugs, Wool, Nylon, Acrylic, Mod-acrylic. With the cooperation of a task group set up by Committee D-13 on Textiles, of the American Society for Testing and Materials and representatives of other interests, an interlaboratory evaluation was carried out on the modified test method. The evaluation was designed by NBS statistical experts, who also carried out the analysis of the data.

The new test is illustrated in Figure 15.

Twelve laboratories participated, six being those of producers of carpets or rugs, and six having consumer or general interest. Each tested twelve carpets selected as representative of the three major categories of interest in any test evaluation: those expected to pass consistently, those expected to fail consistently, and those expected to show marginal performance. One objective of test development is to minimize uncertainties among the results obtained both within individual laboratories and among them. Each laboratory tested 16 specimens of each of the twelve carpets. This required 192 specimens of each carpet.

All 192 specimens of each carpet were cut from a single roll of that carpet, according to a pattern defined in the statistical plan. Each specimen was assigned an identification from a table of random numbers provided by NBS. Upon receipt by the individual participating laboratories, the 16 specimens of each carpet were further randomized into two sets of eight. Figure 16 shows representative burn patterns of samples of the 12 carpets.

The experimental plan called for measurement of several different parameters. The data were analyzed in terms of the repeatability and reproducibility to

be expected from various criteria based on the measured parameters. A copy of the statistical analysis of the test data is given in Appendix 1.

The various possible criteria for which analyses had been made were considered in relation to their probable effect upon choices available to the consumer and to the effect on the industry. A criterion judged to be reasonable was selected.

A market sampling of carpets and rugs was purchased, indicative of the range of fibers and constructions available to the consuming public. These carpets and rugs were tested by the proposed method, using the proposed criterion, to assess the impact of the proposed test and standard. The proposed standard was published in the Federal Register of December 18, 1969, (34 F.R. 19812). A copy of the notice and proposed standard is given in Appendix 2.

4.2 Revision of Apparatus in CS 191-53

The present method for testing the flammability of fabrics, as embodied in CS 191-53, has several technical shortcomings. The major shortcoming is that, in attempting to measure both ease of ignition and burning rate of fabrics, neither characteristic is adequately measured. It was decided to separate the two aspects of fabric flammability and design independent tests to measure ease of ignition and burning rate.

4.2.1 Development of Test to Measure Rate of Burning

For the measurement of burning rate, a Burning Rate Test Method (BRTM) was developed during 1969. An extensive series of experiments was undertaken to pin-point the effects of several variables, to design means to minimize them, and to optimize the overall test. Various specimen sizes (6-1/4" x 2-1/2", 11" x 2-1/2" and 11" x 4") and two specimen inclinations (45° and 60°) above the horizontal were studied. The relative merits of edge ignition versus surface ignition were examined. In order to avoid the effects of transients during and just after ignition, study was made of the length of specimen (lead length) that should burn before measurement of burning rate was started. The minimum length over which burning should be measured (gage length) was also studied. Ignition at the edge rather than on the surface was found to lead to more consistent burning. For edge ignition, a lead length of about 4-1/2 inches and a gage length of six inches were found to be optimum, resulting in an overall specimen 11 inches long and 2-1/2 inches wide (width unchanged from the present standard).

The selection of a larger specimen size than that given in CS 191-53, and the demand for improved accuracy and precision of measurement led to several changes in the test cabinet, the flame burner, and the timing mechanism. The burning of the larger specimen in the present cabinet was accompanied by a collection of smoke and hot gases in the top of the chamber, with some inhibition of combustion during the test. Therefore, the overall height of the cabinet was increased by eight inches. For ease of operation, and in conformance with the use of edge ignition, the burner was simplified, and placed in a vertical orientation. A digital clock, started and stopped by microswitches, was substituted for the present system of a stopwatch activated by a lever and a falling weight. The modified apparatus is shown in Figure 17.

An extensive series of 58 representative fabrics was tested using this new method. The fabrics tested are given in the Table. For most of the fabrics tested, it was found that the heavier fabrics (higher weight per unit area) gave higher values for the time to burn the specified distance of six inches, and that the relationship of burn time to fabric weight per unit area was linear. The results are shown in Figure 18. In common with all other such tests, thermoplastic materials which melt away from the igniting flame are difficult to test and will require more research.

Work is continuing to modify CS 191-53 to permit the testing of loose, fibrous materials, and thin, narrow ribbons and tapes. The experience of the Federal Trade Commission has shown that the testing of these often constitute problems.

4.2.2 Ease of Ignition Test

Ignition has been recognized as the beginning of a chain of events that can end in tragedy. Therefore, the measurement of the ease of ignition of materials and fabrics is essential to characterization of their flammability. Mention has already been made of the study of the relationship of this parameter to the sensory reaction of an individual to heat from an ignition source, and of the failure of the present wearing apparel test to measure ignition. Therefore, the development of a test for ease of ignition under exposure to a small flame was initiated and completed during 1969.

The test utilizes the cabinet, burner, fuel, and burner rotation hardware from the present apparel test. However, the burner has been equipped with a mechanism and controls to permit varying the time of flame impingement, or contact, on the specimen from essentially zero to 15 seconds. The time is monitored by a digital clock. The specimen holder consists of two matching aluminum plates, of 8-inch diameter, with six 2-inch diameter holes in each. One large, or up to six smaller pieces, of the test material may be clamped between the plates. Figure 19 shows the equipment.

This test calls for subjecting the suitably conditioned specimen to successively varied periods of flame impingement until the minimum time is found that is required to produce sustained burning of the material. This time is measured by the clock, and has been found to be reproducible to 0.1 second. A new area on the specimen is used for each trial.

A group of 58 materials, representative of a wide selection of apparel fabrics now on the market, was purchased in retail outlets, and subjected to the ease of ignition test. This is the group shown in Table 1. Results ranged from 0.2 seconds for very light materials to 5.8 for a heavy wool flannel. The results for ignition time plotted against fabric weight per unit area are shown in Figure 20. Again there is a high correlation between ignition time and fabric weight for many fabrics.

A technical paper describing the test and its development is under review, and will be offered for publication in 1970.

4.3 Vertical Test Method

Strong arguments have been advanced for a test method for essentially non-burning fabrics. Such a test might be applied when the degree of risk to the public, or to a segment, such as small children, dictates the maximum possible level of protection. Of the types of tests currently applied to fabrics, those placing the specimen in a vertical orientation are more severe than those involving other orientations, all other factors being equal. Several voluntary standards organizations have published variations of a vertical test, and one appears in the Federal purchase specifications for items purchased by the Federal Government. Although there is overall similarity, there is variation in details among the versions of various organizations. The degree to which the dissimilarities influence the results

obtained is not well documented. A study has been started of some of the differences. The apparatus is shown in Figure 21.

The usefulness of such a test is dependent on the availability of products that will pass the test. Several fabrics have been evaluated by one of the several versions of the test.

A difficulty common to all the versions of the vertical test is experienced with thermoplastic materials. Although some of these materials have been known to ignite when used in garments, and lead to serious burns to the wearers, the same fabrics merely melt away from the exposing flame in the test and do not burn. The failure of a test method to give a measurement for a material subject to the test is a serious inadequacy. A study was carried out to investigate the effectiveness of several techniques in assuring the ignition and burning of thermoplastic materials. The study was similar to one carried out by a voluntary standards group (in which the National Bureau of Standards also participated), but involved some techniques not tried. The results confirmed those of the private sector group. The most effective means presently known for testing such materials is by stitching parallel rows of glass thread up the middle of the specimen.

4.4 Tests on Bed Materials

Both the results of research already described and the experiences of many fire departments show that a smoldering cigarette can, under certain circumstances, cause smoldering combustion or open flaming of bed materials (particularly mattresses), and upholstered furniture. Either type of combustion can lead to death of the occupants of the building within which the ignition occurs.

In order to investigate the circumstances under which cigarettes ignite beds, and to design a suitable test for that behavior, a program has been initiated for characterizing the flammability of bed materials when subjected to a smoldering cigarette. A series of simulated bed systems have been exposed to cigarettes. These systems have consisted of 3- by 5-inch arrays of mattress core materials and ticking (or mattress upholstery systems) with sheets and blankets. In addition to the 3- by 5-inch simulated bed arrays, various types of miniature mattresses, approximately 20-inches square, have been subjected to smoldering cigarettes, with and without overlaid sheets or blankets. Figure 22 shows such an experiment in progress.

At the end of 1969, agreement had been reached with representatives of mattress manufacturers for them to conduct a market survey to identify suitable representative materials to be used as specimens in an interlaboratory evaluation of a test using smoldering cigarettes as the ignition source.

4.5 Heat Release Test

A new test method, undergoing preliminary study, is designed to measure the rate at which sensible heat is evolved in the gases convected from burning fabrics - a parameter that previously has not been systematically quantified. Such measurements should prove to be a useful component of a hazard index for fabrics. Such data might usefully support, supplement, and/or correlate with the total heat data to be obtained with the calorimetry apparatus as well with the calorific indications that may be obtained in the study of pyrolysis reactions.

The gas-flow and temperature recording portions of the apparatus were tested briefly and appeared to operate satisfactorily. The apparatus is shown in Figure 23. The apparatus design calls for instruments for continuous analysis of the oxygen and the combustible gas contents of the effluent gas stream. Such analysis will permit a cross-checked total heat balance to be made. This instrumentation was ordered, but had not been delivered at the end of 1969.

5. Activities Under Sec. 14(b)(4): Training

Activities in training were carried on in three identifiable ways, each discussed separately below. None of these took the form of scheduled classes or lectures.

5.1 Research Associates

The Research Associate Program provides an excellent mechanism for training. The Consumers Union Research Associate, discussed above, obtained valuable training and experience in test methods, and in government research operations and procedures. The value of such experience to the sponsor may be as great as that of the research results. The technical accomplishments of the Research Associate furnished by Consumers Union have been described under In-House Research.

The use of the Research Associateship mechanism has been explored with several industry groups and associations.

Although no new associates were assigned to NBS during 1969, discussions under way at the end of that year indicate a strong possibility of one or more in 1970.

5.2 Bibliographies and Information Center

Bibliographies, which list all the literature articles pertinent to a technical subject, are very valuable to anyone conducting research or development in that subject. Such bibliographies thus constitute a valuable means of education and dissemination of information.

Three bibliographies were sent to the printer late in 1969, and are expected to be released early in 1970. These cover the areas of Wearing Apparel, Bed Fabrics and Carpets and Rugs. Citations have been collected for other areas of interest in the flammable fabrics program. The bibliographies will be published at irregular intervals during 1970. Interior furnishings and test method development will be the next two bibliographies to be published.

An information center has been established under the auspices of the National Bureau of Standards library. All of the citations reported in the various bibliographies are available there for public examination.

5.3 Symposium on the Measurement of Flammability

Over 600 persons attended a symposium in Washington, D. C., June 5 and 6, 1969, organized by the National Bureau of Standards. The symposium was opened by Secretary Stans, with additional opening remarks by Assistant Secretary Myron Tribus and the then NBS Director, A. V. Astin. The technical papers dealt with the reasons for measuring flammability, the particular phenomena that should be measured, the state-of-the-art for measuring those phenomena, and the applicability of those measurements to several categories of items subject to the Flammable Fabrics Act. The specific categories were wearing apparel, blankets, mattresses, upholstered furniture, drapes, rugs and carpets, and linens. The Proceedings of the Symposium are in preparation for publication.

6. Cooperation with Public and Private Agencies

The Flammable Fabrics Act as amended specifies that the activities authorized under Section 14(b) are to be done in cooperation with appropriate public and private groups.

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6.1 Liaison With Industry and Other Groups

A continuous effort is being made to keep all concerned industry, government, and private sector groups informed of the status of research and test method development, and of the progress being made. Liaison is maintained with trade associations. As a consequence, outstanding cooperation has been received from these groups, for example in the development of the proposed carpet and rug standard. Liaison is also maintained with interested consumer groups and government agencies, some of which participated in the development of the proposed carpet and rug standard. Talks were given by NBS staff members before several meetings, including those of:

National Advisory Committee for the Flammable Fabrics Act;

National Cotton Batting Institute Workshop;

American Association of Textile Technologists;

Information Council on Fabric Flammability;

Chemical Finishing Conference, National Cotton Council;

Home Safety Workshop, National Safety Council;

Polymer Conference Series, University of Detroit.

The staff members made several visits to other laboratories engaged in testing, test method development, and product development.

6.2 Liaison With Voluntary Standards Organizations

Liaison has been maintained and strengthened with the appropriate committees of the national voluntary standards organizations concerned with tests for materials and products subject to the provisions of the Act. This has been of advantage to both the Department and the voluntary standards organizations. NBS staff members have been able to draw upon the expertise of the members of the committees in planning and carrying out the development and evaluation of test methods. Members of the committees were among the participants in the interlaboratory evaluation of the proposed carpet and rug standard. Similarly, NBS staff members have participated in interlaboratory evaluations of tests being developed by committees. Committees in which NBS staff members hold active membership include: the American National Standards Institute Ad Hoc Committee on Fabric Flammability, the

ASTM Committee D-13 on Textiles, the ASTM Committee E-5 on Fire Tests of Materials and Constructions, the American Association of Textile Chemists and Colorists Committee RA-46 on Fire Resistance Test Methods, and the National Fire Protection Association Committee on Wearing Apparel.

6.3 General Liaison

Finally, the Department and NBS have been host to numerous visitors, have responded to numerous inquiries, and handled voluminous correspondence. It is estimated that the Office of Flammable Fabrics has handled 5,000 telephone and 1,300 written inquiries, and 200 visitors during 1969.

7. Conclusion

The period covered by this report has been one in which the staff and facilities necessary to carry out the responsibilites delegated to the Department of Commerce under the Flammable Fabrics Act have been built up and organized. Within the limitations imposed by time and budget, a program designed to carry out these responsibilities has been developed. While the pace is still accelerating, a significant increase in the rate of progress will require further support.

FABRIC MATERIALS USED FOR IGNITION TEST
AND TIME OF FLAME SPREAD TEST

No.	MATERIAL	CONSTRUCTION	COLOR	WEIGHT	
				OZ/YD^2	G/M^2
1	COTTON	CORDUROY	BROWN W	6.3	214
2	COTTON	VELVETEEN	GRAY	5.6	190
3	RAYON	VELVETEEN	RED	4.2	142
4	RAYON	VELVETEEN	DARK RED	6.0	204
5	COTTON	SUEDE	BLUE	7.1	241
6	COTTON	FLANNELETTE	YELLOW	3.9	132
7	COTTON	TERRY CLOTH	WHITE	8.6	292
8	COTTON NYLON	95-5 LACE	PINK	3.9	132
9	COTTON ACETATE	BONDED LACE	ROSE	4.5	153
10	LINEN		L BROWN	6.8	230
11	COTTON	BROADCLOTH	ORANGE	3.5	119
12	COTTON	BATISTE	WHITE	1.9	64
13	COTTON POLYESTER	35-65 BATISTE	L GREEN	3.2	108
14	NYLON		PINK	0.5	17
15	NYLON	FLEECE	DARK GREEN	3.2	119
16	NYLON	NET	RED	0.4	14
17	POLYESTER	CREPE	L BLUE	1.8	61
18	RAYON	PEAU DE SOIE	YELLOW	5.4	183
19	ACETATE	SATIN	ROSE	5.3	180
20	NYLON	CHIFFON	WHITE	0.8	27
21	RAYON	CHIFFON	GRAY	1.0	34
22	SILK	CHIFFON	CREAM	0.6	20
23	NYLON		L GREEN	1.5	51
24	WOOL	FLANNEL	CHARCOAL	6.6	20
25	RAYON	METALLIC THREAD	GOLD	3.6	122
26	ACETATE	TAFFETA	ROSE	2.9	98
27	WOOL	FELT	WHITE	5.4	183
28	RAYON ACETATE	BONDED CREPE	PEACH	6.7	227
29	RAYON	CREPE	ROSE	4.3	146
30	WOOL	FLANNEL	YELLOW	6.0	204
31	ACRYLIC ACETATE	BONDED	PINK	7.6	258
32	RAYON	PLAIN	WHITE	2.3	78
33	ACETATE	TAFFETA	YELLOW	2.6	78
34	POLYESTER	DOUBLE KNIT	CREAM	6.9	234
35	POLYESTER		PINK	2.8	61
36	COTTON	PETTI POINT	WHITE	4.3	146
37	COTTON		PINK	4.0	136
38	COTTON POLYESTER	50-50	BLUE	5.1	173
39	WOOL NYLON	80-20	PLAID OGW	7.6	252
40	COTTON POLYESTER	50-50	CORAL	7.4	252
41	COTTON RAYON	50-50	WHITE	4.2	143
42	COTTON RAYON	35 65	PRINT PW	3.9	133
43	COTTON ACETATE	85-15	BROWN	6.7	227
44	ACETATE	BROCADE	WHITE	4.9	166
45	RAYON ACETATE	83-17	AQUA	9.4	319
46	RAYON ACETATE	50-50	CHECK OW	9.0	305
47	ACETATE NYLON POLYESTER SILK	44-39-11-3-3	WHITE	3.5	119
48	RAYON POLYESTER	92-5-3	GOLD	4.9	166
49	COTTON RAYON	34-63	WHITE	8.6	292
50	COTTON RAYON	55-45	BLUE	9.3	315
51	COTTON		BLUE	3.4	115
52	POLYESTER		PRINT BY	1.7	58
53	COTTON		PRINT GBR	3.6	122
54	ACRYLIC		CHECK	5.6	190
55	RAYON ACETATE	75-25	GREEN	6.2	210
56	RAYON ACRYLIC	50-50	PEACH-BLUE	6.7	227
57	RAYON	TWILL	BLACK	3.4	115
58	RAYON	SPUN	PINK BG	8.3	281

APPENDIX 1

Analysis of Data from Interlaboratory Study of Carpet Flammability Test

Introduction

This report presents the statistical analysis of data from an interlaboratory evaluation conducted cooperatively among the Carpet and Rug Institute, Committees of the American Society for Testing and Materials, and the National Bureau of Standards. The subject of the evaluation was a procedure for flammability tests of carpets and rugs. Several parameters were measured and considered as possible end-point criteria.

The test procedure involves the ignition, by a match, of a specified timed burning tablet (methanemine) on a piece of carpet within a draft shield. The carpet specimens had been dried in an oven and cooled in a desiccator. During the test, each specimen is held flat by a steel plate 9 x 9 x 1/4 in. with a 6 in. diameter hole in its center. The various parameters considered as possible end-point criteria are described in a later section of this report. This test method is a modification of the flammability test given in Federal Specification DDD-C-95, Carpets and Rugs, Wool, Nylon, Acrylic, Modacrylic.

The Carpet and Rug Institute was represented by an executive of the Institute and by six member companies. This group formed the nucleus of a task group operating under an ASTM committee, and drafted the initial version of the test method.

Committee D-13 on Textiles of ASTM, in cooperation with Committee E-5 on Fire Tests, and under direction of the ASTM Board of Directors, has initiated a program of development of flammability tests for many textile items, including wearing apparel and interior furnishings. A task group on carpets and rugs provides the direct ASTM contact with this study.

On December 3, 1968 there appeared in the Federal Register notice of finding that that there may be need for flammability standards for carpets and rugs. That notice was published

under authority to set standards granted to the Secretary of Commerce by PL 90-189, Amendments to the Flammable Fabrics Act. Pursuant to that notice, the National Bureau of Standards has been engaged in the development and evaluation of possible test methods for measuring the flammability of carpets and rugs. This interlaboratory evaluation and statistical analysis are part of that effort.

Data

The data subjected to a statistical analysis consist of measurements of the char radius and of the time of burning made on two sets of 8 specimens each, for each of 12 carpets, in each of 12 laboratories. The complete data are given in Table 1.

Objective of the Analysis

The data were collected for the purpose of developing a satisfactory discrimination test between acceptable and unacceptable materials. This task comprises two phases:

a) A "test criterion" must be established to decide whether any single test specimen passes or fails the test.

b) A "sampling plan" must be selected, specifying the number of specimens that shall be tested and the manner in which the number of passes and failures leads to acceptance or rejection of the material.

Establishing a Test Criterion

The test criterion suggested by the Carpet and Rug Institute was described as based on the concept of self-extinguishment. For measurement purposes, a carpet is considered to be self-extinguishing under that criterion if the flame goes out before it reaches the metal ring; i.e. the char radius is less than three inches. For convenience, this criterion shall be referred to as the "Three Inch" criterion.

Another concept that was considered in this test is that of ignition. To establish whether ignition has taken place, two possibilities suggest themselves. Ignition may be considered to have occurred when burning continues for a length of time longer than that required for the timed burning tablet to be completely consumed in the absence of other fuel. Also, ignition

may be considered to have occurred whenever the flame travels beyond the distance that would be reached by burning of the tablet on a non-combustible carpet. One can also combine these two requirements.

A number of possibilities listed below, were considered as possible test criteria in the statistical evaluation of the interlaboratory results. The first is based on the self-extinguishing concept, the other six on the ignition concept.

1. Char radius less than 3 inches.
2. Char radius 1 inch or less.
3. Char radius 2 inches or less.
4. Time of burning 120 seconds or less.
5. Time of burning 150 seconds or less.
6. Char radius 1 inch or less and time of burning 120 seconds or less.
7. Char radius 2 inches or less and time of burning 120 seconds or less.

Table 2 shows the overall percentage of "passing" specimens for each carpet, for each of the seven criteria. Among these, criteria 6 and 7 turn out to be the most promising for the sharpest separation of materials as acceptable or unacceptable. It also appeared that these two criteria lead to almost identical results for all carpets included in the study. In view of these results, one test criterion, in addition to the "Three Inch" criterion, was selected for study. This criterion is formulated as follows:

Dual Test Criterion:

A specimen shall be considered to have passed the test if the char radius is 1 inch or less and the burning time is 120 seconds or less. If either one of these two requirements, or both, are not fulfilled, the specimen is considered to have failed.

Analysis of the Two Test Criteria

Table 3 summarizes the results of the interlaboratory test, using the "Three Inch" criterion. For each laboratory and carpet, two values are given. These are the number of specimens that passed in each of the two sets of 8 specimens.

Table 4 summarizes, in a similar fashion, the results of the interlaboratory test, this time using the "Dual Test" criterion.

For each of the two test criteria, an analysis was made to determine the degree of consistency of the 24 results obtained for each carpet. Table 5 exhibits this analysis for the "Three Inch" criterion, and Table 6 for the "Dual Test" criterion. In each of these tables, a comparison is made between the observed and the theoretical frequency distribution of passing specimens in sets of eight; the theoretical frequency distribution is calculated on the basis of the overall percent of passing specimens, also given in the tables, using the binominal distribution. It is seen from these tables, that the binominal distribution is by and large an adequate representation of the results. This conclusion is discussed in more detail in the following section.

Repeatability and Reproducibility

It is customary to characterize methods of test by measures of repeatability and reproducibility. The former is related to variability of test results obtained by repeated measurements of the same material in a single laboratory. The latter refers to the variability of test results obtained on the same material in different laboratories. In the present instance, the result of the test is not a quantitative measurement, but rather a count: the number of passing specimens in either one or two groups of eight specimens each. If the distribution of these counts follows the binomial law, the variance of the count can be derived by mathematical theory from the overall percent of passing specimens in the carpet. This formula is:

$$\text{Variance } (n) = m \frac{P}{100} \left(1 - \frac{P}{100}\right) \qquad (1)$$

where n is the number of passing specimens in a group of m specimens, and P is the overall percent of passing specimens for the carpet under consideration. The standard deviation of n is the square root of the variance. In our study, m is either 8 or 16, depending on whether we compare the two results obtained within a laboratory or the twelve results, on 16 specimens each, between laboratories.

We could conceivably define the standard deviation of the count n, or an appropriate multiple of this standard deviation, as repeatability or reproducibility. The former

would apply to the within laboratory comparison and the latter to the between laboratory comparison. These standard deviations would be calculated in the usual fashion from the observed counts, and Equation (1) would be used as a theoretical check. However, according to Equation (1), we would expect a variance twice as large for m = 16 as for m = 8, and consequently a reproducibility which is $\sqrt{2}$ times larger than repeatability. For this reason we will define repeatability and reproducibility in a slightly different way, namely as the ratios of the standard deviations just described to the corresponding theoretical values, i.e., to $\sqrt{8 \frac{P}{100}(1 - \frac{P}{100})}$ for repeatability, and to $\sqrt{16 \frac{P}{100}(1 - \frac{P}{100})}$ for reproducibility[1/]. To avoid ambiguity, we will call these ratios the repeatability ratio and the reproducibility ratio.

Table 7 exhibits the repeatability and reproducibility ratios for all carpets, for each of the two test criteria. On the whole, the ratios tend to be close to unity. Ratios exactly equal to unity generally occur for carpets in which specimens either all pass or all fail. Where the ratios differ from unity, there is seen to exist a tendency to obtain values less than unity for the repeatability ratio and larger than unity for the reproducibility ratio. This indicates a tendency for slightly better agreement (smaller standard deviation) within laboratories than between laboratories. In the cases where the differences between the two ratios is pronounced, or where both ratios depart appreciably from unity, the binomial distribution, when applied to all 24 sets of 8 specimens, will not be a perfect representation of the data because of unequal distribution within and between laboratories. For those cases, the agreement between theory and observation in Tables 5 and 6 is somewhat poorer than for those in which the repeatability and reproducibility ratios are close to unity.

1/ It may be useful to point out that these calculations are mathematically equivalent to a partitioning of the chi-square criterion within and between laboratories (of A. E. Maxwell, Analysing Qualitative Data, Chapter III, Methuen's Monographs on Applied Probability and Statistics, John Wiley & Sons, N. Y. 1961). The quantities defined by us as the repeatability ratio and the reproducibility ratio are the square roots of the quotients of the partitioned chi-squares divided by their degrees of freedom.

Selection of a Sampling Plan

Here again, two sampling plans were considered. One had been originally proposed and consists of the following rule.

Single Sampling Plan: Eight specimens shall be tested. The material shall be considered acceptable if and only if at least seven of the eight specimens pass the test.

As an alternative, we propose the following double sampling plan.

Double Sampling Plan: Eight specimens shall be tested. If all eight pass, the material is considered acceptable. If less than seven specimens pass, the material is considered unacceptable. If exactly seven specimens pass, a second set of eight specimens are tested. In order for the material to be considered acceptable, all eight specimens of the second sample must pass.

Figure 1 shows "operating characteristic curves" (OC curves) for both plans. The ordinate represents the probability of accepting a material for which the overall fraction of individual "passing" specimens is plotted on the abscissa. The double sampling plan is seen to be appreciably more discriminating than the single sampling plan.

The Probability of Agreement

For a fuller evaluation of the two test criteria and the two sampling plans, we introduce a further concept, defined as follows.

The probability of agreement is the probability that two independent tests, carried out on the same carpet, will result in the same verdict of acceptable or non-acceptable.

It should be noted that the qualification "independent tests" implies the use of the binominal distribution. Using this law, the probability of agreement can be derived mathematically for any given sampling plan, as a function of the overall percentage of passing specimens (% P). The latter depends of course on the choice of the test criterion. These calculations have been made and the results are given

in Table 8 and in Figures 2, 3, 4, and 5. The first two of these figures show the results for the Single Sampling Plan. In Fig. 2, the values of the overall percentage of passing specimens for the twelve carpets are those based on the Three Inch criterion; whereas in Fig. 3, they are based on the Dual Test Criterion. Fig. 4 and 5 are similar to Fig. 2 and 3, but show the probability of agreement in accordance with the Double Sampling Plan.

Summary of the Analysis

Table 9 is an overall summary of the statistical analysis of the data. It shows the percent of "passing" specimens (% P) for each carpet according to both test criteria; the probability of acceptance of each carpet for both test criteria and both sampling plans; and the corresponding probabilities of agreement for independent tests. An examination of this table shows that for the twelve carpets included in this study the double sampling plan, used in conjunction with the dual test criterion, provides a fairly sharp distinction between acceptable and non-acceptable carpets. Furthermore, the probability of agreement is reasonably close to 100 percent for all twelve carpets, when this test criterion and sampling plan are followed.

To the extent that conclusions may be drawn from this study, the adoption of the dual test criterion and the double sampling plan seems clearly indicated.

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TABLE 1 MAXIMUM BURN RADIUS AND BURNING TIME [1/]

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Carpet No. \ Laboratory	1		2		3		4		5		6		7		8		9		10		11		12	
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T
1	1.3	111	1.2	126	1.8	161	0.8	115	2.1	124	3.0	168	3.0	159	1.0	114	3.0	137	2.1	179	2.1	137	2.0	177
	3.0	216	2.0	129	1.0	115	1.4	104	0.8	107	1.1	114	1.0	113	3.0	145	0.6	115	0.9	116	3.0	240	3.0	180
	0.8	116	3.0	202	3.0	151	3.0	184	0.8	101	3.0	214	3.0	157	3.0	181	3.0	124	3.0	171		454	1.5	112
	2.3	168	3.0	163	1.8	152	0.9	110	3.0	145	1.4	192	0.9	103	1.9	231	0.6	112	3.0	204		159	1.0	117
	0.8	109	0.8	104	1.5	128	3.0	231	0.5	107	3.0	193	0.9	138	3.0	262	1.6	144	0.9	121		126	2.3	130
	3.0	180	0.6	115	2	12 311	3.0	153	1.4	116	2.6	361	1.5	170	2.0	187	1.5	132	3.0	164		181	3.0	270
	3.0	155	2.0	165	0.6	104	0.6	107	0.6	107	3.0	211	1.1	113	1.3	127	3.0	191	3.0	175	0.9	107	3.0	320
	3.0	190	0.6	102	0.6	92	1.5	171	0.6	109	1.4	100	3.0	136	3.0	224	3.0	171	1.2	133	0.8	112	3.0	140
	1.3	122	3.0	190	2.7	165	0.5	96	3.0	154	2.0	277	1.0	162	1.5	135	0.8	134	2.5	401	1.3	117	3.0	166
	0.8	104	3.0	160	3.0	262	0.5	96	0.4	106	3.0	232	1.4	194	1.0	116	3.0	160	0.7	114	1.4	136	3.0	157
	0.8	110	0.6	118	0.7	107	3.0	212	3.0	143	3.0	233	3.0	159	2.5	225	0.6	104	3.0	156	0.6	121	0.8	160
	3.0	186	0.5	101	0.7	115	3.0	201		143	1.1	153		150	2.5	391	0.6	125	1.3	129	2.5	162	2.3	150
	3.0	164	0.6	111	1.8	169	0.8	110		142	1.0	106		215	3.0	218	2.1	188	1.9	251	3.0	139	0.8	125
	1.0	128	0.5	107	3.0	187	3.1	240		123	3.0	214	0.9	155	3.0	210	0.6	112	0.8	100		178	1.0	105
	1.0	167	0.5	110	1.5	109	1.0	115	0.9	96	3.0	269	0.5	175	1.0	116	0.7	110	3.0	175		169	3.0	180
	0.8	106	0.6	118	0.8	108	0.6	170	3.0	164	2.3	152	3.0	188	3.0	276	1.5	178	0.9	137	2.5	144	3.0	140
2	0.8	115	0.7	113	0.7	108	0.9	326	0.9	133	0.7	112	1.5	347	0.8	138	0.7	120	0.8	129	3.0	414	3.0	360
	0.5	112	0.6	114	0.8	115	0.8	126	1.5	94	0.7	131	0.6	158	0.8	131	0.8	160	3.0	424	0.9	123	1.0	126
	1.0	192	1.7	109	0.8	175	3.0	452	1.0	107	0.8	115	0.6	157	1.0	131	0.8	120	0.9	128	3.0	464	0.9	145
	0.5	124	1.6	110	2.3	602	1.0	224	0.6	136	0.7	118	0.9	130	0.8	118	0.7	118	3.0	462	0.7	122	0.8	150
	0.8	119	0.8	131	0.9	113	3.0	444	0.8	163	0.7	115	0.8	160		120	1.0	124	0.9	114	1.0	130	1.0	118
	0.6	111	0.6	128	3.0	485	0.8	130	0.6	121	0.6	154	3.0	328		123	0.8	121	0.9	132	1.0	135	1.5	317
	0.8	114		133	0.9	168	0.5	116	0.8	120	0.6	105	0.8	147		127	1.0	113	0.7	121	0.8	166	0.8	135
	0.8	125		127	0.8	141		150	0.6	110	0.7	106	0.8	172	0.9	116	1.0	121	0.9	142	0.7	169	1.0	118
	1.0	128	0.7	112	0.8	100		125	0.8	119	0.6	106	0.6	122		208	3.0	494		160	0.9	165	0.6	122
	0.8	115	0.5	115	1.0	101		118	0.8	125	1.2	236	0.8	116		211	1.0	130		142	0.8	139	1.0	145
	0.8	140	1.7	130	0.9	125	0.8	125	0.6	114	3.0	488	0.8	122		170	1.0	141	3.0	568	0.8	176		120
	0.8	102	0.6	120	0.7	123	0.5	108	0.8	113	0.6	122	3.0	418	0.8	114	0.8	180	3.0	387	1.2	133		150
	0.6	122	0.5	135	0.8	111	0.8	118	0.5	109	0.6	118	0.8	130	0.8	107	0.9	167	0.8	135	0.9	136	0.8	122
	0.8	105	0.7	139	0.8	127	0.9	118	0.8	113	1.0	104	1.0	175	0.9	115	1.0	125	0.7	124	3.0	438	0.8	130
	0.8	117	0.8	125	0.6	129	0.6	122	0.8	122	3.0	461	0.8	125	1.0	112	0.9	107	0.8	121	2.5	390	3.0	390
	0.8	112	0.5	135	0.9	141	0.8	118	1.0	121	0.6	110	0.8	168	1.0	135	0.9	112	0.8	116	1.1	152	0.8	140

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Laboratory / Carpet No.	1 R	1 T	2 R	2 T	3 R	3 T	4 R	4 T	5 R	5 T	6 R	6 T	7 R	7 T	8 R	8 T	9 R	9 T	10 R	10 T	11 R	11 T	12 R	12 T
3	0.4	107	0.4	103	0.4	109	0.4	100	0.5	107	0.4	98	0.4	111	0.4	105	0.4	89	0.4	107	0.5	107	0.4	100
		98		105	0.4	114	0.3	110	0.4	120	0.9	112		107	0.4	109		108	0.5	122		106		105
		110		108	0.5	106	0.4	109		124	0.4	111		114	0.3	110		117	0.4	115		98		102
		92		111	0.5	105		115		95		101		106	0.4	110		110		122		113		120
		105	0.3	107	0.4	101		106		106		97		101		107		106		117		118		105
	0.5	115	0.4	110	0.4	105		115		106	0.3	115		98		104		100		120	0.4	113		110
	0.4	112	0.4	105	0.5	97	0.3	118		99	0.4	101		115		116		110		106		102		118
		105	0.3	110		110	0.4	119		97		99		100	0.5	105		108		99		99		115
		108		105		109		114		121		109		105	0.4	101		102		114		110		98
		105		101	0.4	118		106		106		107		110		131		100		117	0.7	120		110
		119		110	0.5	107		110		106		110		112		112		115		107	0.4	98		95
	0.1	85		90	0.4	100		120		107		108		108		99		125		106	0.5	107		95
	0.4	106		101		103		98		104		100		91		123		123		116	0.4	105		118
		116	0.4	112		111		118		101		100		111		63		103		113	0.4	113		97
		156	0.4	97	0.5	101		107		106		100		106	0.5	104		100		118	0.5	101		102
		109	0.3	92	0.5	107		113		98		85		99	0.4	114		110		108	0.5	112		127
4	3.0	244	3.0	190	3.0	154	3.0	175	3.0	146	3.0	300	3.0	132	3.0	267	3.0	217	3.0	265	3.0	170	3.0	220
		195		140		168		196		197		267		165		285		297		216		280		255
		200		160		200		188		180		297		166		296		217		189		136		190
		201		171		170		262		226		298		169		267		253		257		186		240
		191		174		317		219		170		233		239		255		199		190		207		165
		297		154		184		201		209		170		215		218		174		243		193		205
		191		170		181		225		186		302		243		246		166		222		186		270
		204		217		167		187		139		187		286		279		170		192		152		235
		319		233		365		214		204		240		196		216		220		215		160		290
		193		379		234		216		200		251		303		236		260		213		169		185
		197		171		224		210		194		214		197		252		172		210		184		180
		193		160		157		234		222		263		199		274		205		161		179		180
		191		161		218		254		202		220		185		240		183		230		160		210
		205		144		162		249		180		234		178		210		201		222		210		212
		183		179		217		225		190		229		266		198		196		166		175		180
		186		180		166		206		193		248		197		228		192		231		195		187

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Laboratory / Carpet No.	1		2		3		4		5		6		7		8		9		10		11		12	
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T
5	0.4	95	0.3	100	0.4	95	0.4	96	0.4	96	0.4	99	0.4	96	0.4	102	0.4	93	0.3	104	0.5	104	0.4	105
		96		100	0.5	101	0.5	98		103	0.3	95	0.5	102	0.4	109		104	0.3	105		98		105
		99		98	0.4	97	0.4	101		107	0.4	96	0.4	99	0.5	115		105	0.5	105		104		102
		91	0.4	100		97		98		98	0.3	102	0.5	100	0.4	105		102	0.4	106		95		100
		98	0.3	101		101		108		103	0.4	97	0.4	100	0.4	101		101	0.3	106	0.4	107	0.5	100
		90		99		98		95		100	0.3	97		98	0.5	112	0.5	102	0.3	100	0.5	99	0.4	97
		103		101	0.5	101	0.3	96		97	0.4	95		116	0.4	95	0.5	100	0.4	97	0.5	104	0.4	105
		98		105		96	0.5	89		98		97	0.3	105		104	0.4	98		109	0.4	97	0.5	97
		107		100		96	0.4	91		98		104	0.4	98		112	0.5	99		99	0.5	94	0.4	97
		96		96		96		97		104		100		92		109	0.4	105	0.3	102	0.4	95		95
		100		98		87		100		103		100		99		105	0.3	98	0.4	101	0.5	100		95
		104	0.4	111	0.4	96	0.3	94		91		109		101		100	0.4	101		99	0.5	104		110
		102	0.3	100	0.3	96	0.3	97		100		105		115		104		97		102	0.4	101		97
		103	0.4	89	0.4	98	0.4	92		101		103		98	0.5	98		104	0.5	108	0.5	97		95
		84	0.3	104	0.4	102		116		87		104		100	0.3	109	0.3	103	0.4	97		101		
		120	0.3	98	0.6	89		99		97		94		67	0.4	99	0.5	96	0.4	99		99		
6	0.9	108	3.0	375	3.0	454	0.5	106	0.8	140	3.0	575	3.0	484	3.0	374	0.8	112	0.6	165	3.0	407	0.8	110
	0.6	107	0.7	170		477	0.8	99	0.6	133	3.0	437		467	0.9	177	3.0	610	3.0	495	3.0	368	3.0	450
	0.5	121	3.0	550		555	0.6	112	1.4	143	0.7	110		363	3.0	460	0.8	155	3.0	470	0.8	104	0.8	115
	0.4	94	3.0	420	0.9	104	0.8	107	3.0	432	3.0	512		458	0.8	110	0.6	131	0.8	104	3.0	401	0.6	97
	3.0	424	1.2	110	1.0	125	3.0	425	3.0	491	3.0	131		423	0.9	152	0.7	112	0.7	139		358	3.0	390
	0.8	117	0.7	122	3.0	521		391	0.8	113	0.6	172	0.8	173	3.0	275	3.0	529	0.8	120		411	0.8	95
	3.0	317	0.7	150	2.9	309		455	1.0	205	3.0	539	3.0	412	3.0	484	0.8	119	0.7	115		405	0.8	105
	0.5	102	0.5	100	0.7	107		406	1.8	145	0.8	104		432	0.9	107	0.7	143	3.0	445		398	1.5	142
	0.8	105	0.5	106	2.5	128	0.5	125	0.8	105	0.7	141		495	0.9	102	3.0	466	0.6	118	0.8	134	0.8	138
	3.0	472	0.5	108	3.0	536	0.8	114	0.8	110	0.7	97		585	0.6	115	0.7	105	3.0	436	0.6	126	3.0	435
	0.8	105	0.6	105	1.1	154	3.0	425	3.0	434	0.6	140		537	3.0	459	1.0	112	0.7	118	3.0	348		495
	3.0	451	0.5	113	1.0	97		484	0.8	102	3.0	397		424	0.9	122	0.7	114	0.6	106	3.0	423		470
	0.8	162	3.0	410	0.8	124		485	0.8	115	0.6	129		510		128		122	3.0	354	0.7	105		420
	0.8	106	0.5	110	2.0	118		321	0.9	100	3.0	326		461		104		116		430	0.8	138	0.8	120
	0.9	145	3.0	410	0.8	119		350	0.8	179	3.0	445	0.6	161		159		102		480	3.0	463	3.0	490
	0.8	110	0.5	108	1.3	171		457	3.0	375	0.7	192	3.0	462	0.8	120	3.0	444	0.7	106	3.0	405	0.8	108

continued

NBS 506a—Analysis paper

* U.S. GOVERNMENT PRINTING OFFICE : 1964 OF—731-638

Laboratory / Carpet No.	1 R	1 T	2 R	2 T	3 R	3 T	4 R	4 T	5 R	5 T	6 R	6 T	7 R	7 T	8 R	8 T	9 R	9 T	10 R	10 T	11 R	11 T	12 R	12 T
7	1.3	146	0.4	105	0.5	108	0.6	104	0.5	105	0.5	114	3.0	209	0.6	109	0.6	160	0.5	104	0.6	114	0.8	117
	1.1	112	0.5	112	0.6	106	3.0	202	0.5	113	0.5	121	0.4	112	0.5	114	0.5	114		114		110	0.6	105
	0.6	111	0.4	100	0.8	125	0.6	108	0.8	98	0.6	120	0.7	107	0.6	105	3.0	227		101		117	0.6	115
	3.0	209	0.4	112	0.5	103	0.5	104	3.0	211	0.5	106	0.9	127	0.5	114	0.6	131	3.0	233	0.9	108	3.0	325
	0.6	128	0.5	107	1.1	100	0.5	102	0.5	105		111	0.8	129	0.6	114		117	0.6	115	0.5	108	0.6	115
	3.0	227	0.4	110	0.7	109	3.0	202	0.5	113		124	3.0	211	3.0	261		113	0.5	112	3.0	168	0.5	115
	0.5	112	0.4	105	3.0	248	0.5	113	3.0	228		122	0.7	112	0.8	125	3.0	192	0.5	118	3.0	207	0.6	115
	0.5	111	0.5	108	0.8	106	0.5	107	0.8	104		107	0.5	120	0.6	113	3.0	207	3.0	202	0.7	117	1.5	195
	0.8	107	0.6	104	0.5	114	0.6	106	0.5	113	3.0	291	3.0	228	0.5	112	0.6	112	0.7	108	0.7	107	3.0	210
	0.5	109	0.4	108	0.7	104	0.5	116	0.6	115	0.5	112	0.7	114	0.6	126	0.5	105	0.5	111	0.5	108	0.6	115
	3.0	244	0.4	112	3.0	227	0.5	112	0.6	119	0.4	115	0.5	126	0.5	108	0.4	94	3.0	249	0.5	106		117
	1.0	133	3.0	166	3.0	187	0.6	121	0.8	110	1.1	185	0.5	123	0.6	112	0.5	105	0.6	126	0.6	117		115
	0.6	117	0.4	110	0.7	112	0.4	115	0.6	112	0.5	110	3.0	169	0.8	114	0.6	116	0.8	118	3.0	216	0.8	140
	0.8	124	0.5	107	0.9	107	0.5	119	0.5	110	0.5	107	0.6	127	0.6	111	2.4	211	0.6	117	0.7	108	3.0	200
	0.8	107	3.0	195	0.5	107	0.6	119		113	0.6	116		127	0.5	105	0.6	113	2.4	219	3.0	174	0.6	110
	0.5	107	0.5	119	3.0	169	0.8	152		112	0.5	115		124	0.9	132	3.0	231	3.0	227	0.7	116	3.0	210
8	3.0	126	3.0	60	3.0	111	3.0	56	3.0	56	3.0	93	3.0	44	3.0	135	3.0	98	3.0	104	3.0	46	3.0	40
		80		62		62		52		58		82		43		127		73		83		56		50
		100		55		76		49		53		97		47		145		108		54		66		50
		95		60		49		45		44		79		46		107		74		68		48		40
		97		65		51		67		58		67		45		106		60		54		66		35
		165		63		86		50		57		74		39		109		85		59		58		50
		175		51		52		58		37		65		44		117		100		68		56		55
		114		50		77		58		45		83		49		127		61		63		46		60
		116		49		55		51		126		74		63		103		73		64		52		55
		120		65		72		56		64		61		52		136		71		56		56		55
		114		61		56		63		52		64		47		158		95		63		56		65
		100		74		63		68		49		74		48		157		105		64		59		55
		120		65		67		56		51		74		56		157		62		47		57		55
		127		55		69		62		52		71		48		133		81		55		99		70
		87		48		73		56		63		65		50		118		81		56		58		42
		93		50		101		65		58		74		44		230		74		63		78		55

continued

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* U.S. GOVERNMENT PRINTING OFFICE : 1964 OF—731-638

Laboratory / Carpet No.	1 R	1 T	2 R	2 T	3 R	3 T	4 R	4 T	5 R	5 T	6 R	6 T	7 R	7 T	8 R	8 T	9 R	9 T	10 R	10 T	11 R	11 T	12 R	12 T
9	0.4	95	0.4	95	0.4	92	0.4	93	0.4	92	0.4	85	0.3	88	0.5	110	0.4	95	0.3	93	0.5	103	0.4	95
	0.5	90	0.4	90	0.5	95	0.4	84		91		89	0.4	116		94	0.5	102	0.4	91	0.6	96		92
	0.4	87	0.3	89	0.4	90	0.5	94		95		93		90		99	0.4	98	0.3	95	0.5	92		95
		94	0.4	93	0.4	87	0.4	92	0.5	92		89		91	0.4	101		105	0.4	92		91		105
		94		96	0.5	97	0.3	89	0.4	104		97		85	0.8	93		98		93		90		95
		91		95	0.4	88	0.4	87		98		92		86	0.4	94		90		99	0.6	95		93
		93		94	0.4	85		93		90		94		94	0.5	97		94		96	0.4	96		95
		84		97	0.5	102		87		89		98		97	0.5	102		103		93	0.5	91		110
		95		94	0.4	96		90		107		94		101	0.4	99		91		89	0.4	93		98
		95		95	0.5	102	0.3	87		93		92		118	0.4	101	0.5	96		89	0.4	95		100
		91		96	0.4	113	0.4	98		98		85		97	0.5	102	0.4	99		102	0.6	96		97
		90		87	0.6	95		96		98		87		91	0.5	97		92		95	0.5	87		95
		99		93	0.5	89		98		88		98		87	0.6	100		122		97	0.5	92		92
	0.5	86		92		92		94	0.5	96	0.3	92		84	0.4	99		101		92	0.4	97		94
	0.4	92		98		88		91	0.4	92	0.3	90		97		107		97		93	0.5	90	0.5	92
	0.4	90	0.4	91		94		93	0.4	91	0.4	91		97		103	0.5	97		94	0.5	99	0.4	90
10	0.5	244	0.5	334	0.6	309	3.0	984	3.0	976	30	1142	30	1065	0.6	277	30	1190	30	1206	30	1346	0.5	252
	30	1187	30	1202	30	1275		985		1005	2.0	967	0.6	311	0.5	304		1096	0.4	282	30	1262	30	1125
		1192	1.5	631	28	1250		1068		1329	0.5	287	0.5	293	0.6	246		932	29	1140	0.5	304	0.6	305
		1082	30	1245	30	1275		794	1.5	659	0.5	328	30	1067	0.5	256		1207	30	1196	30	1198	3.0	825
		1117	0.4	259	30	1072		833	30	1510	0.4	266		1125		309		834		1058	29	1326		1245
		1020	30	1623	0.5	310		814	28	1045	0.5	289		1026		267		1178		994	30	1408		870
	0.5	280	0.5	340	30	1253	0.4	285	30	1762		362		1343	30	1571		1020		1241		1558		1215
	3.0	855	2.5	1040	28	1442	3.0	969	06	332		323	0.5	165	0.5	248		1131		1206		1070		915
		1551	25	1068	28	1468		870	30	1164	0.4	279	3.0	1272	0.5	309		1024	0.5	245		1404	0.4	275
	0.8	224	30	1065	30	1130		1080	0.5	278	30	1413		887	0.6	311		990	30	1259	29	1463	30	1085
	30	1042	04	310		1239	05	303	3.0	971	0.4	278		1081	30	1338		938	30	1148	29	1335	0.5	290
		1060	30	1150		1155	0.5	294		1000	0.5	312		1150	30	1442		976	27	1326	30	1451	30	1040
		901	0.4	263		1098	30	1113		1522	0.4	250	0.4	271	0.5	269		1016	30	1736		938	0.5	295
	0.5	301	30	1020	0.7	347		959	25	1457	0.5	317	30	1161	0.6	271		1086	0.5	309		1160	30	1425
	3.0	854		1142	0.7	317		947	26	1074	30	1447		1199	0.5	314		850	0.5	275		1092	30	1310
	3.0	943		440	0.8	292		972	25	1032	09	302		986	0.5	254		822	30	1321		1204	0.5	320

continued

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* U.S. GOVERNMENT PRINTING OFFICE : 1964 OF—731-638

Laboratory / Carpet No.	1 R	1 T	2 R	2 T	3 R	3 T	4 R	4 T	5 R	5 T	6 R	6 T	7 R	7 T	8 R	8 T	9 R	9 T	10 R	10 T	11 R	11 T	12 R	12 T
11	3.0	168	3.0	153	0.9	112	3.0	161	3.0	153	3.0	205	3.0	173	3.0	195	0.5	131	3.0	170	1.5	137	3.0	225
		196		126	3.0	170	3.0	117	3.0	122	0.5	113		129	3.0	143	3.0	321		176	3.0	131	3.0	135
		227		159	3.0	129	1.0	120	1.5	106	3.0	178		134	0.6	134	3.0	159		183		124	1.1	130
		160		119	2.2	207	3.0	129	3.0	168		172		124	0.8	123	1.0	108		199		194	3.0	120
		120		165	3.0	115		139	1.5	114		172		135	1.8	122	3.0	135		147		183		150
	0.8	230		134		120		153	3.0	131		235		219	3.0	171		148	0.8	113		128		120
	3.0	135		150		152		149		123		127		181		143		210	3.0	119		137		150
	1.3	135		130		168		105		145		310		156		190		182		133		132		275
	3.0	156		122	0.7	141	0.5	167		134		191		158	2.9	142		122		177	0.7	130		163
		135		120	3.0	138	3.0	190	0.6	122		242		153	3.0	296	0.9	103	1.2	107	3.0	131		165
		150	2.0	109		124	0.9	127	3.0	164	0.8	142		115		155	3.0	190	0.5	114		148		132
		136	3.0	125		149	3.0	180	3.0	116	3.0	182		170		191		128	3.0	221		113		150
	0.9	132		130		169		115	1.3	109		133		140		100		198		122		152		180
	1.3	174		147		136		154	3.0	117		183	3.0	165		182		120		144		136		130
	3.0	209		131		165		159		115		196		153		176		190		150		125		132
	3.0	233		114		146	1.0	105		116		162		126	0.9	116		116		125	1.5	125		135
12	3.0	531	2.2	108	2.5	191	3.0	462	3.0	511	3.0	565	3.0	333	3.0	373	3.0	173	3.0	368	3.0	465	2.3	250
	1.0	211	2.0	162	3.0	343		351		425		568		387		620		459		444		103		125
	3.0	667	3.0	565	1.3	199		472		454		527		457	1.1	253		405		347		454	3.0	540
	3.0	446		415	3.0	95		863		465		641		451	2.0	272		335		395		572	2.6	217
	0.9	119		410		77		512		573		505		207	3.0	487		441		518		88	3.0	520
	2.8	181	1.6	175		76		623	2.5	106		373		144		113		647		411		456		465
	3.0	116	3.0	585		113		456	3.0	550		500		364		480		408		413		456		260
		110		95		61		501		71		533		582		135		433		338		422		455
		200		300		350		571		419		634		128		113		710		388		483		570
	2.8	190		95		245		563	0.9	163		215		160		470		406		525		452		410
	3.0	329		536		136		511	3.0	406		148		453		126		460		514		397		470
		475	0.7	175		102		423		361		487		171				437	2.7	651		434		290
		476	3.0	580		336		170		576		524		367	2.4	152		439	3.0	93		121		115
		385	3.0	525		62		470		406	2.8	368		540	3.0	293		590		503		458		105
		226	3.0	440		87		623		406	3.0	437		410		110		568		545		478	2.0	170
		365	1.8	105		554		512		331	3.0	270		150		558		512	1.8	512		492	3.0	115

1/ R = Burning Radius in inches to 0.1 inch T = Burning Time in seconds

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Table 2

Percent of Specimens Passing for Various Test Criteria

Test Criterion / Carpet No.	R <3 in.	R≤1 in.	R ≤2 in.	T ≤120 sec.	T ≤150 sec.	R ≤1 in. and T ≤120 sec.	R ≤2 in. and T ≤120 sec.
1	61	28	51	32	52	28	32
2	91	74	85	35	75	34	35
3	100	100	100	95	99	95	95
4	0	0	0	0	2	0	0
5	100	100	100	100	100	100	100
6	56	49	55	34	49	33	34
7	82	79	81	67	79	66	67
8	0	0	0	95	97	0	0
9	100	100	100	99	100	99	99
10	40	31	32	0	0	0	0
11	18	9	17	18	58	5	7
12	12	1	6	14	18	1	1

R = Burn Radius

T = Burning Time

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TABLE 3 NUMBER OF PASSES IN EACH GROUP OF EIGHT SPECIMENS
3-INCH CRITERION

* U.S. GOVERNMENT PRINTING OFFICE : 1964 OF—731-838

Lab. No. \ Carpet No.	1	2	3	4	5	6	7	8	9	10	11	12
1	4 / 6	8 / 8	8 / 8	0 / 0	8 / 8	6 / 6	6 / 7	0 / 0	8 / 8	2 / 2	2 / 2	3 / 1
2	6 / 6	8 / 8	8 / 8	0 / 0	8 / 8	5 / 6	8 / 6	0 / 0	8 / 8	5 / 3	0 / 1	3 / 2
3	7 / 6	7 / 8	8 / 8	0 / 0	8 / 8	4 / 7	7 / 5	0 / 0	8 / 8	4 / 4	2 / 1	2 / 0
4	5 / 5	6 / 8	8 / 8	0 / 0	8 / 8	4 / 2	6 / 8	0 / 0	8 / 8	1 / 2	1 / 3	0 / 0
5	7 / 2	8 / 8	8 / 8	0 / 0	8 / 8	6 / 6	6 / 8	0 / 0	8 / 8	3 / 4	3 / 2	1 / 1
6	4 / 4	8 / 6	8 / 8	0 / 0	8 / 8	3 / 5	8 / 7	0 / 0	8 / 8	7 / 6	1 / 1	0 / 1
7	5 / 4	7 / 7	8 / 8	0 / 0	8 / 8	1 / 1	6 / 6	0 / 0	8 / 8	3 / 1	0 / 1	0 / 0
8	4 / 5	8 / 8	8 / 8	0 / 0	8 / 8	4 / 7	7 / 8	0 / 0	8 / 8	7 / 6	3 / 1	2 / 1
9	4 / 7	8 / 7	8 / 8	0 / 0	8 / 8	6 / 6	5 / 7	0 / 0	8 / 8	0 / 0	2 / 1	0 / 0
10	4 / 6	6 / 6	8 / 8	0 / 0	8 / 8	5 / 4	6 / 6	0 / 0	8 / 8	2 / 4	1 / 2	0 / 2
11	3 / 5	6 / 7	8 / 8	0 / 0	8 / 8	1 / 4	6 / 6	0 / 0	8 / 8	2 / 2	1 / 2	0 / 0
12	4 / 4	7 / 7	8 / 8	0 / 0	8 / 8	6 / 3	7 / 5	0 / 0	8 / 8	2 / 4	1 / 0	3 / 1

Table 4

NBS 506a—Analysis paper

Number of Passes in Each Group of Eight Specimens

* U. S. GOVERNMENT PRINTING OFFICE : 1964 OF—731-638

1 - inch Burn Radius and 120 Seconds Criterion

Lab. No. \ Carpet No.	1	2	3	4	5	6	7	8	9	10	11	12
1	2 3	5 5	8 7	0 0	8 8	5 4	3 5	0 0	8 8	0 0	0 0	1 0
2	3 6	4 3	8 8	0 0	8 8	1 6	8 6	0 0	8 8	0 0	0 0	0 0
3	3 3	3 3	8 8	0 0	8 8	2 2	5 5	0 0	8 8	0 0	1 0	0 0
4	3 4	1 5	8 8	0 0	8 8	4 1	6 6	0 0	8 8	0 0	1 1	0 0
5	5 2	3 5	7 7	0 0	8 8	1 5	6 8	0 0	8 8	0 0	0 0	0 0
6	0 1	6 4	8 8	0 0	8 8	2 1	5 6	0 0	8 8	0 0	1 0	0 0
7	3 0	0 1	8 8	0 0	8 8	0 0	4 1	0 0	8 8	0 0	0 0	0 0
8	1 2	3 4	8 6	0 0	8 8	2 4	6 6	0 0	8 8	0 0	0 1	0 0
9	2 3	4 2	8 6	0 0	8 8	3 5	3 6	0 0	8 7	0 0	1 1	0 0
10	1 2	1 1	6 8	0 0	8 8	3 4	6 4	0 0	8 8	0 0	1 1	0 0
11	2 0	0 0	8 8	0 0	8 8	1 1	6 6	0 0	8 6	0 0	0 0	0 0
12	1 1	2 1	8 7	0 0	8 8	5 2	6 4	0 0	8 8	0 0	0 0	0 0

TABLE 5 COMPARISON OF RESULTS WITH BINOMIAL DISTRIBUTION
3-INCH CRITERION 1/

Carpets	1		2		3		4		5		6	
	% P = 61		% P = 91		% P = 100		% P = 0		% P = 100		% P = 56	
No. of Passes in sets of 8	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed
0	0	0	0	0	0	0	24	24	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	3
2	1	1	0	0	0	0	0	0	0	0	2	1
3	3	1	0	0	0	0	0	0	0	0	4	2
4	5	9	0	0	0	0	0	0	0	0	6	5
5	7	5	1	0	0	0	0	0	0	0	6	3
6	5	5	3	5	0	0	0	0	0	0	4	8
7	2	3	9	7	0	0	0	0	0	0	1	2
8	0	0	11	12	24	24	0	0	24	24	0	0

Carpets	7		8		9		10		11		12	
	% P = 82		% P = 0		% P = 100		% P = 40		% P = 18		% P = 12	
No. of Passes in sets of 8	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed
0	0	0	24	24	0	0	0	2	5	3	9	10
1	0	0	0	0	0	0	2	2	9	11	9	6
2	0	0	0	0	0	0	5	7	7	7	4	5
3	0	0	0	0	0	0	7	3	3	3	1	3
4	1	0	0	0	0	0	6	5	1	0	0	0
5	3	3	0	0	0	0	3	1	0	0	0	0
6	7	10	0	0	0	0	1	2	0	0	0	0
7	9	6	0	0	0	0	0	2	0	0	0	0
8	5	5	0	0	24	24	0	0	0	0	0	0

1/ % P = the overall percent of passing specimens for carpet in question; the tabulated values are the number of sets (of 8 specimens each) out of 24 sets for which the number of passes is the number in the column at the extreme left of the table.

TABLE 6 COMPARISON OF RESULTS WITH BINOMIAL DISTRIBUTION
ONE INCH AND 120 SECONDS CRITERION[1/]

Carpets	1		2		3		4		5		6	
	% P = 28		% P = 34		% P = 95		% P = 0		% P = 100		% P = 33	
No. of Passes in sets of 8	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed
0	2	3	1	3	0	0	24	24	0	0	1	2
1	5	5	4	5	0	0	0	0	0	0	4	6
2	7	6	6	2	0	0	0	0	0	0	7	5
3	6	7	7	5	0	0	0	0	0	0	7	2
4	3	1	4	4	0	0	0	0	0	0	4	4
5	1	1	2	4	0	0	0	0	0	0	2	4
6	0	1	0	1	1	3	0	0	0	0	0	1
7	0	0	0	0	7	4	0	0	0	0	0	0
8	0	0	0	0	16	17	0	0	24	24	0	0

Carpets	7		8		9		10		11		12	
	% P = 66		% P = 0		% P = 99		% P = 0		% P = 5		% P = 1	
No. of Passes in sets of 8	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed	Theor.	Observed
0	0	0	24	24	0	0	24	24	16	15	22	23
1	0	1	0	0	0	0	0	0	7	9	2	1
2	0	0	0	0	0	0	0	0	1	0	0	0
3	2	2	0	0	0	0	0	0	0	0	0	0
4	4	3	0	0	0	0	0	0	0	0	0	0
5	7	4	0	0	0	0	0	0	0	0	0	0
6	6	12	0	0	0	0	0	0	0	0	0	0
7	4	0	0	0	2	1	0	0	0	0	0	0
8	1	2	0	0	22	23	0	0	0	0	0	0

[1/] % P = the overall percent of passing specimens for carpet in question; the tabulated values are the numbers of sets (of 8 specimens each) out of 24 sets for which the number of passes is the number in the column at the extreme left of the table.

Table 7

Repeatability and Reproducibility Ratios [1/]

Carpet	3-inch Criterion		1-inch and 120-second Criterion	
	Repeatability Ratio	Reproducibility Ratio	Repeatability Ratio	Reproducibility Ratio
1	1.03	.82	.98	1.38
2	.84	1.15	.86	1.74
3	1.00	1.00	1.22	1.05
4	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00
6	.98	1.62	1.28	1.40
7	.97	.80	.95	1.34
8	1.00	1.00	1.00	1.00
9	1.00	1.00	1.00	1.00
10	.66	1.96	1.00	1.00
11	.75	.88	.59	1.02
12	.97	1.37	1.00	1.00

1/ For definition, see body of report.

Table 8

Probability of Agreement Between Two Laboratories

Overall Percentage of Passing Specimens	Probability of Agreement, in Percent	
	Single Sampling Plan	Double Sampling Plan
0	100.	100.
10	100.	100.
20	99.98	100.
30	99.74	99.99
40	98.31	99.87
50	93.21	99.20
60	80.99	96.41
65	71.90	93.02
70	61.98	87.14
75	53.53	77.85
80	50.02	65.47
85	54.94	53.01
90	69.61	51.81
92	77.42	57.72
94	85.42	67.92
96	92.66	81.18
98	97.95	93.98
100	100.	100.

TABLE 9 SUMMARY OF ANALYSIS

Sampling Plan	Passing Specimens, %		Probability of Acceptance, %				Probability of Agreement, %			
			Single		Double		Single		Double	
Test Criterion[1/]	A	B	A	B	A	B	A	B	A	B
Carpet										
1	61	28	12	0.1	2	0	79	99.8	96	100
2	91	34	84	0.3	64	0	73	99.4	54	99.96
3	100	95	100	94	100	85	100	89	100	74
4	0	0	0	0	0	0	100	100	100	100
5	100	100	100	100	100	100	100	100	100	100
6	56	33	7	0.2	1	0	87	99.5	98	99.97
7	82	66	56	18	28	4	51	70	60	92
8	0	0	0	0	0	0	100	100	100	100
9	100	99	100	99.7	100	99.1	100	99.5	100	98
10	40	0	1	0	0.1	0	98	100	99.8	100
11	18	5	0	0	0	0	100	100	100	100
12	12	1	0	0	0	0	100	100	100	100

[1/] A = 3 inch
B = 1-inch and 120 second

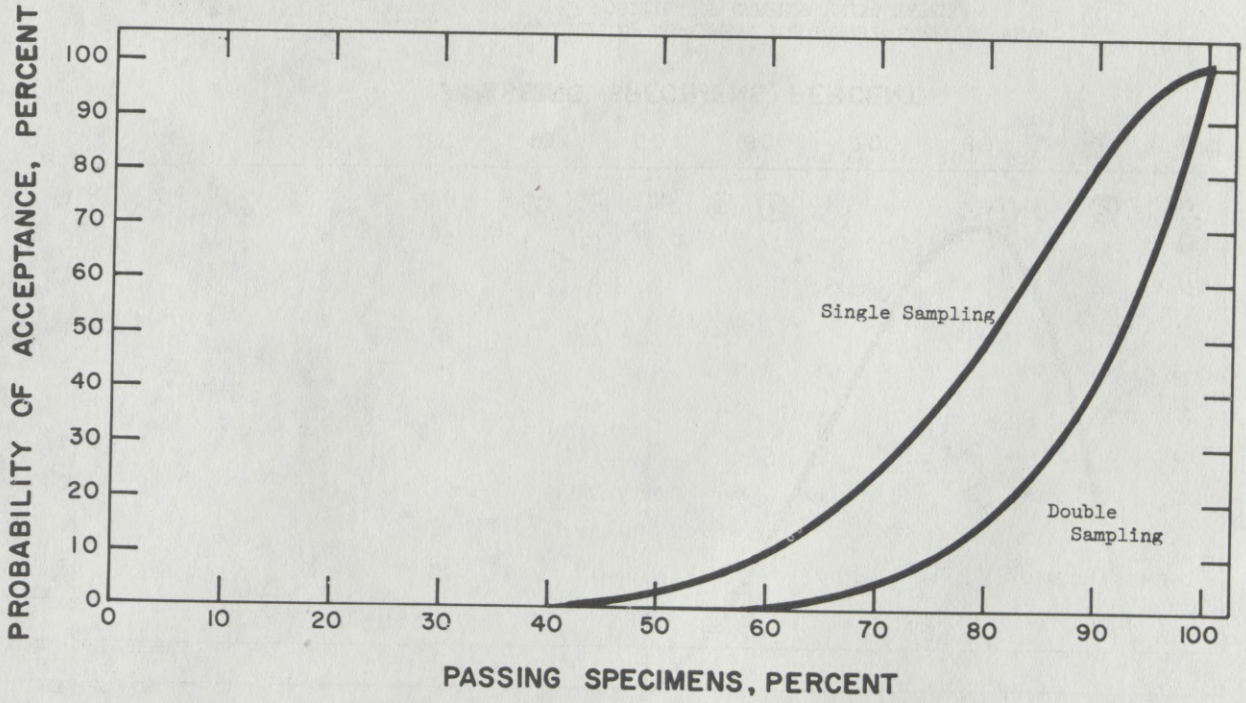

FIGURE A1. OPERATING CHARACTERISTIC CURVES FOR TWO SAMPLING PLANS

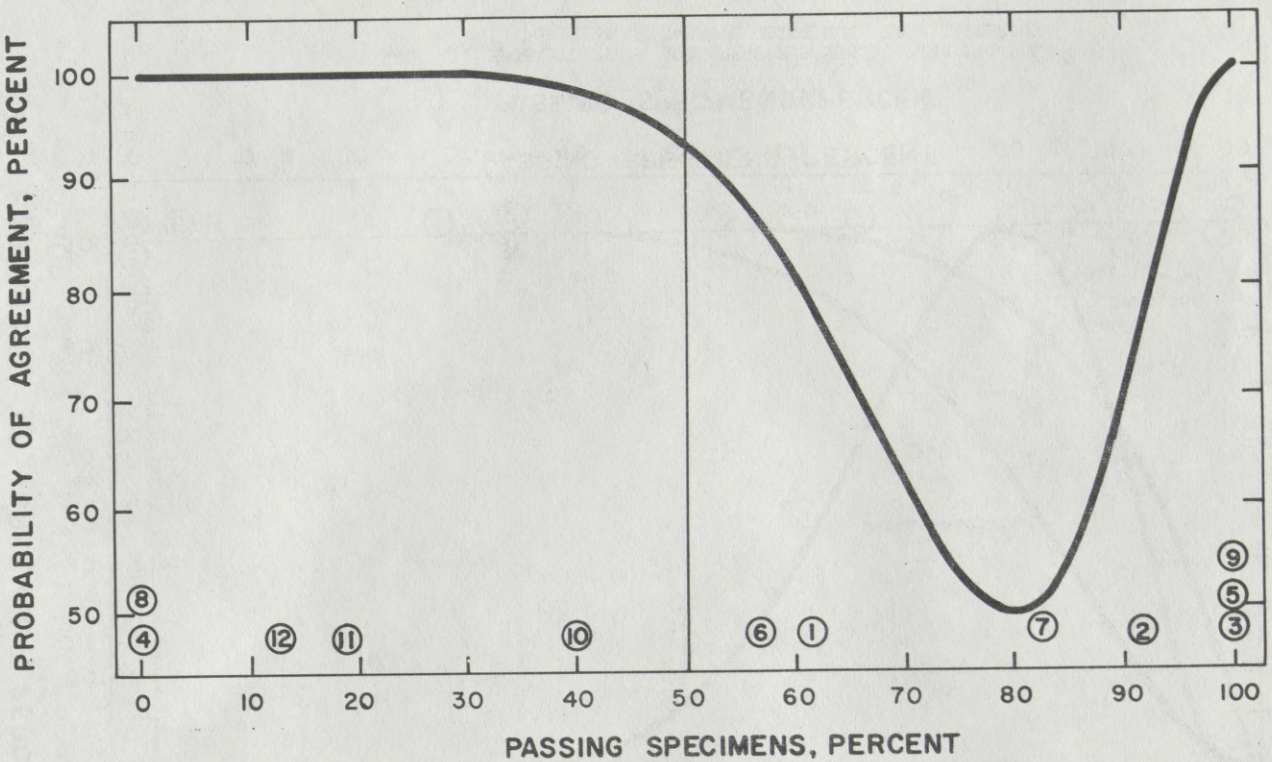

FIGURE A2. PROBABILITY OF AGREEMENT FOR SINGLE SAMPLING PLAN
○ POSITION OF CARPETS USING THREE
INCH CRITERION

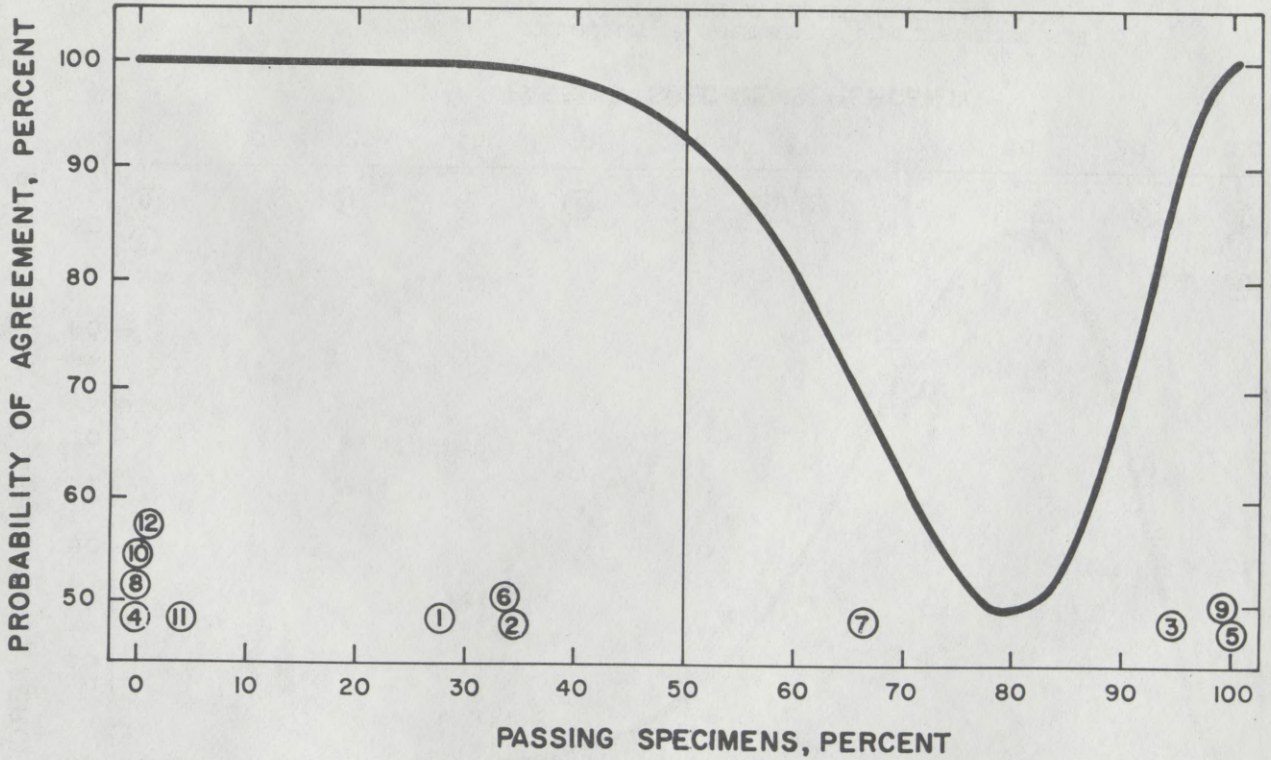

FIGURE A3. PROBABILITY OF AGREEMENT FOR SINGLE SAMPLING PLAN
O POSITION OF CARPETS USING DUAL TEST CRITERION

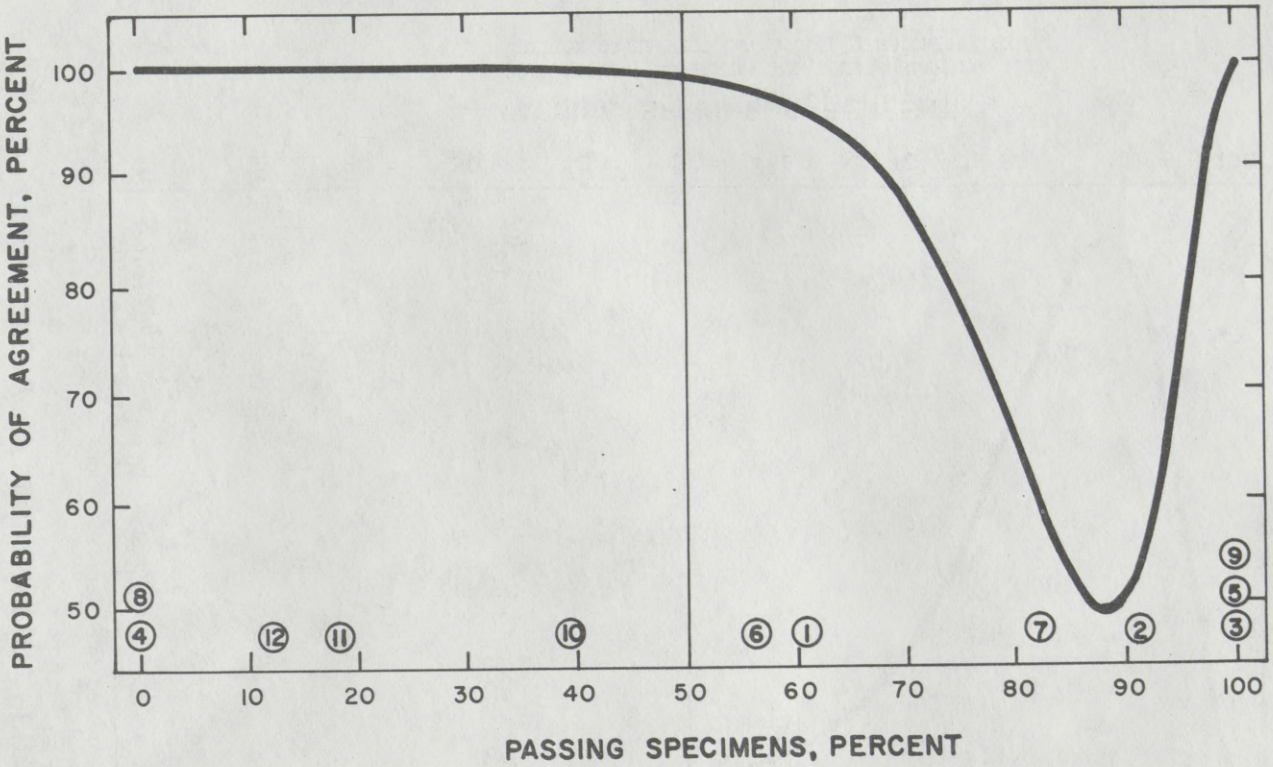

FIGURE A4. PROBABILITY OF AGREEMENT FOR DOUBLE SAMPLING PLAN
○ POSITION OF CARPETS USING THREE INCH CRITERION

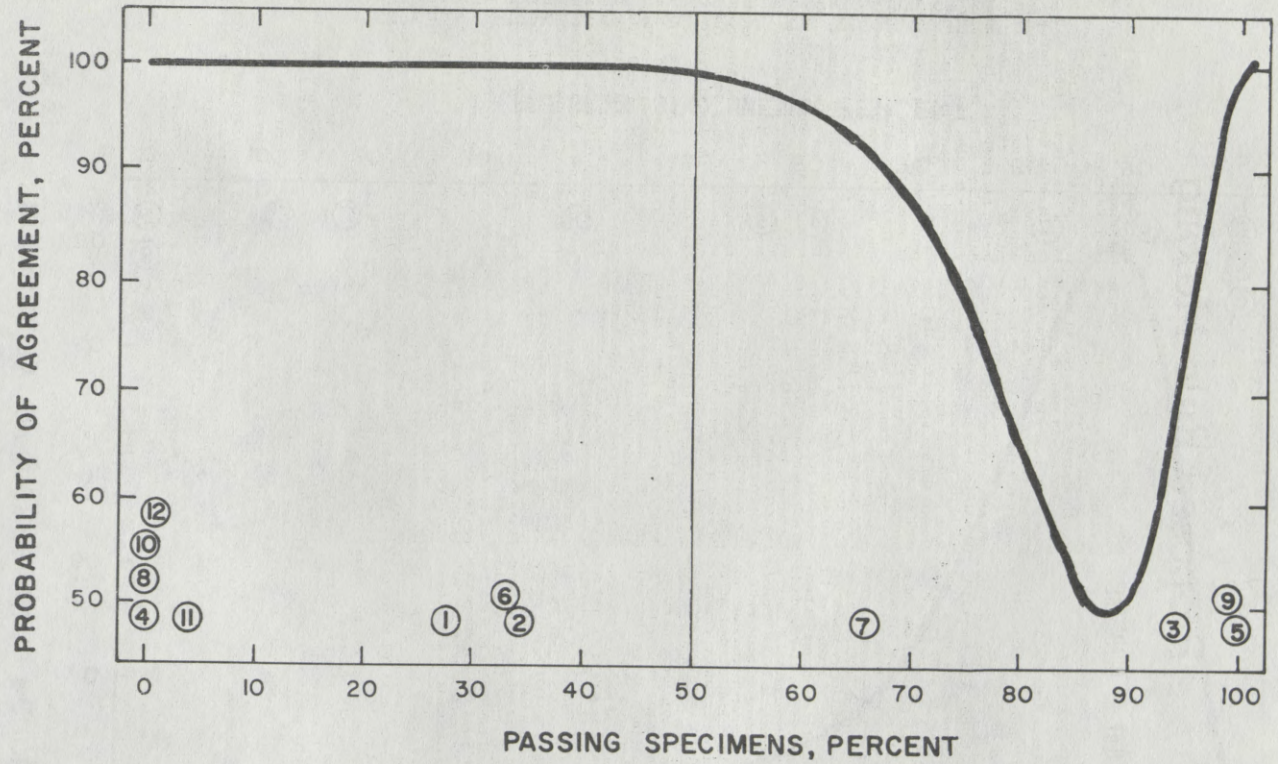

FIGURE A5. PROBABILITY OF AGREEMENT FOR DOUBLE SAMPLING PLAN
○ POSITION OF CARPETS USING DUAL TEST CRITERION

Proposed Rule Making

DEPARTMENT OF COMMERCE

Office of the Secretary

[15 CFR Part 7]

CARPETS AND RUGS

Notice of Proposed Flammability Standard

On December 3, 1968, there was published in the FEDERAL REGISTER (33 F.R. 17921) a notice of finding that a flammability standard or other regulation, including labeling, may be needed for carpets and rugs, to protect the public against unreasonable risk of the occurrence of fire leading to death, injury, or significant property damage, arising from the hazards of rapid flash burning or continuous slow burning or smoldering, and for institution of proceedings for the development of an appropriate flammability standard or other regulation. In order that the Department of Commerce, hereinafter referred to as the "Department," might receive adequate and deliberative responses representing the considered views and recommendations of interested persons and to accommodate a number of requests for additional time to respond to the December 3 notice, the Department by notice in the FEDERAL REGISTER on January 10, 1969 (34 F.R. 398), extended the period for filing comments to February 3, 1969.

After review and analysis of the comments received, analysis of material developed through research, and after further review of information previously cited in the December 3, 1968, FEDERAL REGISTER (33 F.R. 17921), it is hereby found that a flammability standard for carpets and rugs is needed to protect the public against unreasonable risk of the occurrence of fire leading to death, injury, or significant property damage arising from the hazards of rapid flash burning or continuous slow burning or smoldering.

Proposed standard. It is preliminarily found that the proposed flammability standard as set out in full at the end hereof as Appendix I:

(a) Is needed for carpets and rugs to protect the public against unreasonable risk of the occurrence of fire arising from the hazards of rapid flash burning or continuous or slow burning or smoldering, and leading to death, personal injury, or significant property damage;

(b) Is reasonable, technologically practicable and appropriate and is stated in objective terms; and

(c) Is limited to carpets and rugs which currently present the unreasonable risks specified in (a) above.

Basis for proposed flammability standard. Although there are standards for certain specialized applications, there now exists no national flammability standard for carpets and rugs affording protection to the general public from an unreasonable risk of the occurrence of fire. An analysis of data and all comments received and research conducted pursuant to inquiry by this Department into flammability problems in carpets and rugs reveals that carpets and rugs are being produced and made available for consumer purchase which present, through ordinary use, an unreasonable risk of the occurrence of fire leading to death or personal injury, or significant property damage, arising from the foreseeable hazards of rapid flash burning or continuous slow burning or smoldering. The proposed standard would remove from the market those rugs and carpets which present either of these hazards. This analysis further reveals that the proposed standard will protect against such risks and, at the same time, is reasonable, technologically practicable and appropriate and is stated in objective terms. The current state of the art in carpet and rug manufacture can conform to this proposed standard, and rugs and carpets are, in fact, available to the public which meet the requirements of this proposed standard. This proposed standard is limited to rugs and carpets which present the hazards of rapid flash burning or continuous slow burning or smoldering. The information upon which the finding is made indicates that such items present the unreasonable risks mentioned above unless produced in conformance to the proposed standard.

In federally owned or leased buildings, a measure of protection against hazards from the flammability of carpets and rugs is afforded through the requirement of the Federal Supply Service, General Services Administration, that all rugs and carpets purchased for use in such buildings must comply with the flame resistance criteria of Federal Specification DDD–C–95, Carpets and Rugs, Wool, Nylon, Acrylic, Modacrylic. Under the test procedure prescribed therein, each of two specimens of carpet, conditioned at a prescribed temperature and relative humidity and placed in a horizontal position, is subjected to controlled ignition from a timed burning tablet. Flammability is evaluated by measuring the maximum dimension of the charred area produced.

The Department proposes that all carpets and rugs, and fabrics or related materials intended to be used, or which may reasonably be expected to be used as carpets or rugs, shall be classed as "resistant to flammability" in the test method described in Appendix I. This test method is a modification of the test method in Federal Specification DDD–C–95, Carpets and Rugs, Wool, Nylon, Acrylic, Modacrylic. The method tests the resistance to flammability of rugs and carpets only under draft-protected conditions by requiring that the maximum dimension of charred area produced under certain carefully prescribed conditions and after controlled ignition from a timed burning tablet shall not exceed a certain limit as set forth in the Standard in Appendix I. From observations made during development of this method, it can be concluded that if combustion has progressed to the limit defining failure in the test, combustion, wherever initiated, may reasonably be expected to progress in actual service to the edges of the carpet and provide a possible source for subsequent ignition of other furnishings.

The Department has (1) conducted an interlaboratory evaluation to develop the test method; (2) developed the test method for use in connection with the proposed flammability standard; and (3) used the test method on a selected sample of carpets and rugs being offered at retail outlets selling to the consuming public. The results of these latter tests are given in Appendix II.

Based on the analysis of the test data and subsequent economic investigations by the Department's Office of Textiles, the proposed standard in Appendix I has been developed.

Participation in proceedings. All interested persons are invited to submit written comments relative to the proposed flammability standard within 30 days after the date of publication of this notice in the FEDERAL REGISTER. Written comments should be submitted in at least four (4) copies to the Assistant Secretary for Science and Technology, Room 5051, U.S. Department of Commerce, Washington, D.C. 20230, and may include any data or other information pertinent to the subject.

Inspection of relevant documents. The written comments received pursuant to this notice will be available for public inspection at the Central Reference and Records Facility of the Department, Room 2122, Main Commerce Building, 14th Street between E Street and Constitution Avenue NW., Washington, D.C. 20230.

Issued: December 12, 1969.

MYRON TRIBUS,
Assistant Secretary for Science and Technology.

[Appendix I]

CARPETS AND RUGS

PROPOSED STANDARD FOR THE RESISTANCE TO FLAMMABILITY OF CARPETS AND RUGS (METHENAMINE PILL)

.1 *Definitions.* In addition to the definitions given in section 2 of the Flammable Fabrics Act, as amended (sec. 1, 81 Stat. 568; 15 U.S.C. 1191), and section 7.2 of the Procedures (33 F.R. 14642, Oct. 1, 1968), the following definitions apply for the purposes of this Standard:

(a) "Acceptance Criterion" means that at least seven out of eight individual specimens of a given carpet or rug shall meet the test criterion as defined in this Standard.

(b) "Carpet" means any type of finished product made in whole or in part of fabric or related material and intended for use or which may reasonably be expected to be used as a floor covering which is exposed to traffic in homes, offices, or other places of assembly or accommodation, and which may or may not be fastened to the floor by mechanical means such as nails, tacks, barbs, staples, adhesives, etc. Mats, hides with natural or synthetic fibers, and other similar products are included in this definition, but resilient floor coverings such as linoleum, asphalt tile and vinyl tile are not.

(c) "Rug" means, for the purposes of this Standard, the same as carpet and shall be accepted as interchangeable with carpet.

(d) "Resistant to Flammability" means that a carpet or rug complies with the acceptance criterion.

(e) "Timed Burning Tablet" means the methenamine tablet, weighing approximately 0.149 grams, sold as Catalogue No. 1588 by the Eli Lilly Co. of Indianapolis, Ind. 46206.

(f) "Test Criterion" means the basis for judging whether or not a single specimen of carpet or rug has passed the test, i.e., the charred portion of a tested specimen shall not extend to within one inch of the edge of the hole in the flattening frame at any point.

(g) "Underlayment" means any pad, cushion, mat, or other material, used between the floor and the carpet or rug.

(h) "Fire-Retardant Treatment" means any chemical or process to which a carpet or rug has been exposed, which significantly modifies the resistance to flammability, as defined in this standard, of the carpet or rug.

.2 *Scope and application.* (a) This Standard provides a test method to determine the resistance to flammability of finished carpets and rugs when exposed to a standard source of ignition under carefully prescribed draft-protected conditions. It is applicable to all types of carpets and rugs used as floor covering materials regardless of their method of fabrication or whether they are made of natural or synthetic fibers or films, or combinations of or substitutes for these.

(b) This Standard requires the determination of the resistance to flammability of carpets and rugs as such. However, because an underlayment may modify the resistance to flammability of these materials under some conditions of use, where the combination of carpet and underlayment is available, consideration should be given to performing the test on the combination as it would be used in service.

.3 *General requirements*—(a) *Summary of test method.* This method involves the exposure of each of eight conditioned, replicate specimens of a given carpet or rug to a standard igniting source in a draft-protected environment and measurement of the proximity of the charred portion to the edge of the hole in the prescribed flattening frame.

(b) *Test criterion.* A specimen passes the test if the charred portion does not extend to within one inch of the edge of the hole in the flattening frame at any point.

(c) *Acceptance criterion.* If at least seven of the eight specimens meet the test criterion, the material shall be classified as resistant to flammability.

.4 *Test Procedure*—(a) *Apparatus*—(1) *Test chamber.* The test chamber shall consist of an open top hollow cube made of noncombustible material [1] with inside dimensions 12 x 12 x 12 inches (30.5 x 30.5 x 30.5 cm.) and a minimum of ¼-inch (6.4 mm.) wall thickness. The flat bottom of the box shall be made of the same material as the sides and shall be easily removable. The sides shall be fastened together with screws or brackets and taped to prevent air leakage into the box during use.

(A minimum of two chambers and two extra bottoms are suggested for efficient operation.)

(2) *Flattening frame.* A steel plate 9 x 9 inches (23 x 23 cm.), ¼-inch (6.4 mm.) thick with an 8-inch (20.3 cm.) diameter hole in its center is required to hold the carpet or rug flat during the course of the test. It is recommended that one be provided for each test chamber.

(3) *Standard igniting source.* No. 1588 methenamine timed burning tablet. These tablets shall be stored in a desiccator over a desiccant for 24 hours prior to use. (Small quantities of sorbed water may cause the tablets to fracture when first ignited. If a major fracture occurs, any results from that test shall be ignored, and it shall be repeated.)

(4) *Test specimens.* Each test specimen shall be a 9 x 9 inches (23 x 23 cm.) section of the carpet or rug to be tested. Eight specimens are required.

(5) *Circulating air oven.* A forced circulation drying oven capable of removing the moisture from the specimens when maintained at 105° C. for 2 hours.[3]

(6) *Dessicating cabinet.* An air- and moisture-tight cabinet capable of holding the floor covering specimens horizontally without contacting each other during the cooling period following drying, and containing an efficient desiccant, such as calcium chloride or silica gel.

(7) *Glove.* A nonhygroscopic glove (rubber, polyethylene, etc.) for raising the pile on specimens prior to testing.

(8) *Hood.* A hood capable of being closed and having its draft turned off during each test and capable of rapidly removing the products of combustion following each test. The front or sides of the hood should be transparent to permit observation of the tests in progress.

(9) *Mirror.* A small mirror mounted above each test chamber at an angle to permit observation of the specimen from outside of the hood.

(10) *Vacuum cleaner.* A vacuum cleaner to remove all loose material from each specimen prior to conditioning. All surfaces of the vacuum cleaner contacting the specimen shall be flat and smooth.

(b) *Sampling*—(1) *Selection of samples.* If there is an applicable material specification, take a lot sample. If not, select a sample of the material representative of the lot and large enough to permit cutting eight specimens 9 x 9 inches (23 x 23 cm.), free from creases, fold marks, delaminations or other distortions. The sample of material representative of the lot may be more than one carpet or rug.

If the carpet or rug has had a fire-retardant treatment, or is made of fibers which have had a fire-retardant treatment, the selected sample shall be washed, dry-cleaned or shampooed 10 times in a manner normally used for that carpet or rug in service prior to cutting of specimens.

(2) *Cutting.* Cut eight 9±¼-in. (23±0.6 cm.) square specimens of each carpet or rug to be tested.

(c) *Conditioning.* Clean each specimen with the vacuum cleaner until it is free from all loose ends left during the manufacturing process and from any material that may have been worked into the pile during handling.[3] Care must be exercised to avoid "fuzzing" of the pile yarn.

Place the specimens in the drying oven in a manner that will permit free circulation of the air at 105° C. around them for 2 hours.[4] Remove the specimens from the oven and place them horizontally in the desiccator with pile side up and free from contact with each other until cooled to room temperature, but in no instance less than 1 hour.

(d) *Testing.* Place the test chamber in the draft-protected environment (hood with draft off) with its bottom in place. Remove a test specimen from the desiccator, brush its surface with a gloved hand in such a manner as to raise its pile. Place the specimen on the center of the floor of the test chamber, pile side up, exercising care that the specimen is horizontal and flat. Place the flattening frame on the specimen and position a

[1] ¼-inch (6.4 mm.) cement asbestos board is a suitable material.

[2] Option 1 of ASTM D 2654–67T, "Methods of Test for Amount of Moisture in Textile Materials," describes a satisfactory oven. ("1969 Book of ASTM Standards," Part 24, published by the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.)

[3] The vacuum cleaning described is not intended to simulate the effects of repeated vacuum cleaning in service.

[4] If the specimens are moist when received, permit them to air-dry at laboratory conditions prior to placement in the oven. A satisfactory preconditioning procedure may be found in ASTM D 1776–67, "Conditioning Textiles and Textile Products for Testing." ("1969 Book of ASTM Standards", Part 24, published by the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.)

methenamine tablet on one of its flat sides in the center of the 8-inch (20.3 cm.) hole.

Ignite the tablet by touching a lighted match or an equivalent igniting source carefully to its top.[5]

Continue each test until one of the following conditions occurs:

(1) The last vestige of flame or glow disappears (this is frequently accompanied by a final puff of smoke).

(2) The flaming or smoldering has approached within 1 inch of the edge of the hole in the flattening frame at any point.

When all combustion has ceased, ventilate the hood and measure the shortest distance between the edge of the hole in the flattening frame and the charred area. Record the distance measured for each specimen.

Remove the specimen from the chamber and remove any burn residue from the floor of the chamber. Before proceeding to the next test, the floor must be cooled to room temperature or replaced with one that is at room temperature.

(e) *Report*—The number of specimens of the eight tested in which the charred area does not extend to within one inch of the edge of the hole in the flattening frame shall be reported.

(f) *Interpretation of results*—If the charred area does not extend to within one inch of the edge of the hole in the flattening frame at any point for at least seven of the eight specimens, the carpet or rug meets the acceptance criterion.

.5 *Labeling*—If the carpet or rug has had a fire-retardant treatment during the manufacturing process, or is made of fibers which have had a fire-retardant treatment, it shall be labeled with the letter "T."

[Appendix II]

TESTS OF SELECTED CARPETS AND RUGS

In order to determine to what extent carpets and rugs that would not pass the acceptance criterion were sold on the market, the National Bureau of Standards purchased a sample of carpets and rugs indicative of the fiber and construction types available to the public.

Forty-three separate and distinct carpets and rugs were purchased from six retail outlets. Twenty-nine of these were cut from large rolls of material, or were floor samples taken originally from rolls, and fourteen were items made up for sale in predetermined sizes. Of these forty-three carpets and rugs, 33 were labeled as having a single fiber type in the pile and 10 were labeled as containing blends of two or more fibers in the pile. The former contained the following carpet fibers: Acrylic, cotton, nylon, olefin, polyester, rayon and wool. The blends contained two or more of the following: Acetate, acrylic, cotton, modacrylic, nylon, olefin, polyester, and rayon.

[5] Care must be exercised to avoid igniting the carpet prior to the tablet. If more than 2 minutes elapse between the removal of the specimen from the desiccator and the ignition of the tablet, the conditioning must be repeated.

The results of the resistance to flammability tests are summarized in Table 1.

TABLE 1.—RESISTANCE OF CARPETS AND RUGS TO FAMMABILITY

Item	Number tested	Number meeting acceptance criterion
Carpets (from rolls)	29	22
Rugs and mats	14	6
By pile fiber material: [1]		
Acrylic	6	5
Cotton	2	1
Nylon	10	10
Olefin	8	5
Polyester	2	1
Rayon	3	0
Wool	2	1
Blends	10	3
By construction: [1]		
Indoor-Outdoor	4	4
Loop	10	8
Plush	5	5
Sculptured	7	4
Shag	5	2
Tweed	1	1
Twist	2	2
Rugs and mats	14	6

[1] Fiber content and construction information as provided by the retailer. Some construction designations were combinations of three types of construction, and are listed with each type. Therefore, the individual numbers do not add up to the total number of carpets and rugs tested.

[F.R. Doc. 69-14969; Filed, Dec. 17, 1969; 8:45 a.m.]

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Secretary

[24 CFR Part 31]

GUARANTEE OF PRIVATE OBLIGATIONS FOR FINANCING NEW COMMUNITY LAND DEVELOPMENT

Notice of Proposed Rule Making

Notice is hereby given that the Secretary of Housing and Urban Development proposes to issue the regulations set forth below as a new Part 31 of Title 24, pursuant to the New Communities Act of 1968 (title IV of the Housing and Urban Development Act of 1968, 42 U.S.C. 3901 et seq.). Although the proposed regulations relating to a guarantee are not subject to the rule-making requirements of 5 U.S.C. 553, interested persons are invited to submit written comments or suggestions regarding the proposed regulations to the Assistant Secretary for Metropolitan Development, 451 Seventh Street SW., Washington, D.C. 20410, within 30 days of the publication of this notice in the FEDERAL REGISTER.

The proposed regulations are as follows:

PART 31—GUARANTEE OF PRIVATE OBLIGATIONS FOR FINANCING NEW COMMUNITY LAND DEVELOPMENT

Subpart A—General

Subpart B—New Community Criteria and Standards

Subpart C—Financial and Economic Criteria and Standards

Subpart D—Procedures

Subpart E—Fee and Charge Schedule

AUTHORITY: The provisions of this Part 31 issued under section 413 of the New Communities Act of 1968, 42 U.S.C. 3912; and sec. 7(d), Department of HUD Act, 42 U.S.C. 3535(d).

Subpart A—General

§ 31.1 Statement of applicable law.

(a) The New Communities Act of 1968 (42 U.S.C. 3901–3914) authorizes the Secretary of Housing and Urban Development to guarantee obligations issued by private developers to help finance new community development projects. It also authorizes the Secretary to make grants to State and local public bodies and agencies to supplement the Federal assistance that is otherwise available for certain water, sewer, or open-space projects if these projects are needed or desirable in connection with a new community which will make available a substantial number of housing units for persons of low and moderate income. The amount of such grants may not exceed 20 percent of project costs, and, since this is to supplement other Federal assistance, the projects must also meet the applicable requirements for regular grants under section 702 of the Housing and Urban Development Act of 1965, as amended (42 U.S.C. 3102); section 306(a)(2) of the Consolidated Farmers' Home Administration Act, as amended (7 U.S.C. 1926(a)(2)); or title VII of the Housing Act of 1961, as amended (42 U.S.C. 1500–1500e).

(b) The Act (1) amends section 202 (b)(4) of the Housing Amendments of 1955, as amended (42 U.S.C. 1492), to permit public facilities loans without regard to the population limits otherwise applicable for facilities serving a new community development; (2) amends

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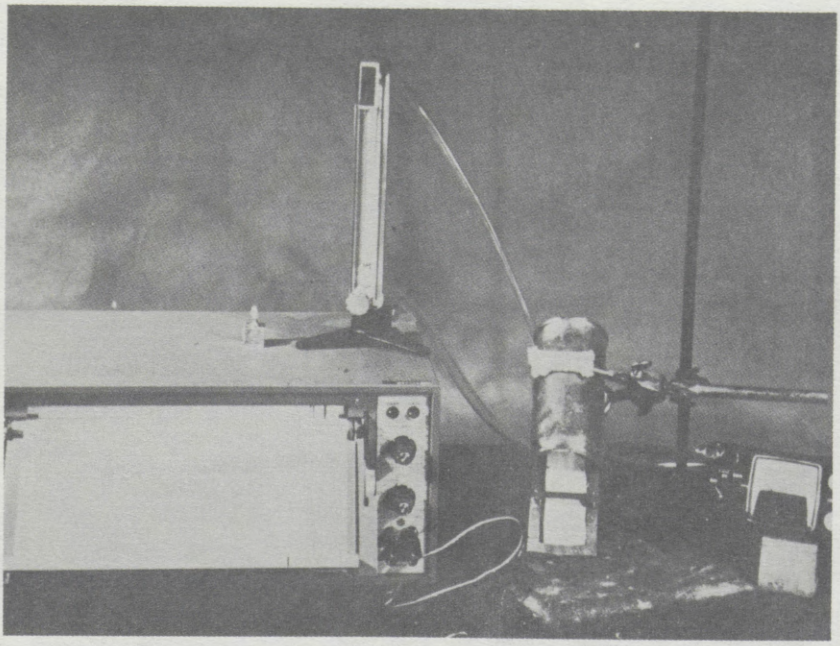

FIGURE 1

PROTOTYPE CALORIMETER. THIS INSTRUMENT, SHOWN HERE IN ITS EARLY DEVELOPMENT STAGES, WILL MAKE IT POSSIBLE TO MEASURE THE TOTAL HEAT GIVEN OFF BY A BURNING FABRIC AS WELL AS THE RATE AT WHICH IT IS GIVEN OFF. THE AMOUNT OF HEAT GIVEN OFF, AND THE RATE AT WHICH IT IS GIVEN OFF ARE IMPORTANT IN DETERMINING THE HAZARD FROM A BURNING FABRIC.

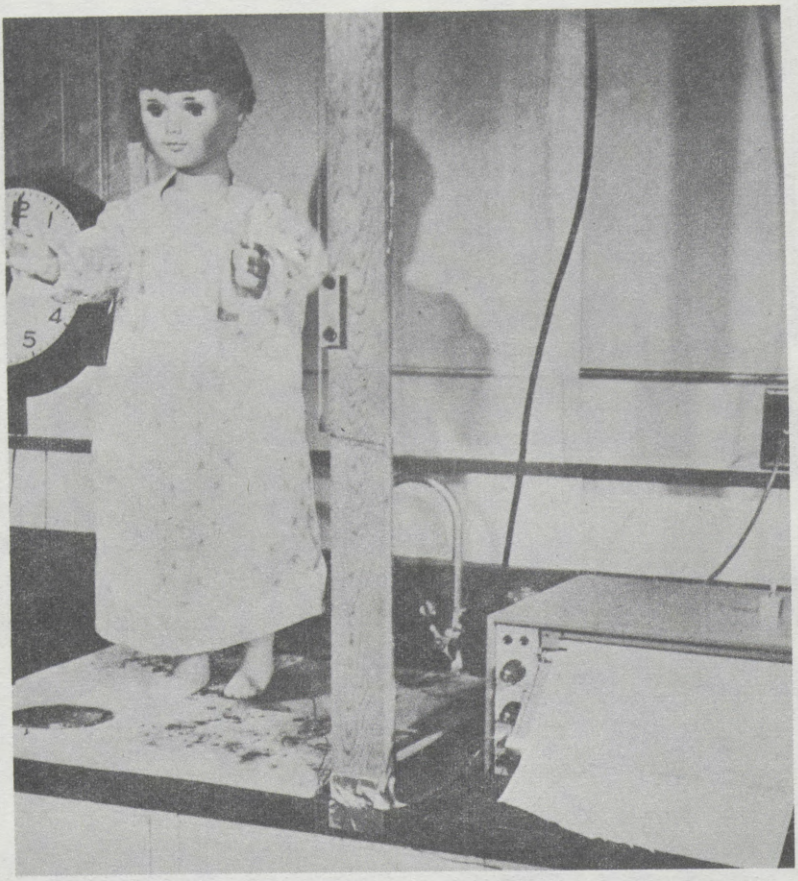

FIGURE 2

AN INSTRUMENTED MANNEQUIN. THE BURNING OF GARMENTS ON SUCH MANNEQUINS, AND THE MEASUREMENT OF TEMPERATURES AND AMOUNT OF HEAT TRANSFERRED TO THE BODY WILL MAKE POSSIBLE THE DEVELOPMENT OF MORE MEANINGFUL TESTS FOR APPAREL FABRICS.

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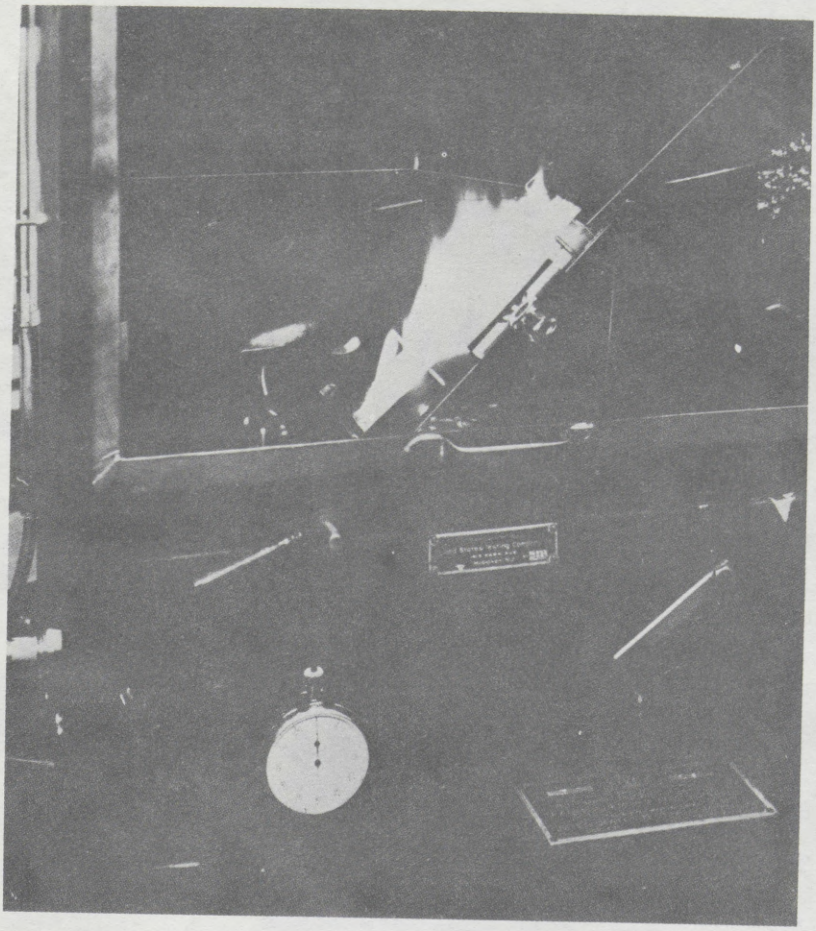

FIGURE 3

BURNING OF A SAMPLE OF FABRIC IN THE TEST (CS 191-53) PRESENTLY SPECIFIED IN THE FLAMMABLE FABRICS ACT. THIS TEST HAS SEVERAL TECHNICAL INADEQUACIES, FOREMOST OF WHICH IS THE INABILITY TO DISTINGUISH BETWEEN EASE OF IGNITION AND RATE OF BURNING.

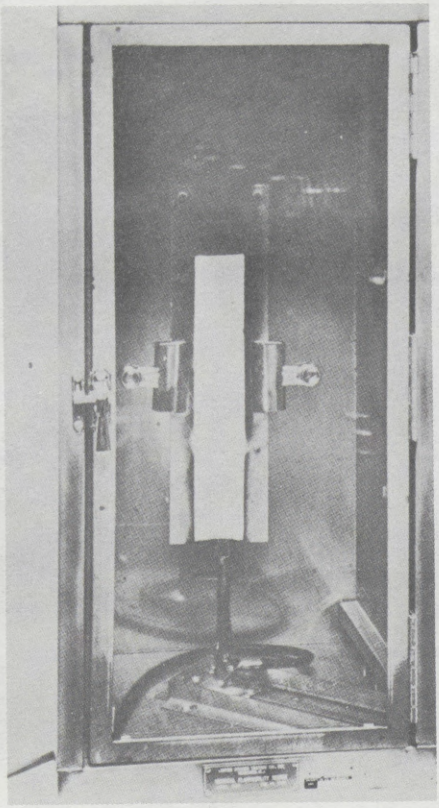

FIGURE 4

A VERSION OF THE VERTICAL FLAMMABILITY TEST. THIS IS THE MOST STRINGENT OF THE TESTS PRESENTLY IN USE. IN ORDER TO PASS IT, A MATERIAL MUST ONLY CHAR AND NOT BURN. ONLY A VERY FEW MATERIALS CAN PRESENTLY PASS THIS TEST, WHICH IS USED WHERE A MAXIMUM DEGREE OF PROTECTION IS DESIRED AND OTHER CONSIDERATIONS ARE SECONDARY.

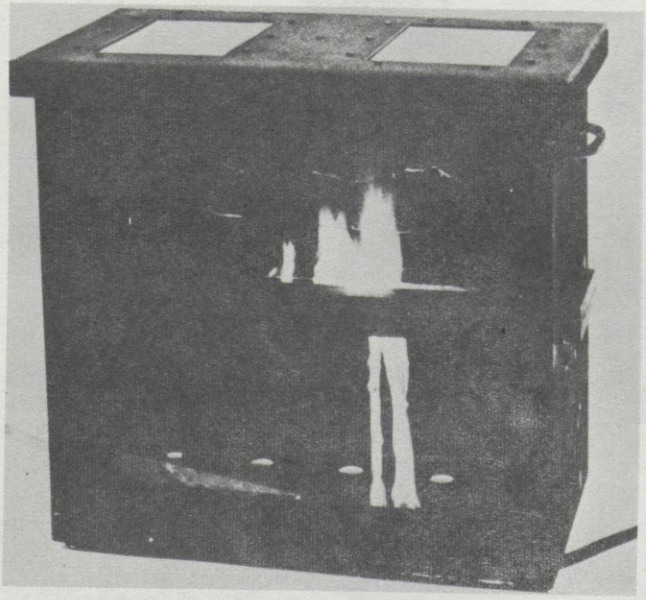

FIGURE 5

HORIZONTAL BURNING TEST METHOD. IN THIS TEST, THE SAMPLE OF FABRIC TO BE TESTED IS HELD IN A HORIZONTAL POSITION. THE TEST IS NOT USED IN STANDARDS AT THE PRESENT TIME.

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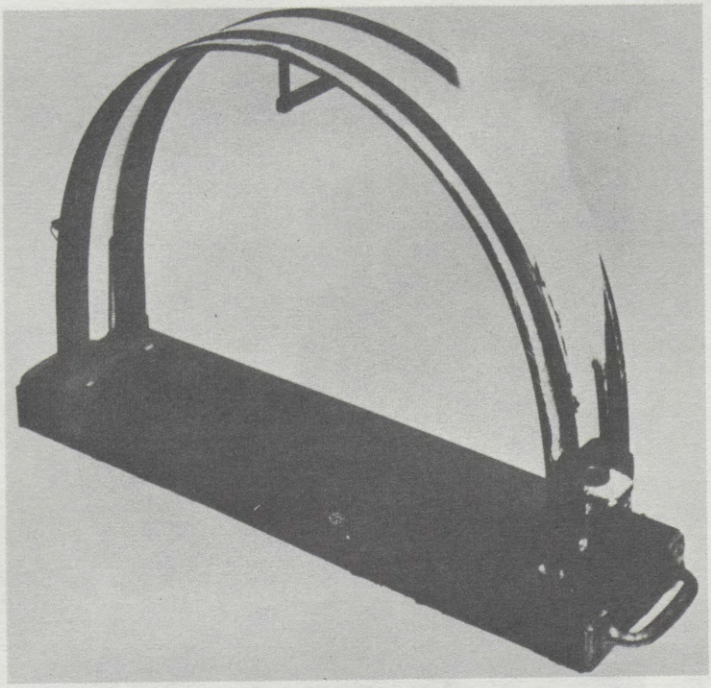

FIGURE 6

THE SO-CALLED "SEMICIRCULAR" TEST. THIS TEST HAS THE ADVANTAGE OF INVOLVING ALL ANGLES OF BURN. IT IS A RESEARCH TEST, AND NOT USED FOR ANY TEST METHOD.

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FIGURE 7

A PORTION OF A SHIRT RECOVERED FROM AN ACCIDENT CASE, SUBMITTED TO THE NATIONAL BUREAU OF STANDARDS BY THE OFFICE OF PRODUCT SAFETY, FDA. THE CORRELATION OF THE BEHAVIOR OF THE FABRIC IN SUCH GARMENTS ON THE TESTS UNDER DEVELOPMENT, AND THE DETAILS OF THE ACCIDENT FROM WHICH THE GARMENT WAS RECOVERED, WILL PERMIT THE DEVELOPMENT OF PROPER STANDARDS.

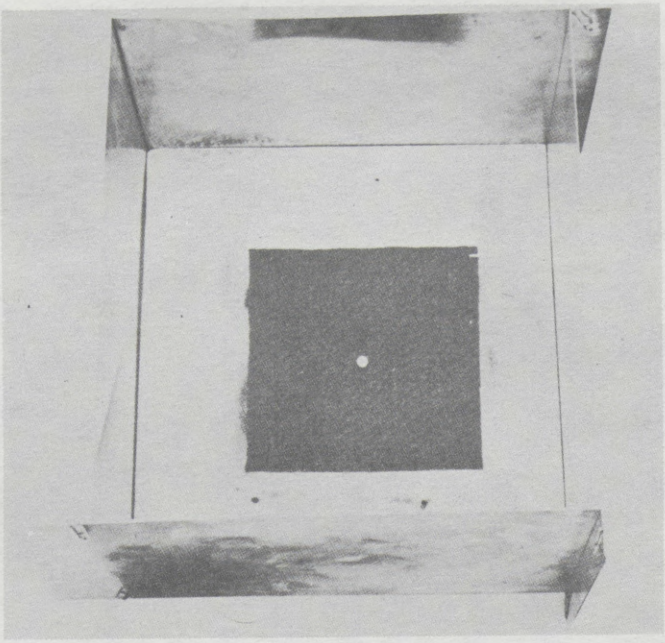

FIGURE 8

THE APPARATUS USED IN THE STANDARD DDD-C-95 PRESENTLY USED TO CONTROL THE FLAMMABILITY OF CARPETS PURCHASED FOR FEDERAL GOVERNMENT INSTALLATIONS. THE SAMPLE OF RUG IS 6" X 6", AND THE WHITE TABLET IN ITS CENTER IS A TIMED BURNING TABLET WITH THE NAME "METHENAMINE". THIS TABLET BURNS WITH AN APPROXIMATELY MATCH-SIZE FLAME FOR ABOUT 90 SECONDS.

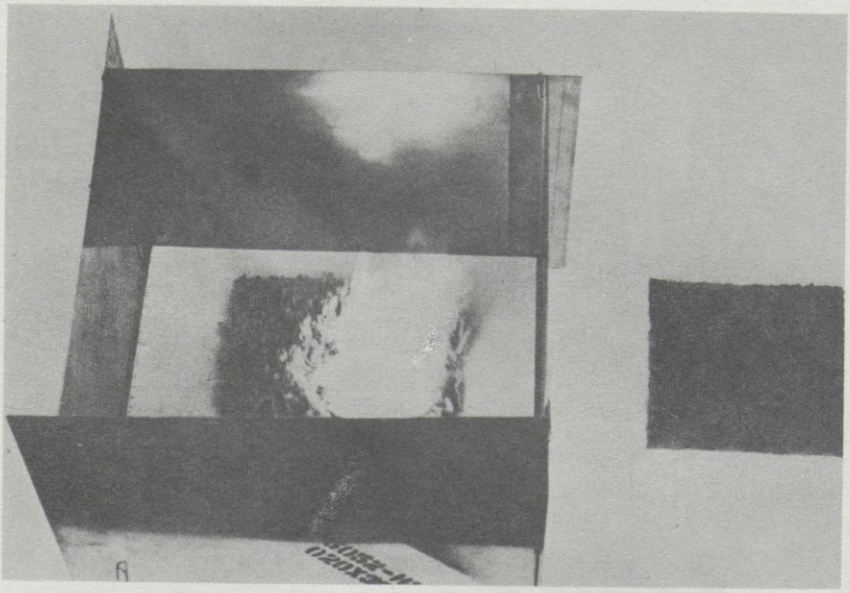

FIGURE 9

A SPECIMEN OF RUG BURNING IN THE APPARATUS DESCRIBED IN FIGURE 8. IN ORDER TO PASS THIS TEST, TWO SPECIMENS OF RUG MUST NOT BURN MORE THAN TWO INCHES IN ANY DIRECTION. THE BURNED SQUARE OF CARPET ON THE RIGHT IS ONE SIMILAR TO THE ONE IN THE BOX AFTER TESTING. IT HAS FAILED THE TEST.

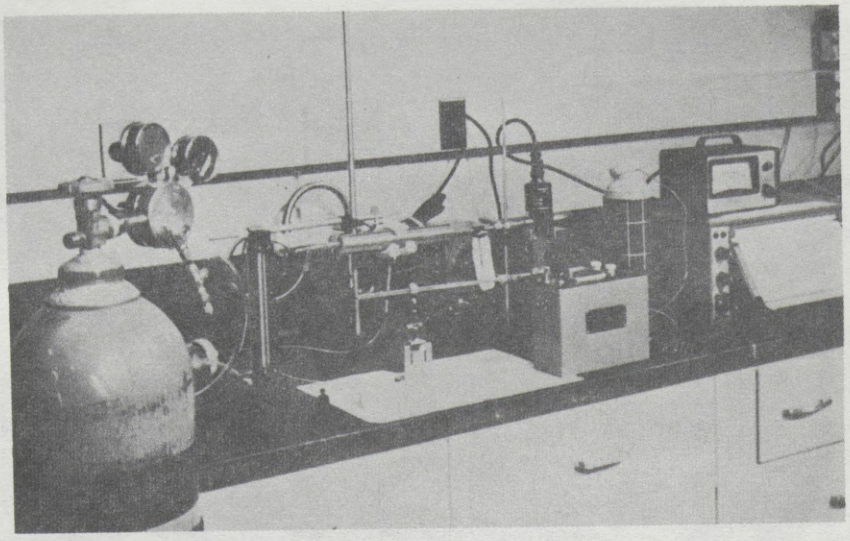

FIGURE 10

APPARATUS FOR PYROLYSIS STUDY. IN THIS APPARATUS, A SMALL SAMPLE OF THE FABRIC TO BE STUDIED IS HEATED TO A TEMPERATURE THAT CAUSES DECOMPOSITION. THE RESULTING GASES WOULD BURN IN NORMAL CIRCUMSTANCES. THE MEASUREMENT OF THE RATE OF EVOLUTION OF THESE CASES, AND A MEASUREMENT OF THEIR CALORIFIC CONTENT, PERMITS A STUDY OF THE FLAMMABILITY OF A MATERIAL.

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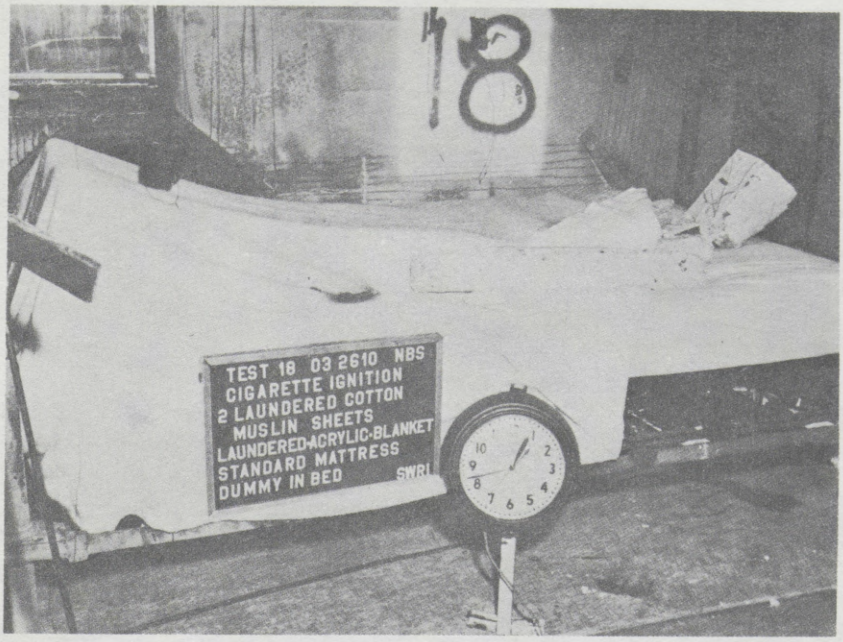

FIGURE 11

A BED AND MANNEQUIN AT THE BEGINNING OF ONE OF THE TESTS USED TO DETERMINE THE LIFE HAZARDS FROM BEDDING FIRES. THE SMOLDERING SPOT NEAR THE END OF THE ARM OF THE MANNEQUIN WAS CAUSED BY A CIGARETTE. TOXIC GAS SENSORS AND THERMOCOUPLES WERE PLACED AT VARIOUS LOCATIONS IN THE ROOM. SMOKE DENSITY WAS DETERMINED BY MEASURING THE OBSCURATION OF A LIGHT BEAM ACROSS THE ROOM. THE TEST BEGAN AT 12:00 ON THE CLOCK.

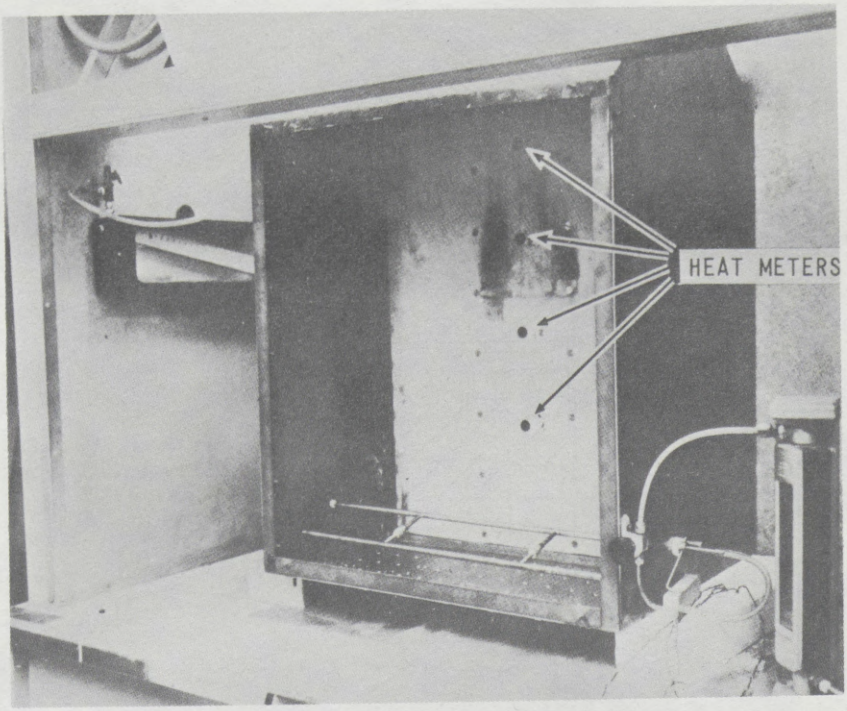

FIGURE 12

A VIEW OF THE APPARATUS USED TO MEASURE HEAT DELIVERED TO A SUBSTRATE FROM A BURNING FABRIC. THE BLACK DOTS ARE HEAT METERS. IN PRACTICE, A PIECE OF FABRIC IS SUSPENDED IN FRONT OF THEM AND BURNED, AND THE HEAT SENSED BY THE METERS IS MEASURED. IN COMBINATION WITH THE RESULTS OBTAINED WITH THE APPARATUS SHOWN IN FIGURES 1 AND 2, THIS IS EXPECTED TO LEAD TO MORE MEANINGFUL TEST METHODS.

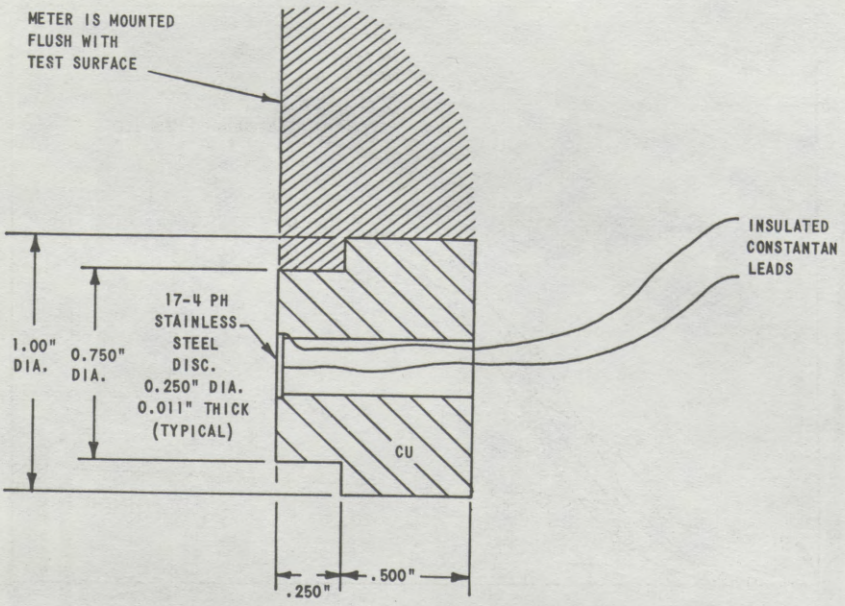

FIGURE 13

A DIAGRAM OF THE HEAT METERS SHOWN IN FIGURE 12.

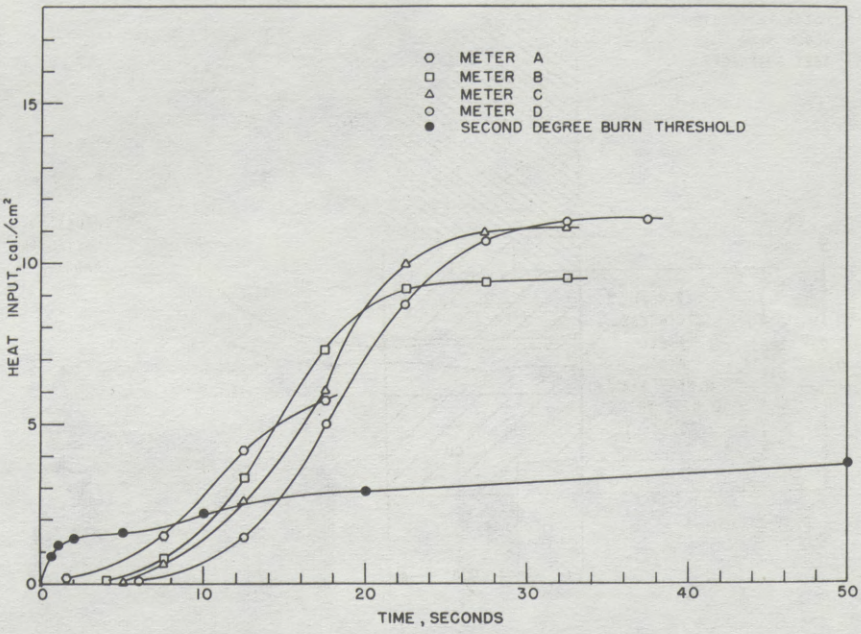

FIGURE 14

RESULTS OBTAINED WITH THE APPARATUS SHOWN IN FIGURES 12 AND 13. THESE RESULTS INDICATE THAT, FOR THIS PARTICULAR SPACING OF FABRIC AND SUBSTRATE, SECOND DEGREE BURNS WOULD HAVE BEEN SUSTAINED FOR SKIN AT THE POSITION OF THE LOWEST METER EIGHT SECONDS AFTER IGNITION. THESE RESULTS DO NOT TAKE INTO ACCOUNT HUMAN REACTION TIMES.

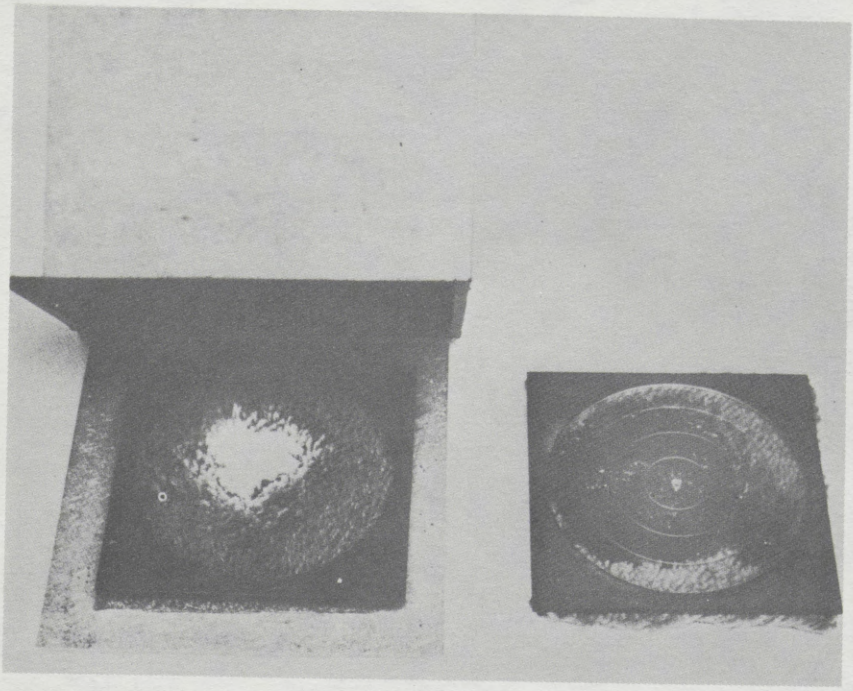

FIGURE 15

AN ILLUSTRATION OF THE APPARATUS USED FOR THE CARPET AND RUG STANDARD PROPOSED ON DECEMBER 18, 1969. THE TEST IS SIMILAR TO THAT SHOWN IN FIGURE 8. THE SAME BURNING TABLET IS USED, BUT IN THIS PROPOSED STANDARD AT LEAST SEVEN OUT OF EIGHT SPECIMENS MUST NOT BURN THREE INCHES OR MORE IN ANY DIRECTION. THIS REQUIREMENT, ALONG WITH THE REQUIREMENT THAT THE SAMPLES OF CARPET BE TESTED DRY, MAKES THIS A MORE STRINGENT STANDARD THAN THAT USED IN DDD-C-95.

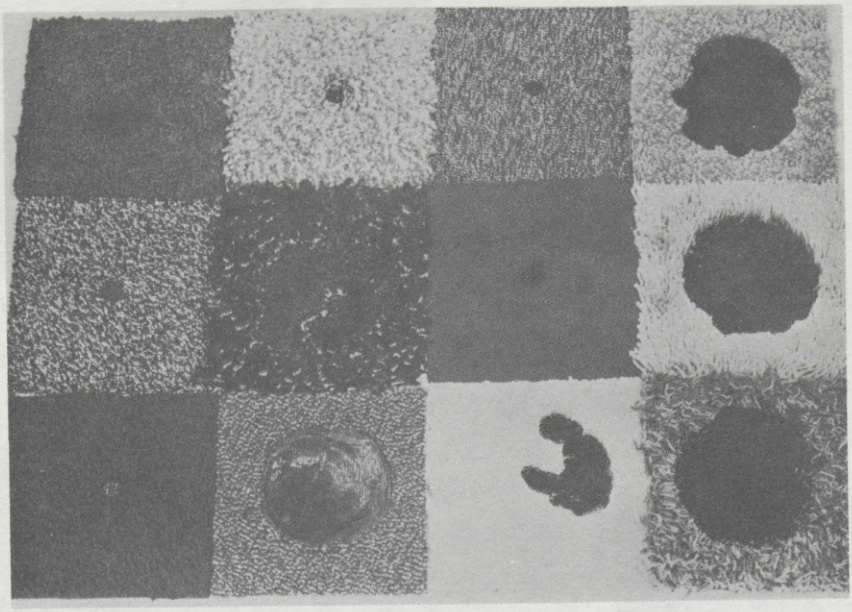

FIGURE 16

SPECIMENS OF THE TWELVE RUG TYPES USED IN THE DEVELOPMENT OF THE PROPOSED CARPET AND RUG STANDARD.

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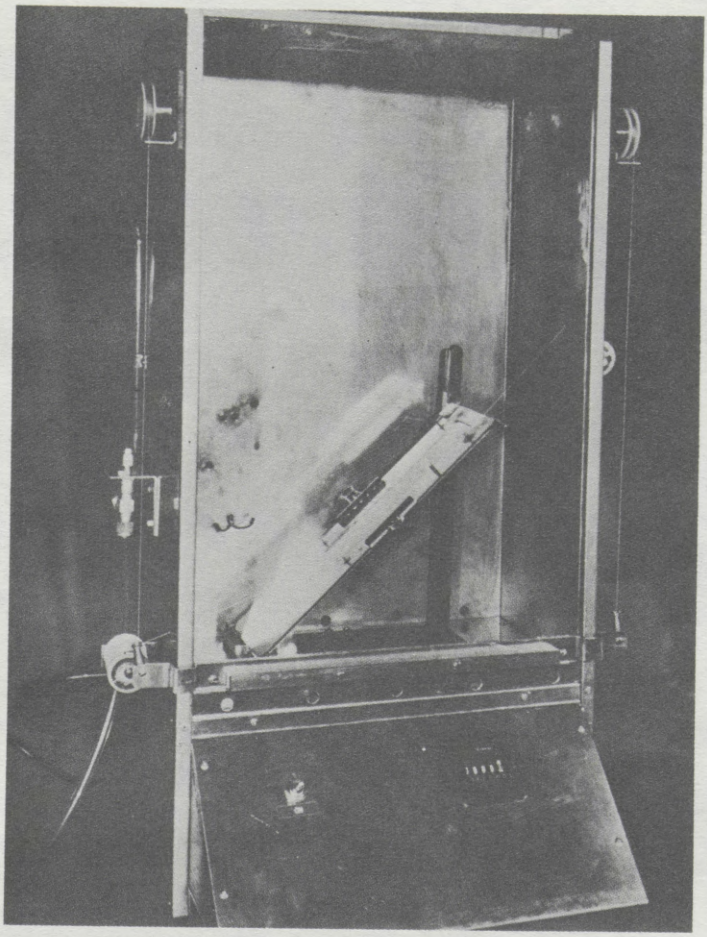

FIGURE 17

A PICTURE OF THE NEWLY DEVELOPED RATE-OF-BURN TEST. WHILE SUPERFICIALLY SIMILAR TO THE TEST SHOWN IN FIGURE 3, THIS TEST MEASURES ONLY BURN TIME. THE RESULTS ARE NOT COMPLICATED BY THE ADMIXTURE OF TIME TO IGNITION IN THE RESULTS.

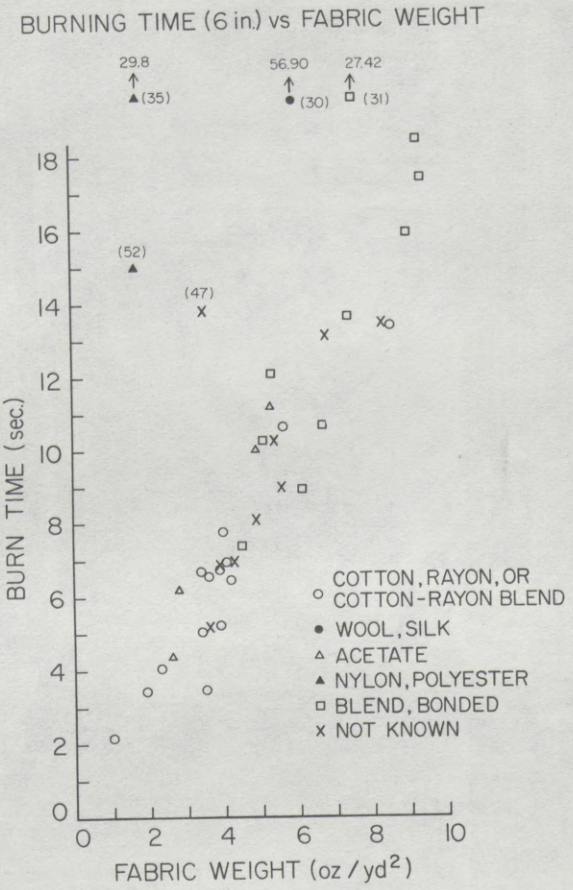

FIGURE 18

RESULTS OF BURN TIMES OBTAINED IN THE APPARATUS SHOWN IN FIGURE 17 PLOTTED AGAINST FABRIC WEIGHT PER UNIT AREA. FOR MANY FABRICS, THE BURN TIME IS LINEARLY DEPENDENT ON THE FABRIC WEIGHT PER UNIT AREA. OTHER FABRICS DO NOT FOLLOW THIS CORRELATION.

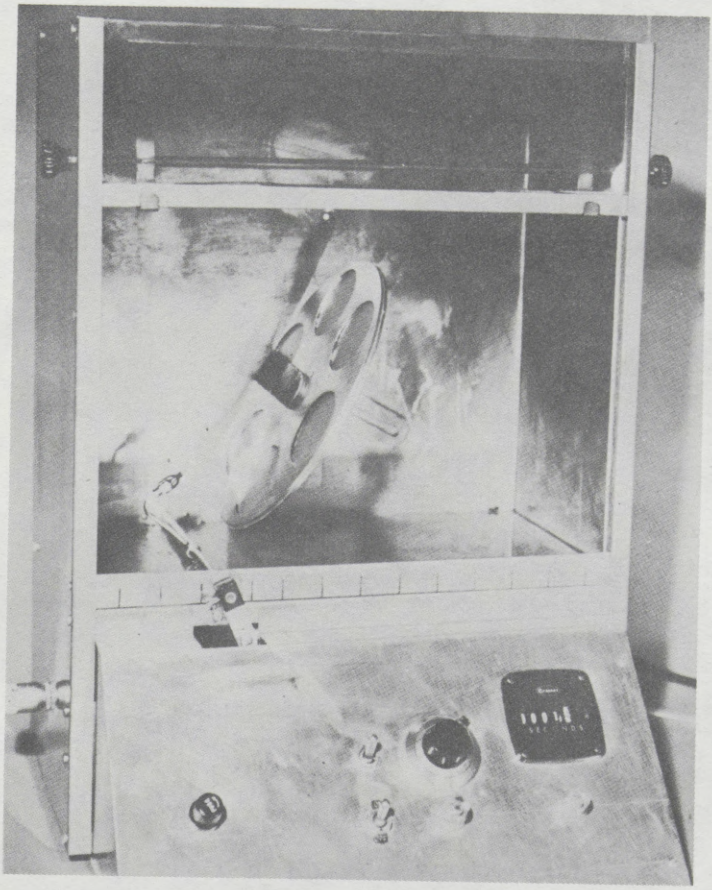

FIGURE 19

A PHOTOGRAPH OF THE APPARATUS USED IN THE NEWLY DEVELOPED TEST METHOD FOR EASE OF IGNITION. THE SMALL FLAME IS IMPINGED ON THE SPECIMEN OF FABRIC FOR SUCCESSIVELY LONGER TIMES UNTIL THE SHORTEST TIME FOR WHICH IGNITION IS OBTAINED IS FOUND.

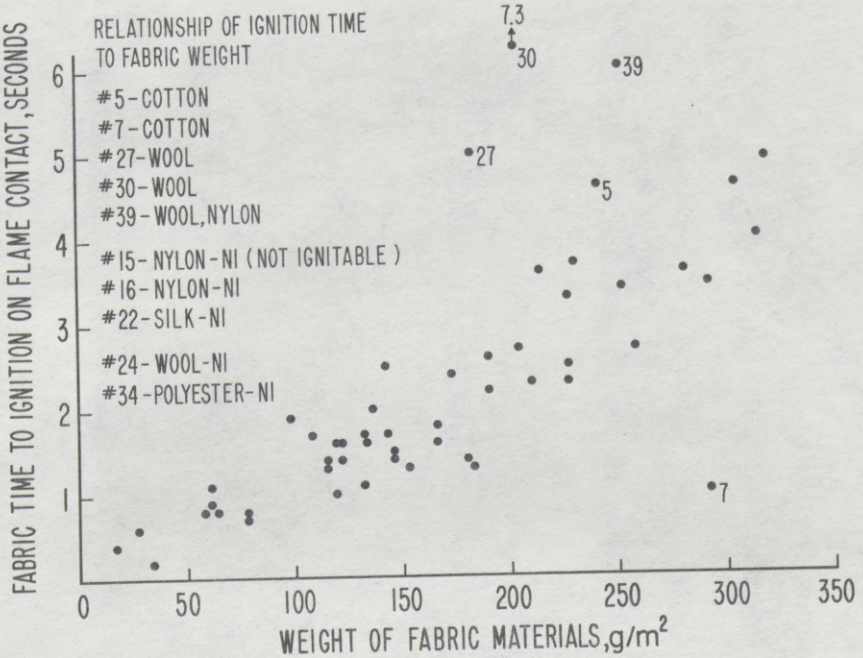

FIGURE 20

RESULTS OBTAINED ON A REPRESENTATIVE SERIES OF FABRICS WITH THE TEST METHOD SHOWN IN FIGURE 19 PLOTTED AS A FUNCTION OF FABRIC WEIGHT PER UNIT AREA. THE FABRICS ARE THE SAME AS THOSE USED TO OBTAIN THE RESULTS SHOWN IN FIGURE 18. THE TIME TO IGNITION IS A LINEAR FUNCTION OF THE FABRIC WEIGHT PER UNIT AREA FOR SOME TYPES OF FABRICS, BUT OTHERS DO NOT FOLLOW THIS CORRELATION.

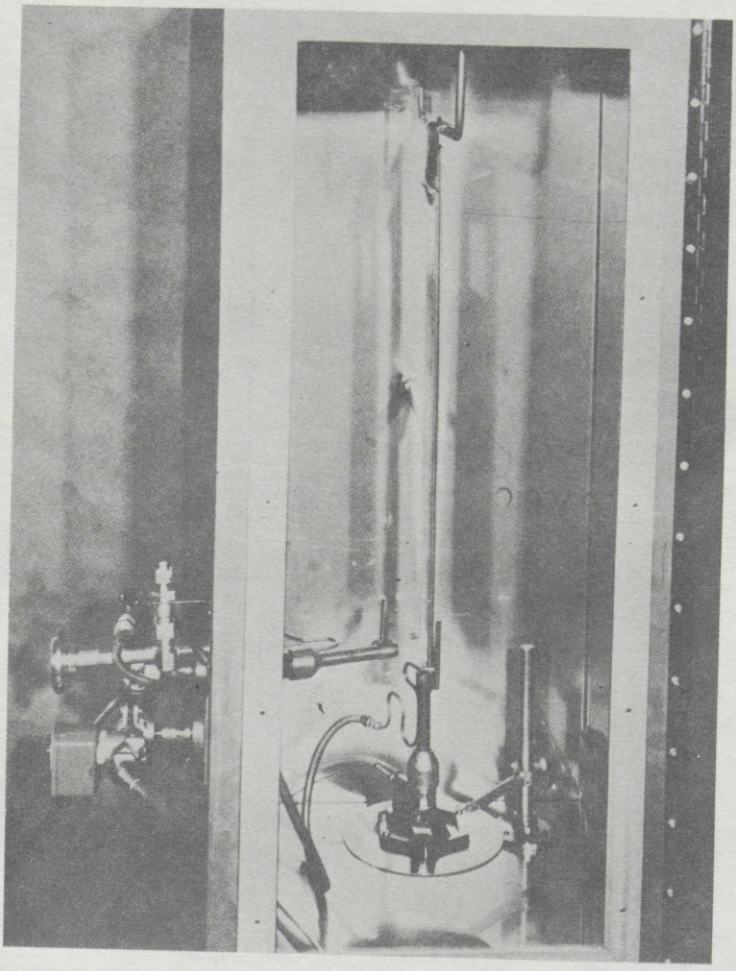

FIGURE 21

THE MOST MODERN MODIFICATION OF THE VERTICAL TEST DESCRIBED IN FIGURE 4. THE COMMENTS MADE THERE APPLY EQUALLY TO THIS TEST.

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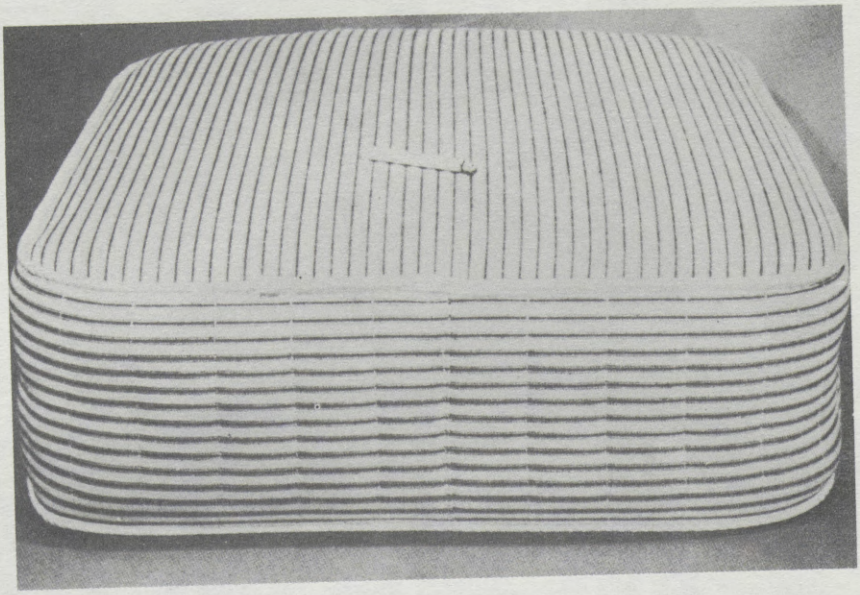

FIGURE 22

A SMALL MATTRESS BEING USED TO DEVELOP A MATTRESS TEST. ONE OF THE POSSIBILITIES FOR THIS TEST IS A CIGARETTE TEST SUCH AS ILLUSTRATED HERE. IN THIS PARTICULAR TEST WITH THIS PARTICULAR MATTRESS, THE MATTRESS WILL BEGIN TO SMOLDER SHORTLY AFTER PLACEMENT OF THE CIGARETTE, AND EVENTUALLY EMIT COPIOUS QUANTITIES OF FUMES.

75

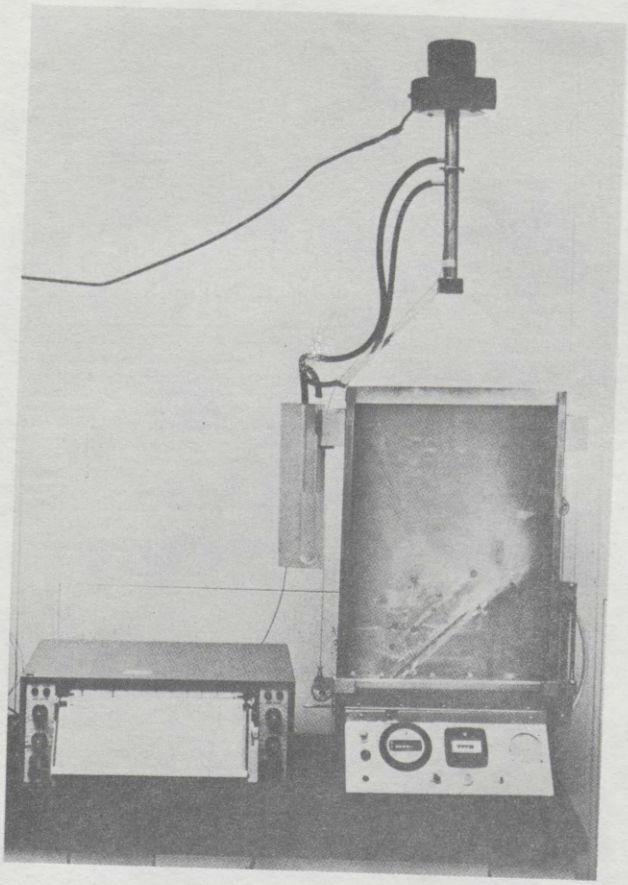

FIGURE 23

A TEST BEING DEVELOPED TO MEASURE THE CONVECTIVE HEAT GIVEN OFF DURING BURNING OF A FABRIC. THE HOT GASES ARE DRAWN UP THROUGH THE COPPER TUBE BY THE FAN AND THEIR TEMPERATURE MEASURED. THE RESULTS OF THIS TEST METHOD, COMBINED WITH THOSE SHOWN IN FIGURES 1, 2 AND 12, WILL MAKE MORE MEANINGFUL TEST METHODS POSSIBLE.

Decision Analysis Approach To Satisfying the Requirements of the Flammable Fabrics Act

Address by Assistant Secretary of Commerce for Science and Technology Myron Tribus, Prepared for Delivery at the Textile and Needle Trades Division, American Society for Quality Control, at Greensboro, North Carolina, February 12, 1970

The Flammable Fabrics Act of 1967 is a unique experiment in several ways. Under the terms of the Act, the Secretary of Commerce is to promulgate standards for fabric flammability which are "reasonable," and practical. These standards will determine what clothing and furnishings may be legally sold in the United States and its territories. The law also provides that the Secretary will be assisted by an Advisory Committee which is comprised of approximately one third consumer representatives, one third distributors, and one third manufacturers. In addition, the law specifies a rather lengthy process of publishing "Notices of Findings" in the Federal Register. The legal procedures for establishing a standard are devised to give all parties a fair chance to be heard.

The Secretary has delegated these responsibilities to the Assistant Secretary of Commerce for Science and Technology, and when I assumed that office last April, I was confronted with the fact that very little had been accomplished to meet the objectives of the Act. At that time,

it was clear to me that there were some obvious moves which should be made. The staff and facilities needed to be examined and strengthened. The Committee needed to be activated and its first meeting scheduled.

Under the terms of the Act the Department of Health, Education and Welfare was authorized to obtain field data on burn injuries. A review of that activity indicated slow progress and, more importantly, a lack of integration with the Department of Commerce program.

The lack of progress and coordination has been recognized by both Departments; existing resources were reprogrammed and budget increases for fiscal year 1970 were requested by both HEW and Commerce. The staff of the two Departments have initiated action to coordinate their programs.

While good people, adequate funding and facilities, good communication channels, and good organization are essential to any development process, they are by no means sufficient. There must also be developed an overall plan of attack that clearly sets forth the role of all participants.

What distinguishes our effort in the area of fabric flammability from many other similar efforts is that the responsibilities for setting standards are so diffuse. The key words "reasonable protection" must have a definition which is acceptable to producers, distributors, consumers, enforcement officials, and politicians if we are to be spared a complete and counter productive free-for-all battle. A management scientist would describe the situation as an exercise in group risk-taking.

It is evident, both from the testimony heard by the Congress and the language of the law, that absolute, complete protection, without regard for cost, cannot be a realistic goal. The Secretary of Commerce is expected to decide on a "reasonable" trade-off between cost and degree of protection.

For a given year, with a specified class of garment and a defined population of users, if we assume an increasing

cost to be associated with increasingly stringent standards, we can conceptualize a graph of such a trade-off as shown in Figure 1. If compliance with the standard is achieved, then the incremental cost of achieving any standard can be compared with the increase in safety attained. We shall examine this overly simplistic conceptualization later.

There are probably many who do not appreciate the necessity of approaching the subject from this point of view. In its defense, I offer two arguments. First, the Congress has recognized the need for balance by enacting legislation that a reasonable solution is to be found. And secondly, rational analysis suggests that there is no valid alternative to balancing cost and protection than through the use of probability theory. To talk openly of paying dollars to decrease the probability of injury is to recognize what people do intuitively. The matter is conceptually similar to decisions concerning -- whether to put a stop sign or a guard at a traffic intersection; whether to post more than one life guard at the beach; how many policemen to place on the beat; how big a stockpile of plasma to keep in the hospital emergency supply -- these problems all involve a trade-off of risk and expense.

This approach to considerations of safety is not original. For example, Chauncey Starr in his paper "Social Benefit versus Technological Change"[1] delivered before a recent meeting of the National Academy of Engineering, gave a comparison of several risks and benefits. Figure 2 reproduced from that paper compares some risks and benefits for voluntary exposures (such as general aviation, railroad travel, smoking, hunting, skiing) and some involuntary exposures (such as natural disasters, use of electric power, etc.). For comparison he includes probability of death due to exposure to the Vietnamese war and the average death rate due to disease for the entire population of the United States. In interpreting the figure the data presented should be viewed as approximations, noting the wide range of fatalities per person per hour of exposure, from one in ten thousand to one in one hundred billion. Figure 3 from the same paper indicates that automotive safety has been increasing. The annual <u>number</u> of deaths from automobile accidents is rising because

of the rapidly increasing population of motorists, but the death rate due to automotive accidents is now about on a par with the rate of death due to disease. Therefore, Starr argues that it is more difficult to reduce the probability of death below this level simply because people do not become sufficiently alarmed when the death rate is this low. With a low death rate it becomes more difficult to put "teeth" into the law and to get popular support for enforcement of the law.

Starr makes the interesting observation that if we were to design nuclear power plants to the same safety standard as coal burning plants (for which the death rate is about 4 per million of population per year), this would imply a risk about one hundred times greater than would be acceptable to investors in nuclear fueled power generating stations. In other words, nuclear power stations are now so large and so expensive that from the point of view of economics alone it behooves the designer to make the plant about 100 times safer than coal fired generating stations have been built in the past! It is doubtful that, prior to Starr's analysis of the problem, the value to the investor of the reactor safeguards committee (which must approve all installations of nuclear fuel) was appreciated. This is an example of an instance in which economic and humanitarian objectives are in complete harmony. Unfortunately, it is not always the case that this harmony of purpose is achieveable for all who are involved in the production and distribution process.

Under the terms of the delegated authority of the Flammable Fabrics Act, the Assistant Secretary of Commerce for Science and Technology must make the decision under the scrutiny of an Advisory Committee, the industry, his superiors in the Executive Branch, the Congress, the Courts, and, not the least, his conscience.

These circumstances have led me to prepare a formal decision analysis of the problem. Decision analysis is a procedure which permits one to analyze the expected results emanating from particular alternatives and to select a decision on the basis of values associated with the existing

alternative actions. I do not expect this analysis to yield immediate, quantitative results, for, as we shall see, the raw data required are not immediately available. But the analysis does provide the conceptual framework required to guide both the data gathering and laboratory experimentation -- for it points out the types of information that are missing and the areas where most experimentation is required if we are to arrive at an equitable and reasonable solution to the problem. Perhaps more importantly, it suggests a useful framework for reasoning about public programs whose purpose is to protect the public. It could presage a more realistic way of performing public duties.

The analysis presented here has as its immediate chief virtue the setting forth in unambiguous terms the framework for an attack on the problem of defining "reasonable." The benefits from the analysis occur even if we do not assign precise numbers to the formulae. The chief immediate benefit is that by means of equations, symbols and graphs we provide a common basis for discussion among groups with diverse backgrounds. As will be seen, the analysis also indicates the kinds of field data and experiments which need to be conducted.

At its first meeting, the Advisory Committee urged the Secretary to concentrate his attention on children's apparel. It was pointed out that children are more likely than adults to suffer injury because they do not know how to brush out a flame once ignited, they may panic, etc. Therefore, I have been concerned primarily with children's clothing.

Time today does not permit me to cover fully the formal procedures for decision analysis. Enough introductory material will be given to enable the technically qualified to follow the development. For those seeking a more complete understanding I suggest they consult "Rational Descriptions, Decisions, and Designs"[2] in which I fully describe and justify the procedures.

Let me develop a simplified analysis to illustrate the method employed. Decision analysis undertakes to evaluate the expected results of a proposed decision where the

subsequent occurrences and consequences can only be stated in terms of probabilities. Alternatively this is decision making under conditions of uncertainty.

If the decision maker can establish a value scale for measuring the outcomes of his decision and if he can assign the various probabilities with some degree of confidence then the expected results of the decision can be evaluated.

The three necessary steps in the conduct of an analysis are to

(1) Make a list of symbols and statements,

(2) Define the probability distribution sought, and

(3) Use the extension rule to introduce the data and other variables of the problem.

Because of space limitations in this paper, only a simple analysis involving a rather limited set of decisions, consequences, technical factors, and values will be described. But the method and its usefulness should be apparent.

We assume we are faced with three alternative standards of protection. (This is of course an artificiality because there are many possible standards for a wide variety of fabrics. A generalization of the analysis to embrace all standards would not cause any conceptual difficulty but it would cloud this discussion.) Let us identify these standards as S_1, S_2, and S_3. Each of the standards will have associated with it a complicated incremental cost function. I say a complicated cost because I wish to imply that in addition to the increased cost of manufacture, which would be reflected in increased item cost, there is the dollar equivalent to the consumer of such factors as style, feel, wearability, texture, washability, and all the other factors that a consumer takes into consideration in making the purchase decision. We could identify this complicated cost as the total incremental disutility the consumer associates with a garment that conforms to the standard. In advance of the standard, the costs will not be known except in terms of probabilities. Because of

the need to be unambiguous I will segment the total range of the cost per garment into an appropriate number of subranges. I will use the midvalue of these subranges as a measure of the cost of the subrange. These midvalues I define as C_1, C_2, ..., C_j, where j is the index of subranges.

Even if we presume strict compliance by the manufacturers, distributors, and importers (relying on the FTC for enforcement), the experiences in England make it clear that the public can subvert the standard. As perceived costs rise an increasing percentage of parents will boycott the system and start making articles of clothing using materials that do not conform to the standard. We will use the symbol U to represent that garments conforming to the standard will be used and u to represent that they will not be used. The upper case letter is used to represent a statement (here U = "the consumer will use the garment"). A lower case letter is used to represent the denial of the upper case symbol.

A necessary condition for a burn to occur is that exposure to an ignition source take place. Exposure probability is a measure of the hazard that is present in the environment in which the child lives. The symbol E will mean "exposed to ignition source" and e will mean "not exposed." On exposure the fabric may ignite (I) or fail to ignite (i). The fabric once ignited may burn (B) or not burn (b) depending on the characteristic of the fabric and the availability of someone to extinguish the flame. For this analysis we assume that burning of the fabric results in a burn to the child. (Expansion of the analysis to contemplate severity of burn presents no conceptual problems.)

To understand the interrelationship of the highly idealized sequence of events I have described, a graphical representation is helpful. The sequence of events is depicted in Figure 4. The diagram is normally referred to as a decision tree.

Starting at the left, the three branches represent the three standards postulated in this discussion. Each standard (S) implies a different level of protection.

At the time the standard is set it is not known precisely what the complicated cost to the consumer will be. Manufacturing and sales volume, as well as changes in technology, determine increased production cost per garment. The diagram indicates a variety of values for C_j may occur for each standard. Since Standard S_1 has been defined to be current practice, the incremental change in cost is zero if Standard S_1 is chosen.

After this choice is assumed to happen the consumer decides to use the garment (U) or not to use (u). We presume that with selection of the present standard S_1 there is only use (U). The next step in the tree indicates exposure to ignition source (E) or nonexposure (e). If e is true, then there is no burn and the tree shows a path to the no burn point. If E is true, however, the exposure to a source of flame may result in ignition (I) or no ignition (i). If no ignition occurs, again the decision tree leads to no burn. If ignition occurs, it may still happen that the fire is extinguished, possibly by an adult, before damage occurs. The decision tree thus ends on either burn or no burn.

The total probability of ending the path starting at S_i through the decision tree on B (a burn) is the sum of the probabilities associated with all the paths which lead to B. For a given choice of standard, say S_i, the probability of ending on B is given by a technique I have called "extending the conversation":

$$p(B|S_i) = \sum_{\substack{\text{sum over} \\ \text{all possible } j}} p(C_j u E I B|S_i) + \sum_{\substack{\text{sum over} \\ \text{all possible } j}} p(C_j U E I B|S_i)$$

The left hand side of this equation is read as follows:

$p(B|S_i)$ is the probability of a burn, conditional on Standard S_i. This probability distribution is of course the one we are seeking to assess in our decision making process. When symbols are written together it means they are considered to be simultaneously true, i.e., as though the word "and" had been spoken. Thus

$p(C_jUEIB|S_i)$ is the probability of a cost C_j and use and the child's exposure to an ignition source and ignition and a burn injury conditional on the Standard S_i.

Given a Standard for each cost, there are only two paths to B, as indicated in Figure 4. By the rule for calculating the probability of joint events, these probabilities may be decomposed into probabilities of several contingent events.

The technique of "extending the conversation" permits introduction of the necessary data and variables. For example, the probability of the joint event $BC_jUEI|S_i$ (that there is a burn, cost C_j, use, exposure to ignition source and ignition conditional on S_i being true) may be written as the product of 5 probabilities:

$$p(B|UEIC_jS_i)p(I|UEC_jS_i)p(E|UC_jS_i)p(U|C_jS_i)p(C_j|S_i)$$

(The order in which symbols are written has no meaning. Several statements written together will be taken to mean each statement is true.)

These terms have the following meaning:

$p(B|UEIC_jS_i)$ is the probability of a burn, given use, exposure to ignition source, ignition, cost, and a certain Standard.

$p(I|UEC_jS_i)$ is the probability that ignition will follow exposure to a source, given use and a Standard S_i at cost C_j.

$p(E|UC_jS_i)$ is the probability of exposure to an ignition source given that the garment is used, the Standard S_i and the cost is Cj.

$p(U|C_jS_i)$ is the probability that the garment will be used, given the cost C_j and the Standard S_i.

$p(C_j|S_i)$ is the probability that the cost will be C_j, given that the Standard is S_i.

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Each of the individual terms in the product can be made the subject of a separate investigation. For example:

$p(B|UEIC_jS_i)$ can be determined from laboratory tests on various flame retardant materials. (It turns out that given $UEIS_i$ true, C_j is immaterial.) For a high level of protection, the probability can be made very close to zero, for this probability is computed as conditional on use of clothing that complies with the standard. For a low level of protection, the probability is not necessarily nearly unity, though it is considerably larger than zero. There is always a chance that an adult will be nearby and put out the flame. I would estimate that this term is near 0.5 or 0.75, for thin party dresses used for little girls, perhaps smaller for denim materials -- since it takes a little longer for the flames to spread with denim than it does with very thin cotton. Clearly a useful investigation would be to try to ascertain, in a statistical sense, how long one has, in the usual case, before an adult can be counted on to put out the fire. If the time is more than a few seconds, flame retardant materials will not suffice -- flame resistant materials may be needed. In the absence of data it is prudent to assign probabilities larger than 0.5.

The term $p(I|UES_iC_j)$ represents the probability that a fabric will ignite when exposed to a flame. (Some fabrics are hard to ignite but once ignited burn rapidly.) This probability is reckoned conditional on the truth of UES_i (again C_j is immaterial here). A study of the various conditions of exposure as gleaned from field studies correlated with laboratory tests will enable an assignment of this term. For example, book matches are a frequent ignition source. They have a burning time of limited duration and this fact may be useful in relating probability of ignition to a standard. Of course if S_i represents a stringent enough standard, this probability becomes effectively zero.

The term $p(E|US_iC_j)$ is interesting because it concerns the probability a child will be exposed to a source of ignition. At first it might be reasoned that this term is independent of S_i and C_j but it may happen that the mere promulgation

of a stiff standard, with concurrent advertising and education could reduce the probability of exposure since parents may become more aware of the hazard. Marketing and consumer studies should be helpful here.

The term $p(U|S_iC_j)$ represents the probability that parents will not subvert the standard but will pay cost C_j to achieve standard S_i. The skill of the market researcher will be needed to provide an estimate of this term. Testing may well be necessary to resolve the matter. But we do have a feeling for the results. If, for example, the cost of flame-proofing were ten times the normal cost of clothing, we could almost guarantee that $p(u|S_iC_j)$ would be nearly unity and $p(U|S_iC_j)$ would be near zero.

The total probability of a burn, contingent on a choice of standard, may with the expansion of the probabilities into their component parts, be written as:

$$p(B|S_i) = \sum_{\text{sum over all } j} p(B|UEIC_jS_i)p(I|UEC_jS_i)p(E|UC_jS_i)p(U|C_jS_i)p(C_j|S_i)$$

$$+ \sum_{\text{sum over all } j} p(B|uEIC_jS_i)p(I|uEC_jS_i)p(E|uC_jS_i)p(u|C_jS_i)p(C_j|S_i)$$

It is the responsibility of the Federal Government to investigate each of the probabilities indicated above. Of course, there will be uncertainty in the individual assignments, and therefore a rather large uncertainty in the final assignment. But high accuracy is not really required. An error by a factor of ten is not important if we succeed in pushing the probability low enough. As noted in the figures given by Starr (see Figure 2 for example), the best that can be expected is that we shall draw a band perhaps of varying width upon the graph, rather than a sharp line, and base our decision on the expected range of values rather than a specific value. Naturally we would attempt to obtain as narrow a band as possible within the constraints of available time and resources.

As I have said, the drawing of such curves is not equivalent to making a decision. The graphs are merely a means for communication so that decision makers can agree on what are the likely consequences of their actions. The standards may be set as high or low as seems "reasonable." The curves only indicate what to expect at any one choice.

Once the various probabilities have been assigned, the expected number of burn cases may be computed. The units of $p(E|US_iC_j)$ and $p(E|uS_iC_j)$ determine the units of $p(B|S_iC_j)$ since the other probabilities are dimensionless and $p(E|uS_iC_j)$ or $p(E|US_iC_j)$ are taken per unit of time and unit of population. The expected number of burn cases per unit of time will be given by

$$\langle n|S_i \rangle = Np(B|S_i)$$

where

N = total number of children

n = total number of burns/time

$\langle |S_i \rangle$ signifies "expected value" conditional on S_i.

Of course, in a careful analysis it would be well to divide N into age groups, for which the various probabilities might differ.

The method of analysis which I have described represents a technique for computing expected numbers of burn cases at various levels of expenditure for protection. It is the hope of every engineer researcher that the cost can be made so low that the number of burn cases could be reduced to zero. Unfortunately, no breakthroughs seem to appear in the current picture. To make a cotton cloth non-flammable requires the addition of chemicals which amount to about twenty percent of the cloth by weight. At the present state of the art, these chemicals must be added late in the production cycle lest they interfere with the dyeing of the cloth. If we want the highest standards of protection, we may have to settle for only plain, undyed cloth. Under these

circumstances $p(U|S_iC_j)$ would become near zero, and the net result may be more burns than for a lesser standard.

Let us reexamine the trade-off conceptualization. Because of the increasing disutility of garments that the customer will perceive with increasingly stringent standards there will be an increase in the propensity of the consumer to use garments not conforming to the standard or to use garments not intended for the purpose to which they are used. For example, mothers could make their children's sleepwear from bolt cloth not conforming to the standard, or children might sleep in such items of clothing as their father's shirt.

Figure 5 depicts the situation as I visualize a possible trade-off. Curve (1) indicates the expected number of burns that will be experienced per year with increasingly stringent standards if the standard was universally observed. But it is possible for consumers to subvert the standard by using substitutes for standard garments. Economic analysis leads to the conclusion that increasing numbers of persons will seek substitutes as disutility increases (more stringent standard). Thus we would expect the number of burns to conform to the pattern shown by the curve labeled (2) because of human reaction to increased costs. The divergence of curves (1) and (2) is a reflection of the counter effects that consumer reaction can cause. n_u depicts this quantity for the standard Si.

Figure 5 provides a basis for considering the effects on the number of burns by programs complementary to standard setting such as publicity and education for example.

Presuming that we can determine the curve of expected numbers of burns vs. expected increased cost to produce (this being the increased dollar cost to produce a garment), where is it reasonable to put the standard -- at what level do we demand protection? Clearly, the answer depends on the numbers themselves, and a large number of factors exogenous to the analysis. Until we have all the facts before us, I shall reserve my decision. The problems of establishing standards will not be as evident or as simple as they were for ruling torch sweaters off the market.

I'm sure, with capable researchers and adequate investigatory efforts, we will be able to make such decisions on a relatively objective basis. The analysis I have presented here is admittedly crude. It is intended only to indicate the basis on which an attempt is being made to comply with the spirit and the letter of the Flammable Fabrics Act. A more elaborate analysis will be required if we are to arrive at a "reasonable" level of protection. The analysis I have used as an illustration, crude as it is, does have the virtue of bringing the individual components of the problem into relationship with one another and permits decomposition of the problem into its constituent parts, each of which may be investigated either in the field or in the laboratory. It suggests indices which go beyond a corpse count and which may be measured to see if we are making progress. It also suggests how resources may be usefully applied. For example, if we should find that fire injuries can be reduced by an effective public-education program to decrease exposure it may be possible to design more useful protection measures for less money by education than by expensive additives of fabrics. And it may well be that, when the figures are all in, we will perceive that we can afford a great deal more protection than we now give our children.

Perhaps it is even time for a reexamination of the whole problem of the consumer and producer economics of children's clothing. Because these and other possibilities now present themselves as a result of the analysis, I am confident that, in the long run, more rigorous and formal analysis of a problem of safety can make substantial contributions to the well-being of your children and mine.

(The constructive comments and helpful suggestions of Dr. Alexander Craw, Mr. Richard Ku and Mr. Richard Penn of the Technical Analysis Division, National Bureau of Standards, in the preparation of this paper are acknowledged.)

REFERENCES

1. Starr, Chauncey: "Social Benefit versus Technological Risk", Symposium on Public Safety, National Academy of Engineering, May 1, 1969. (See also, SCIENCE, 19 September 1969, Vol. 165, No. 3899, page 1232.)

2. Tribus, Myron: "Rational Descriptions, Decisions and Designs," Pergamon Press, 1969.

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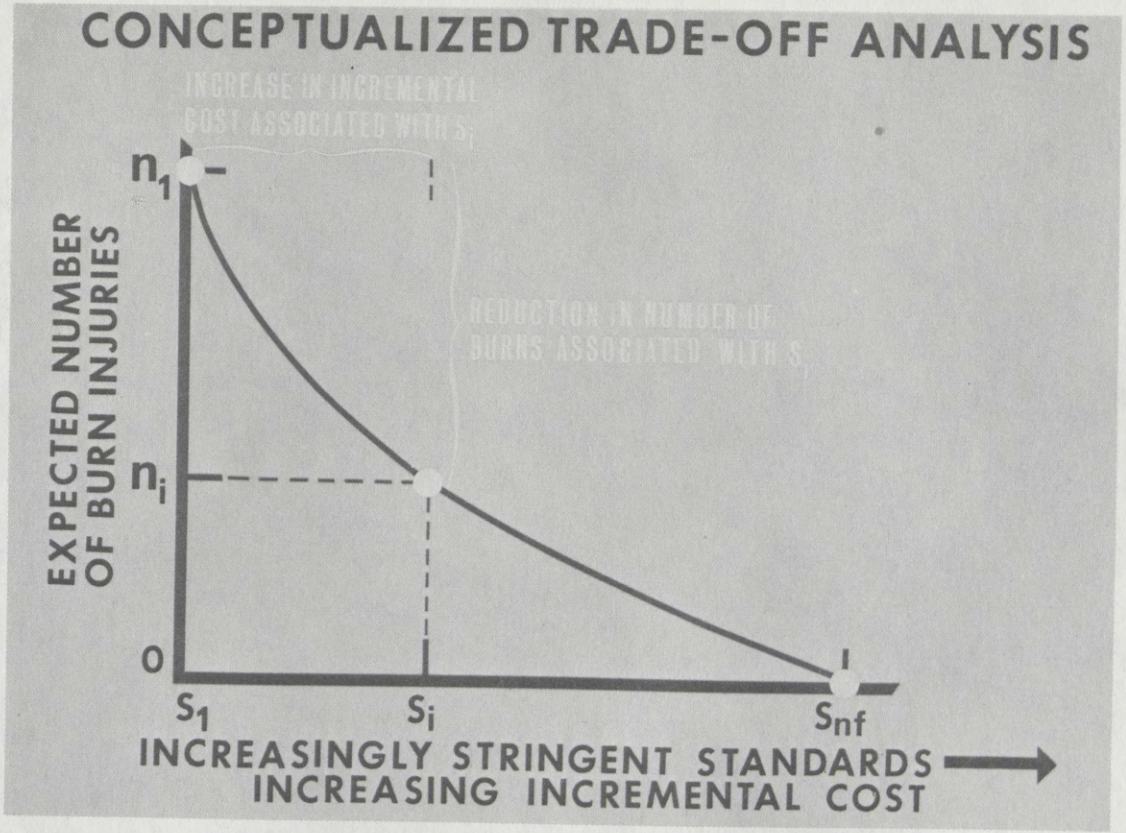
CONCEPTUALIZED TRADE-OFF ANALYSIS
INCREASE IN INCREMENTAL COST ASSOCIATED WITH S_i
REDUCTION IN NUMBER OF BURNS ASSOCIATED WITH S_i
n_1
n_i
0
EXPECTED NUMBER OF BURN INJURIES
S_1
S_i
S_{nf}
INCREASINGLY STRINGENT STANDARDS
INCREASING INCREMENTAL COST

Figure 1

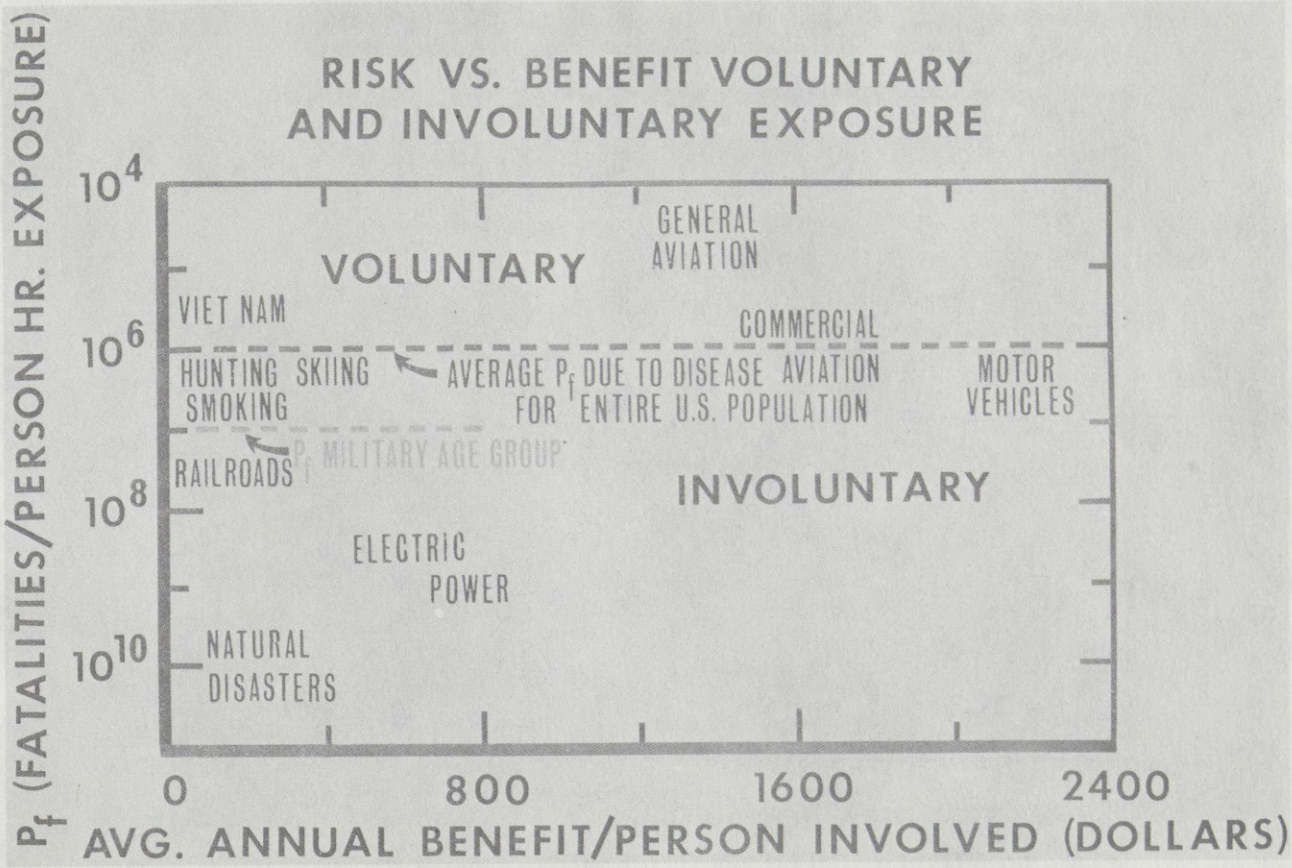
RISK VS. BENEFIT VOLUNTARY
AND INVOLUNTARY EXPOSURE
P_f (FATALITIES/PERSON HR. EXPOSURE)
10^4
10^6
10^8
10^{10}
VOLUNTARY
GENERAL AVIATION
VIET NAM
COMMERCIAL AVIATION
HUNTING SKIING SMOKING
AVERAGE P_f DUE TO DISEASE FOR ENTIRE U.S. POPULATION
MOTOR VEHICLES
RAILROADS
P_f MILITARY AGE GROUP
INVOLUNTARY
ELECTRIC POWER
NATURAL DISASTERS
0
800
1600
2400
AVG. ANNUAL BENEFIT/PERSON INVOLVED (DOLLARS)

Figure 2

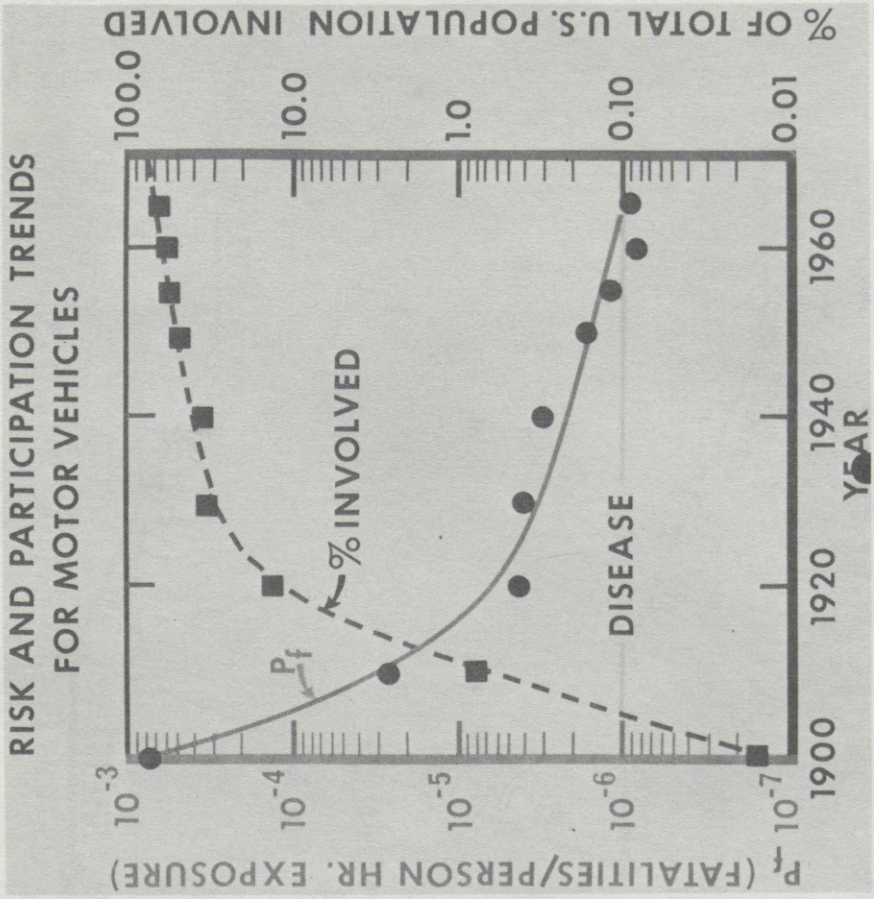
RISK AND PARTICIPATION TRENDS
FOR MOTOR VEHICLES
% OF TOTAL U.S. POPULATION INVOLVED
100.0
10.0
1.0
0.10
0.01
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
P_f (FATALITIES/PERSON HR. EXPOSURE)
P_f
% INVOLVED
DISEASE
1900
1920
1940
1960
YEAR

Figure 3

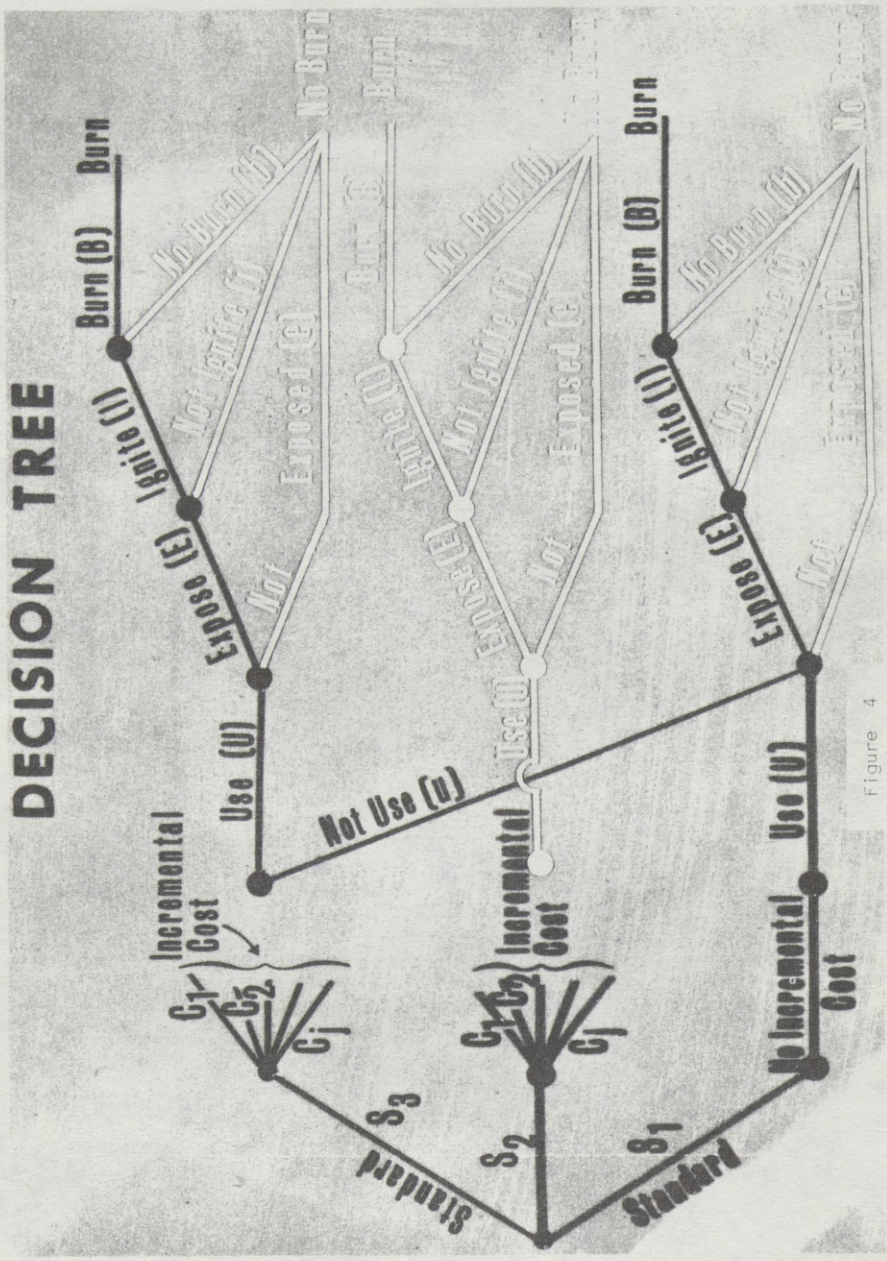
DECISION TREE
Standard
S_3
S_2
S_1
Incremental Cost
C_1 C_2 C_j
Use (U)
Not Use (u)
Expose (E)
Not Expose (e)
Ignite (I)
Not Ignite (i)
Burn (B)
No Burn (b)
No Incremental Cost

Figure 4

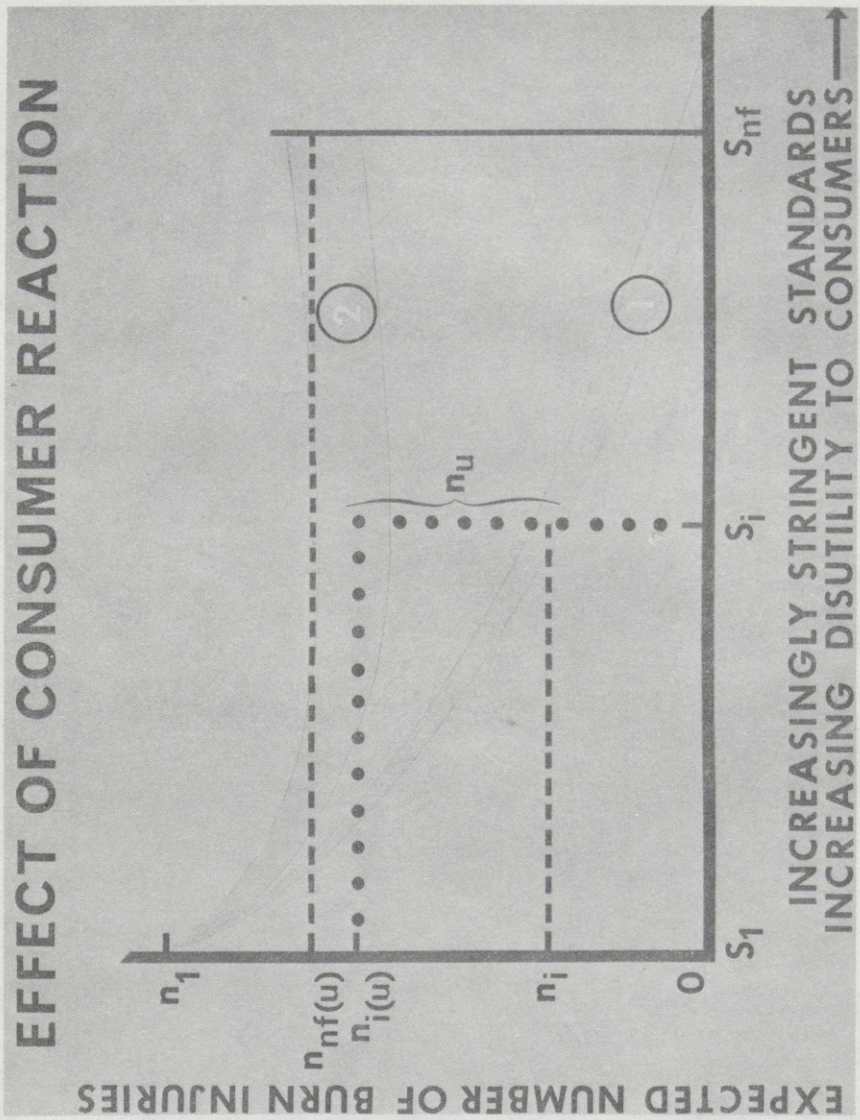
EFFECT OF CONSUMER REACTION
EXPECTED NUMBER OF BURN INJURIES
INCREASINGLY STRINGENT STANDARDS
INCREASING DISUTILITY TO CONSUMERS
n_1
$n_{nf(\omega)}$
$n_{i(\omega)}$
n_u
n_i
0
S_1
S_i
S_{nf}

Figure 5

Mr. Moss. Thank you, sir.

Mr. Keith.

Mr. KEITH. How much of an increase in personnel did you say you had in paragraph 2 on page 2?

Mr. TRIBUS. We went from four people to 23 man-years of effort. As indicated in my testimony, we have a full-time staff of 20.

Mr. KEITH. And you mentioned that the first meeting of the national advisory committee was called for May 2, 1969, 1 month after your appointment. Prior to your appointment, the committee had not even met, you said.

Mr. TRIBUS. That is correct. The committee had been appointed but no meetings had been called.

Mr. KEITH. When had it been appointed?

Mr. TRIBUS. I believe it was appointed 9 months to a year earlier. I am told the appointments become effective January 1969.

Mr. KEITH. January 1969?

Mr. TRIBUS. Yes, sir.

Mr. KEITH. You were appointed April 2?

Mr. TRIBUS. April 1. I believe my appointment coincides with April Fool's Day but I am not absolutely sure of that. It might have been the day before.

Mr. KEITH. Would the minutes of your meetings shed any helpful light on this problem insofar as the Congress is concerned?

Mr. TRIBUS. If you refer to the problem of when appointments were made?

Mr. KEITH. No; the substantive nature of the deliberations.

Mr. TRIBUS. Yes; the minutes of the meetings are available. The meetings are quite informal. I started to say that in the beginning it was necessary for the 18 people on the advisory board to get acquainted with what we were doing, to state the views that they represented, to begin to come to grips with one another's arguments and to assess for themselves whether or not service on this committee was going to be meaningful. I think by the time of the second meeting they had reassured themselves and, as we got into the third and fourth meetings, you would be able to see from the records that the discussions were quite substantive and useful. The comments by the members of the committee are very direct. The word "outspoken" wouldn't be inappropriate occasionally.

It would be useful to the Congress to look at the minutes of the meeting.

Mr. KEITH. Do you have good geographical representation as well as a wide representation from a technical point of view on your boards?

Mr. TRIBUS. I would have to reexamine the geographical distribution. I do believe they come from all over. What is more important we have approximately one-third you could identify as consumer representatives. We have one-third distributors and one-third manufacturer's representatives, and so I think we have all of the points of view required to grapple with the problem and make the kinds of trade-offs required. Many of the people who serve on the committee have been identified in their professional lives with an advocacy of one sort or another in this problem.

Mr. KEITH. I have no further questions at this time, Mr. Chairman.

Mr. Moss. Mr. Blanton?

Mr. BLANTON. Thank you, Mr. Chairman.

Mr. Tribus, you said in your opening statement that you supported H.R. 16824 as amended. Does that mean that you support the amendments on the Senate bill S. 3765 as amended by the Senate?

Mr. TRIBUS. No, sir. We have commented on that.

I testified concerning those amendments and we have also written to Senator Magnuson concerning these amendments. I hesitate at this moment only because I want to find the shortest way to summarize what I said then. We can submit to you for the record the testimony that we gave before the Senate.

Mr. BLANTON. I would like to ask that that testimony be entered.

Mr. Moss. Without objection, the testimony and letter will be received and included in the record at this point.

(The statement and letter referred to follow:)

STATEMENT OF HON. MYRON TRIBUS, ASSISTANT SECRETARY OF COMMERCE FOR SCIENCE AND TECHNOLOGY, BEFORE THE CONSUMER SUBCOMMITTEE, SENATE COMMITTEE ON COMMERCE ON S. 3765, FLAMMABLE FABRICS ACT AMENDMENTS OF 1970 ON AUGUST 18, 1970

Mr. Chairman, Members of the Subcommittee: My name is Myron Tribus. I am Assistant Secretary of Commerce for Science and Technology. I am before you to offer my comments on S. 3765 as it was amended by the Senate Committee on Commerce.

The views which we offer today are addressed to general problems I have noted in S. 3765 in its present form.

In the time available, we have been unable to prepare and circulate specific language proposals within the Administration. This will be done in the next few days and we hope to submit these to you promptly thereafter.

As you are aware, the responsibility of the Department of Commerce under the Flammable Fabrics Act is to establish flammability standards, where needed. The Federal Trade Commission is given the duty of enforcing these standards when they become effective.

We in the Department of Commerce are in favor of a vigorous and effective enforcement of these standards. In this connection, we believe that the Federal Trade Commission should have at its disposal those enforcement tools which it believes it needs.

SECTION 3 OF THE ACT

With respect to the amendments presented by S. 3765 in its present form, section 3(a) would require textiles covered by the section to meet standards established under the Act and to be so certified by the manufacturer. While the specific language of section 3(a) contemplates its application to imports, in terms of effective administration of the Act certain foreign manufacturers will not be subject to administrative enforcement by the Federal Trade Commission. It, therefore, may be appropriate to modify section 3(a) to provide for effective enforcement with respect to imports.

In addition, section 3(a) would require persons offering textiles in the market place to certify that these textiles meet the applicable standards established pursuant to the Flammable Fabrics Act and to further certify that such certification is based upon a reasonable testing program as approved by the Federal Trade Commission. The establishment of a test program would necessarily involve familiarity with the technology available to the industry. A valid statistical sampling of fabrics and fabric products is primarily a scientific and technological problem as the techniques employed in selecting the samples to be tested are intimately bound up with the establishment of the standard. In our opinion, this Department's scientific and technological resources would be of great value in the establishment of a reasonable testing program. Accordingly, we suggest that provision be specifically made for the Federal Trade Commission to consult with the Secretary of Commerce before approving a testing program.

We have noted that the certification requirement of section 3(a) would become effective immediately upon passage of the proposed amendment and would, presumably, apply to any flammability standard then in effect. Currently there

are two Federal flammability standards, CS 191–53 for general wearing apparel and DOC FF 1–70 for large carpets and rugs. These standards apply to approximately 32,000 textile manufacturers. Upon passage of proposed section 3(a) all of these textile manufacturers would be required to cease production until such time as their testing programs were approved by the FTC. The sheer weight of these numbers also points up the need for a provision in section 3(a) to permit affected Government agencies to maintain, at manageable levels, the additional work loads imposed by the requirement for approval of testing programs. To avoid the obvious burden on the manufacturers and the burden on the FTC, we recommend that with regard to standards existing prior to the effective date of the amendment a reasonable time for certification be provided.

The Act provides that all standards will become effective one year after promulgation unless otherwise stated. Thus during the period between the establishment of a standard and its effective date, there would usually be ample opportunity for testing procedures to be approved. However, to cover the possibility of a standard which would be effective immediately under the provisions of section 4(b) of the Act, section 3 should be modified to provide that section 3 will not be applicable for some reasonable period.

SECTION 7 OF THE ACT

Section 7 of the Act now provides that a willful violation of sections 3 or 8(b) is a criminal misdemeanor, punishable by a fine of not more than $5,000 or imprisonment up to one year or both. The amendments of section 7 would provide the following scheme of penalties:

a. In section 7(a) a violation, with knowledge, of sections 3 or 8(b) would be a criminal felony punishable by a fine of not more than $10,000 or imprisonment up to three years, or both;

b. In section 7(b) a violation, regardless of knowledge, of sections 3 or 8(b) would be a criminal misdemeanor punishable by a fine of not more than $1,000 or imprisonment up to one year or both;

c. In section 7(c) a violation, regardless of knowledge, of sections 3 or 8(b) would be subject to a civil penalty of not more than $10,000 per violation.

This proposed scheme of penalties must be examined in view of the proposed section 3(a). Section 3(a) establishes a requirement that manufacturers certify the conformance to applicable flammability standards. Further, certification must be based upon a testing program approved by the Federal Trade Commission after consultation with the Secretary of Commerce. As you may remember from my past testimony before this subcommittee, the proper testing of fabrics for flame resistance involves the destruction of the fabric tested. Therefore, since it is impossible to test every piece of fabric offered for sale, the test program must be based upon a statistically valid sampling of the fabric produced. We are informed by a well qualified knitted goods producer that a very good level of quality control would be 0.5% undetected rejects reaching the public in connection with the application of finishes like fire retardants to textile fabrics. In other words, under such a program you would find somewhere between 0 to 5 out of 1,000 items that reach the public might fall below the prescribed quality. This is considered to be an excellent level of quality control. To avoid the "no fault" criminal sanctions some manufacturers may be forced to adopt unreasonably strict testing programs. The additional cost of such programs will be reflected in a higher sales price. The consumer, faced with the higher prices may thus be tempted to substitute a product that is not required to pass the same standard for the higher priced product, thereby subverting the purpose of the Act.

However, even if he follows the highest level of quality control program that might be established and approved under the provisions of section 3(a), a manufacturer would subject himself to a mathematical chance of violation of section 3. Since there are approximately 12,589,400,000 linear yards of broad woven cotton, wool, silk and man-made fibers produced domestically and 3,620,100,000 linear yards equivalent of broad woven cotton, wool and man-made fibers imported in calendar year 1969, you can see that good faith violations of the law as it is proposed in section 7 would be a mathematical certainty. However, the few rejectable fabrics which would reach the market by virtue of the statistical nature of any approved testing program will probably fall short of the prescribed standard by only a narrow margin. Consequently, these rejectables are safer than untreated fabrics.

In my opinion, the "no fault" criminal penalties provided in proposed section 7(b) would subject the manufacturer who, in good faith and in full compliance with a reasonable testing program approved by FTC, produces some minimal amount of fabric that fails to conform to the applicable flammability standards, to criminal sanctions. We would propose instead, that the criminal misdemeanor penalty remain in the amendments but that it be realistically modified, so that the manufacturer is not forced to assume the burden of insuring absolute compliance of every piece of fabric or related materials with a given flammability standard.

Further, the civil penalty provided in section 7(c) could apply to the manufacturer who establishes an approved testing program under section 3(a) and follows it in good faith. As with section 7(b), it would therefore appear appropriate to make some suitable modification of section 7(c).

In summary, the Flammable Fabrics Act as amended in 1967 was designed to provide reasonable standards to protect against unreasonable hazards. S. 3765, in its present form, requires a reasonable testing program. However, it also appears to provide unreasonable sanctions against the manufacturer who innocently, and in full compliance with the testing provisions of the Act, places on the market a statistically inevitable percentage of rejectables.

I hope that my remarks will provide some assistance to this Committee in developing effective enforcement tools that will be fair and reasonable to all the parties concerned with the Flammable Fabrics Act—the Government, the manufacturer and the consumer.

DEPARTMENT OF COMMERCE,
OFFICE OF GENERAL COUNSEL,
Washington, D.C., August 27, 1970.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: At the hearings August 18, before the Consumer Subcommittee on S. 3765, the Flammable Fabrics Act Amendments of 1970, Deputy Assistant Secretary Simpson undertook to furnish amendatory language to remedy certain problems we see in implementing the bill in its present form.

For your convenience we have incorporated these amendments in a redraft of the bill which is attached. The reasons for individual amendments are discussed below.

1. S. 3765 contemplates amendment of section 3(a) of the Act to establish reasonable testing programs for assuring compliance with flammability standards. It does not distinguish between imported materials and domestically manufactured materials and, as drafted, would apparently permit testing by a foreign manufacturer.

We share the Committee's concern that any amendment of the Act should not result in the erection of nontariff trade barriers. On the other hand we are concerned that it may be difficult or impossible to enforce sanctions against foreign manufacturers, so that foreign testing may sometimes be meaningless from the standpoint of protecting consumers against the hazards of flammable fabrics.

Accordingly, we suggest amendments to the bill to provide:

a. That the testing contemplated by amended section 3(a) of the Act be undertaken in the case of foreign goods either by the foreign manufacturer or the U.S. importer, employing tests approved by the Federal Trade Commission; and

b. That language be added to section 7 of the Act, as amended, to provide that a U.S. importer (who would be subject to the jurisdiction of the FTC and U.S. Courts) who elects to rely on the testing of a foreign manufacturer is himself responsible as a manufacturer under the civil and criminal penalties in section 7 as amended.

These modifications would permit effective enforcement as to imported fabrics, but at the same time afford the importer an option to test imported goods himself or to rely on the tests of a foreign manufacturer. We do not believe that it is fair to require the importer to test if he is satisfied that tests have been properly conducted by the foreign manufacturer. On the other hand, because some foreign manufacturers will not be subject to the jurisdiction of the Federal Trade Commission, we should be able to look to the importer to insure compliance with the

testing program contemplated by the bill. He should be required to assume the same burden of proof which is borne by the domestic manufacturer.

These amendments are accomplished in the attached redraft by addition of the words "or importer" after "manufacturer" in section 3(a), and by addition of the new subsection 7(d).

2. Further, we are concerned that the certifications apparently contemplated by the bill as reported might reduce effective enforcement by creating an unmanageable paper burden for the Federal Trade Commission. (As noted in our testimony, there are already some 32,000 textile manufacturers affected by existing flammability standards.)

To avoid this burden on the FTC we recommend deletion of the certification requirement in the reported version of section 3(a) and the substitution of a requirement for "testing in accordance with reasonable and representative tests approved by the Federal Trade Commission." We believe that this would permit the FTC to promulgate after appropriate hearings a series of approved statistical testing procedures which could be employed.

3. Any manufacturer who in good faith performs the approved tests and determines that his goods are in compliance should be permitted to establish these facts as an affirmative defense against the misdemeanor and civil penalty provisions of section 7. As indicated in our testimony before the Subcommittee, there is virtual statistical certainty that some fraction of the goods tested in an approved manner will fall short of the established standard. (This stems from the fact that flammability tests involve destruction of the fabric, and therefore not every yard of fabric subject to a standard can in fact be tested.) In view of this, we believe that "no fault" criminal and civil penalties are clearly inappropriate. We would urge instead that a manufacturer should be permitted to prove good faith compliance with the provisions of section 3(a) as a defense against a charge that a single item fails the test. This protection against the consequences of the statistical nature of the testing program is critical in cases where fabrics must be treated with fire retardant finishes to pass the more strict requirements contemplated for future standards.

This amendment is accomplished by the provisos added to the proposed subsections 7(b) and 7(c) of the Act contained in the attached redraft.

4. The Department of Commerce will likely be called upon to evaluate some of the testing programs under consideration by the Commission. As pointed out in our testimony before the Subcommittee, the techniques employed in the selection of test samples is technologically linked to the establishment of the standard. This Department's scientific and technological resources would be of substantial value in evaluating prospective test programs in light of the current state of technology. This amendment is contained in the amendment to section 14 of the Act found in section 6 of the attached redraft.

5. Under the proposed section 3(a) of the Act contained in S. 3765 as presently drafted, manufacturers would have to test all products manufactured after the date of enactment under a reasonable testing program approved by the Federal Trade Commission. There are some 32,000 textile manufacturers subject to the flammability standards now in effect. However, no testing programs are required by current law. Without a delay in the effective date of section 3(a) as revised, its literal application would require manufacturers to interrupt production on the date of enactment of the bill or be subject to the felony provisions of section 7(a). To avoid such disruption of the market we believe the effective date of the proposed amendments to sections 3, 7, and 8 should be one year after enactment. The new section 7 contained in the redraft so provides.

6. In addition technical amendments suggested by the Department of Justice are incorporated in the first line of section 7(a), in sections 7(c)(2) and 7(c)(3), and in section 8 of the Flammable Fabrics Act as amended by our proposed redraft.

We should note that it was not possible within the time available to obtain the views of the Federal Trade Commission on our proposed amendments.

We have been advised by the Office of Management and Budget that there would be no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

WILLIAM E. MURANE,
Acting General Counsel.

PROPOSED REDRAFT OF S. 3765 AS REPORTED BY THE SENATE COMMERCE COMMITTEE JULY 29, 1970

Changes proposed to be made to the bill as reported are shown as follows (language deleted is shown in brackets, language added is italics).

A BILL To authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Flammable Fabrics Act Amendments of 1970."

SEC. 2. Section 3 of the Flammable Fabrics Act (15 U.S.C. 1192) is amended by redesignating subsections (a) and (b) as subsections (b) and (c), respectively, and inserting the following new subsection (a) immediately after "SEC. 3.":

"(a) The manufacture for sale, the sale, or offering for sale, in commerce, or the importation into the United States, or the introduction, delivery for introduction, transportation or causing to be transported, in commerce, or the sale or delivery after a sale or shipment in commerce of any product, fabric, or related material, or any product made of fabric or related material, as to any of which an applicable standard of flammability has been issued or amended under the provisions of section 4 of this Act, which product, fabric, or related material has not been [certified] *tested prior thereto* by the manufacturer *or importer* thereof [to meet the requirements of the applicable standards or other regulations] *in accordance with reasonable and representative tests approved by the Federal Trade Commission, and determined by said manufacturer or importer to be in conformity with the applicable flammability standards* issued or amended under the provisions of section 4 of this Act, shall be unlawful and shall be an unfair method of competition and an unfair and deceptive act or practice in commerce under the Federal Trade Commission Act. [Such certification shall be based upon a reasonable testing program conducted by the manufacturer and approved by the Federal Trade Commission.] *Provided,* That this subsection shall not apply to such product, fabric, or related material, or any product made of fabric or related material, which has been exempted from this subsection by rule or regulation issued by the Commission pursuant to the provisions of section 5(c) of this Act."

SEC. 3. Section 7 of the Flammable Fabrics Act is amended to read as follows:

"PENALTIES

"SEC. 7. (a) Whoever *knowingly and willfully* performs any act in violation of section 3 or section 8(b) [with knowledge that such act is in violation of that section] shall be guilty of a felony and upon conviction shall be fined not more than $10,000, imprisoned for not more than three years, or both, in addition to any other penalties, civil or criminal, imposed for such violation.

"(b) Whoever performs any act in violation of section 3 or section 8(b) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $1,000, imprisoned for not more than one year, or both, in addition to any other penalties, civil or criminal, imposed for such violation: *Provided, however, no person shall be held in violation of this subsection if such person establishes that in the manufacture or importation of the product, fabric, or related material the tests and determinations required under section 3(a) have been made in good faith.*

"(c)(1) Whoever performs any act in violation of section 3 or section 8(b), in addition to any other penalties imposed for such violation, shall be subject to a civil penalty *imposed by the Federal Trade Commission* of not to exceed $10,000 for each such violation: *Provided, however, no person shall be held in violation of this subsection if such person establishes that in the manufacture or importation of the product, fabric, or related material the tests and determinations required under section 3(a) have been made in good faith.*

"(2) [Any such civil penalty may be compromised by the Commission. In determining the amount of the penalty, or the amount agreed upon in compromise, the appropriateness of such penalty to the size of the business of the person charged and the gravity of the violation shall be considered.] *Upon failure of the offending party to pay the civil penalty, the Commission may request the Attorney General to commence action in a court of the United States for such relief as may be appropriate.*

"(3) [Any such civil penalty may be enforced by the Commission through a civil action brought in the name of the United States by attorneys of the Commission in the district court of the United States in the judicial district in which the defendant resides or does business."] *Prior to referral to the Attorney General for appropriate action, the Commission may compromise such civil penalty.*

"(d) Notwithstanding section 8, an importer who chooses to rely on the tests and determinations of a foreign manufacturer under section 3(a) shall be responsible as a manufacturer under subsections (b) and (c) of this Section for any violation of Section 3 resulting from his importation of a product, fabric, or related material produced by such foreign manufacturer."

SEC. 4. Section 8 of the Flammable Fabrics Act is amended by adding after the word "prosecution" in the first sentence the words "or penalty".

SEC. 5. Section 13 of the Flammable Fabrics Act is amended to read as follows:

"AUTHORIZATION OF APPROPRIATIONS

"SEC. 13. There is authorized to be appropriated a sum not to exceed $9,000,000 for the period beginning July 1, 1970, and ending June 30, 1972, to carry out the provisions of this Act."

SEC. 6. Section 14 of the Flammable Fabrics Act is amended by omitting the word "and" after subsection (b)(3) and by adding after subsection (b)(4) the following:

"and,

"(5) evaluate, upon request by the Commission the reasonable and representative tests required by section 3(a) of the Act."

SEC. 7. The amendments to sections 3, 7, and 8 shall be effective one year after the enactment of this Act.

Amend the title so as to read: "A bill to amend the Flammable Fabrics Act to increase the protection afforded consumers against injurious flammable fabrics."

Mr. TRIBUS. Let me summarize the major concern we had. There are two problems. One is the substance of our objection and then proposals that we might make to meet what seemed to be the concern of the Senate and at the same time not contain the objectionable features and at this instance I can't recall the precise wording of our proposal but let me speak to our objection.

Fabrics that are treated to be nonflammable are produced at a very high rate in a typical mill. They go through a series of processes and if you go to such a mill you see the material whizzing by at enormous speeds. Now, to test whether that material has been properly treated, it is necessary to subject it to the kind of exposure to flame you saw in the film. Clearly we cannot test each and every square foot of material produced at the mill, otherwise there would be nothing to sell. Consequently, we must engage in statistical quality control tests in which we take samples of material.

Now, in every statistical quality control program based on destructive tests there is a finite probability some material will get through that doesn't pass the test. The expense of guaranteeing that no material will get through that doesn't meet the test is enormous. It is necessary, therefore, for an agreement to be worked out between Government representatives and the manufacturers concerning what that test shall be. So far so good.

The Senate amendment would make it a criminal act if a man carrying out an agreed program with the Government was found to produce a single piece of material that failed to meet the standard. We think that that just isn't right and we have made proposals which I hope will be accepted by the Senate and incorporated in whatever act they finally pass to get around this and at the same time make sure that what is instituted in the way of a test procedure provides the maximum protection to the public.

We have also commented regarding the role of the importer and the thrust of our comments there was to place him in the same kind of responsible position as a domestic manufacturer. If he is able to agree with the actual manufacturer in another country on a test program that is the same as the one that would be imposed on a manufacturer here, he would still be liable for the integrity of that program, but I do want to get away from a position where we would make a man criminally liable for something over which he has no control, and that in my opinion is what the act as amended by the Senate would have done.

Now, I would like to ask the assistant general counsel, Mr. Ellert, if he has any comments as seen by an attorney.

Mr. ELLERT. Well, just to emphasize the points raised by Dr. Tribus, we have been advised that once we get into this certification procedure which the Senate bill requires, that there are some 32,000 manufacturers, each of which would be required to be certified by the Federal Trade Commission. We felt that this might be an onerous burden on FTC. One of our changes was to suggest that FTC set the quality testing control that would be imposed by the manufacturer. And we felt they could just do this by Federal regulation rather than having to certify the particular process of each of the 32,000 textile manufacturers. They could set up a statistical method of quality control to conform to FTC requirements. And the second point Dr. Tribus mentioned: We are advised by our statisticians that any statistical system of quality control you devise will permit a finite error.

If you follow the system as set up by FTC, there is going to be some pieces of cloth that will escape, through no fault of the manufacturer, into the marketplace. It was in this part that we were concerned. We have, in theory, the manufacturer following a system of quality control devised by Federal Trade Commission rather than by himself. If he is following their system and if there is the statistical error, he shouldn't be forced into a criminal misdemeanor penalty which the Senate bill would provide. And also the same with the civil penalty. We have no problem with that part of the Senate bill which treats the willful and knowing act as a felony, because willful violations should be a felony. We have no opposition to that and it sounds very reasonable. However, we believe that for the criminal misdemeanor penalty set out in the Senate bill and also for the civil penalty, there should be a provision for an affirmative defense whereby the manufacturer could say, "Look, I have followed the system of quality control approved by FTC. I have followed it in good faith. These pieces have escaped detection; however, I shouldn't receive this criminal penalty provided for the criminal misdemeanor." We also feel that this defense should be included in the civil penalty, that if you can show that you followed the quality control procedure, that you shouldn't become penalized.

The basis for our reasoning is, first of all, this is not a quality control procedure devised by the manufacturer at his own risk, it is one devised by FTC which we presume will be established after consultation with the Department of Commerce when we are able to work out a statistically good quality sampling. If that system is followed, we feel that it will be largely successful, and, therefore, the manufacturer who does it in good faith should have the safeguard of saying, "Well, I won't have a criminal misdemeanor charged against me if I am fol-

lowing the system and I can prove I have followed it in good faith." This is the gist of our comments to the Senate Commerce Committee in Dr. Tribus' testimony and also contained in the letter by the General Counsel to the chairman of the Senate Commerce Committee which we are introducing for the record.

Mr. BLANTON. Would it be your interpretation of a Senate amendment so that the manufacturer or producer could face criminal penalties whether it was willful or not?

Mr. ELLERT. The Senate amendment provides, first of all, that a willful violation is a felony. And that is one contained in 7(A). Then I believe 7(B) provides for a criminal misdemeanor penalty where intent is not required. And then 7(C) provides for a civil penalty.

Mr. BLANTON. But the question I asked you was, is it your interpretation of these penalties in the Senate amendments that a manufacturer or producer can be held in criminal violation or be charged with criminal violation of this act without willfully committing such a crime?

Mr. ELLERT. Certainly to the criminal misdemeanor this is true. It would not be true for the felony penalty.

Mr. BLANTON. Dr. Tribus, do you think it would be fair with the inadequacies that we have pointed out, the infancy of the fabric flammable test that we now have knowledge of, to go deep into penalties at this time for a producer or manufacturer?

Mr. TRIBUS. I don't think it would be either fair or in the best interests of the program. We have been working cooperatively with people in industry and I think they are working with goodwill toward resolving this problem. I have made personal visits to plants, visited the people doing the work and their bosses, the people who commit the money. We have talked about this problem and I found a lot of the people there taking a risk in a sense that they are spending money to try to develop something to get into the market to do a good job.

I think if we can get nonflammable fabrics onto the marketplace and get acceptance by the consumers, we are going to go a long way toward doing something worthwhile in reducing the number of deaths. I think it is premature to worry about someone who doesn't quite make the standard at this time. I think as soon as we start getting tests from the field, if we find there is a problem—it's pretty easy to move in and do something about it. I think at this moment to hold over the heads of industry this extra kind of a whip just isn't needed, and I think the people on the advisory committee would agree with me.

We have not discussed it with them, but I think they would take this view too. There is a genuine effort here on the part of many people to do something, and I don't think penalties makes them move any faster.

Mr. BLANTON. Invariably, and I agree with your statement, both from industry and Government we have found this same statement that there is a wonderful cooperation between industry and the Government in trying to attain this goal of nonflammable fabrics. So it seems to me that with industry spending hundreds of thousands of dollars each year to try to achieve this goal that it is premature at this time to initiate criminal penalties and aggravate the wonderful cooperation that we now enjoy between industry and Government in trying to reach this goal.

Mr. TRIBUS. I would want to make one point clear, though. We believe that there must be vigorous and effective enforcement of the standards once promulgated; that anyone who tries to violate the standards willfully should be severely dealt with. That is not the question.

Furthermore, we believe that once standards are promulgated they have to be vigorously enforced, otherwise the whole program fails. The manufacturers that go to the effort of meeting the standards have got to be protected from people who don't. So that we would also believe that the Federal Trade Commission should have at its disposal whatever enforcement tools it believes it needs, but that is separate from the sort of thing that was in the Senate amendment.

Mr. BLANTON. It would seem to me maybe cease-and-desist powers would be adequate until we have a proven test method to test flammability as far as meeting standards because you have shown today the fallibility of the methods now used and as I said earlier it is in its infancy and certainly we should have our facts straight and be able to have a definite technological yardstick by which to measure industry by before we start prosecuting criminal penalties.

Would you agree to that?

Mr. TRIBUS. Yes, sir.

Mr. BLANTON. I have no further questions, Mr. Chairman.

Mr. MOSS. All right. I wonder, Doctor, if you would supply the committee with a list of the names and affiliations of the National Advisory Committee?

Mr. TRIBUS. Yes, sir, we will do that.

Mr. MOSS. Without objection the record will be held at this point to receive it.

(The following information was received for the record:)

MEMBERSHIP LIST OF NATIONAL ADVISORY COMMITTEE FOR THE FLAMMABLE FABRICS ACT

Chairman: Dr. Myron Tribus, Assistant Secretary for Science and Technology, U.S. Department of Commerce.

Executive Secretary: William M. Segall, Office of Textiles—BDSA, U.S. Department of Commerce.

Dr. Abraham B. Bergman, Director of Outpatient Services, Children's Orthopedic Hospital and Medical Center, 4800 Sand Point Way, N.E., Seattle, Washington 98105.

Mr. George S. Buck, Jr., Director of Research, National Cotton Council of America, 1918 North Parkway, Memphis, Tennessee 38112.

Mr. Daniel Chaucer, Director, Bureau of Standards, R. H. Macy & Company, Inc., 151 West 34th Street, New York, New York 10001.

Dr. George F. Crikelair, Director of Plastic Surgery, Columbia-Presbyterian Medical Center, New York, New York 10001.

Mrs. Margaret Dana, Consumer Relations Counsel, R. D. #3, Doylestown, Pennsylvania 18901.

Mr. John E. Field, President, Cone Mills Marketing Company, 1440 Broadway, New York, New York 10018.

Mr. Fred Fortess, Manager, Consumer Technical Relations, Celanese Fibers Marketing Company, 522 Fifth Avenue, New York, New York 10036.

Mr. P. J. Fynn.*

Dr. Samuel R. Gerber, Coroner, Cuyahoga County, 2121 Adelbert Road, Cleveland, Ohio 44106.

Mr. J. Raymond Gerken, President and Chairman of the Board, Norwalk Furniture Company, Norwalk, Ohio 44857.

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*Retired from J. C. Penney about four months ago. Address as of 8/25: 1223 Seville Drive, New Orleans, Louisiana 70122.

Mr. J. B. Goldberg, Executive House, 225 East 46th Street, New York, New York 10017.

Mr. Morris Kaplan, Technical Director, Consumers Union, 256 Washington Street, Mt. Vernon, New York 10500.

Mr. Alvin L. Kassel, Rathheim, Hoffman, Kassal & Silverman, Counselors at Law, 61 Broadway, New York, New York 10006.

Dr. Earl T. McBee, Managing Director, Great Lakes Chemical Corporation, West Lafayette, Indiana 47906.

M. Louis Segal, Office of California State Fire Marshal, 107 South Broadway, Los Angeles, California 90012.

Mr. Foster C. Wilson, Manager, Product Testing Laboratories, Owens-Corning Fiberglas Corporation, Granville, Ohio 43023.

Mr. Bertram Wyle, Director, Corporate Research, Warnaco, Incorporated, 325 Lafayette Street, Bridgeport, Connecticut 06602.

Mr. Moss. Addressing myself first to the House bill, H.R. 16824, it would authorize for the fiscal years of 1971 and 1972 a total sum not to exceed $6 million, and I quote, "such sums as may be necessary for succeeding fiscal years."

It has been the policy of the House Commerce Committee not to authorize for more than 3 years and to make no open-end authorizations. We want the opportunity to review at least on a 3-year basis all of the programs for which we have legislative responsibility.

On the $6 million, in reading the Senate report I find that it was the conclusion of the Senate that the $6 million for the 2 fiscal years would be an inadequate amount. Do you concur in that finding of the Senate?

Mr. TRIBUS. Just a moment, please.

The request that we made for this coming year represents the administration's best view of the proper amounts to spend in this area. It represents percentagewise a very large increase in the program. With respect to what is requested in the 1972 budget and what is requested in 1973, we will have to wait until we have gone through the balancing of all of the things we can do and should do to respond to that. We have taken the $6 million figure as the one most likely and have made our planning around that. I don't have any other comment because we haven't worked through what we would do at different levels of funding and how efficiently those funds could be used. My experience has been in the prosecution of research that you have to balance very carefully the inefficiency that comes with too abrupt an expansion in both manpower and dollars against the possibility that you can do new things that the additional funds would cover. I think we are on a good growth curve now as indicated by that chart. It is pretty steep. And it represents the thinking as we have carried it thus far.

Mr. Moss. You are at the moment at a level of 23 persons?

Mr. TRIBUS. Yes, sir; that is our level of effort.

Mr. Moss. And this would contemplate reaching 25 by the end of 1971, the addition of two additional personnel to the operation?

Mr. TRIBUS. Well, it would actually involve five new full-time positions since only 20 people are now assigned to the program full time.

Mr. Moss. Do you feel that that would be too rapid an escalation or would it be possible to absorb?

Mr. TRIBUS. There will be an increase at that time in the amount of money that we are spending outside of the Department of Commerce.

Mr. Moss. You go from——

Mr. TRIBUS. Let's see, there is, if you will look at the——

Mr. MOSS. Looking at the chart you have here.

Mr. TRIBUS. The shaded area is the contracts. And you see what we have is a rather rapid buildup of the capabilities within the Department of Commerce, within the National Bureau of Standards. We would plan to use increased funding in external contracts developing the expertise beyond the Bureau of Standards rather than continuing to increase the size of the staff and amount of work carried on within the Bureau itself.

Mr. MOSS. I notice in 1970 there are no contracts.

Mr. TRIBUS. That is right.

Mr. MOSS. There were no contracts.

Mr. TRIBUS. I'm sorry, there was one contract for about $6,000. It doesn't show on the scale of the chart. That was the time when I felt it was necessary to reorganize the operation and get a scientific basis for what we wanted to do and so on. I felt that the group, at the time I first began to work with them, was not really prepared to engage in a large outside contracting effort because the staff really wasn't on top of the problem the way I wanted them to be.

Mr. MOSS. Will you now supply for the record a list of those contracts which have been entered into and a list setting forth the types of contracts which would be contemplated in fiscal 1971 and 1972?

Mr. TRIBUS. Yes, sir. Do you wish us to go back to the beginning of the program from 1968?

Mr. MOSS. We are dealing with such a brief period that I think it would be helpful to the committee to have a complete compilation.

Mr. TRIBUS. We will do that.

(The following information was received for the record:)

CONTRACTS—FISCAL YEARS 1968–72

Organization and title	
Fiscal year 1968	None
Fiscal year 1969:	
Southwest Research Institute: Characterization of bedding and upholstery fires	$19,864
Cornell Aeronautical Laboratory, Inc.: Fabric flammability test development	21,287
Denver Research Institute, University of Denver: A design for studying the incidence and effects of fires involving flammable fabrics	24,977
Fiscal year 1970: Ernst & Ernst: A study to estimate the additional cost of children's sleepwear under flammability standards	5,892
Fiscal year 1971:	
A university: Engineering evaluation of a fabric flammability test	30,000
A survey organization: Pilot implementation of the recommendations of the Denver Research Institute study	30,000
Fiscal year 1972:	
A university: Engineering evaluation of a 2d flammability test	30,000
A survey organization: A nationwide survey of the incidence of fabric fires	200,000
A research organization or university: The relationship of fabric construction to flammability	24,000

Mr. MOSS. Now, the expansion in staff from the end of fiscal 1971 to 1972 is 15.

Mr. TRIBUS. Actually the point on the graph for 1972 is at 41 for an increase of 16.

Mr. MOSS. Positions.

Mr. TRIBUS. Yes, sir.

Mr. MOSS. And would you set forth what the nature of those positions might be and the levels?

Mr. TRIBUS. I will have to ask Dr. Clark who works directly on the project to respond to that.

Mr. CLARK. Yes, sir, the present manpower allows us to just barely keep on top of the areas of responsibility which we have. As the number of areas in which we are active grows, we have a need for additional manpower to keep directly on top of the research, the technology and the accident data which are involved with each of the additional areas, and they would be distributed in our research efforts, our accident data and information efforts and our test development efforts in those new areas.

Mr. TRIBUS. Not shown in these figures would be the research associates who come to us at the expense of outside agencies. The agency, it might be a manufacturer, it might be someone like Consumers Union, will enter into an agreement with the Bureau of Standards to place a man at the Bureau to work in this field under our direction but at their expense. Dr. Clark, can you tell me how many are under consideration now?

Mr. CLARK. Yes, we presently have one research associate on board from the National Cotton Council, and we will have one more on board within the month from the Underwriters Laboratories. The Man-Made Fibers Producers Association has also agreed to establish a research associateship with us within the next few months.

Mr. TRIBUS. We have discussion with a number of others who may join our staff.

Mr. MOSS. Then if I understand correctly, the position of the Department of Commerce is that the level of funding proposed in the Senate bill S. 3765 is excessive for the needs of the program?

Mr. TRIBUS. Yes, I think that is correct.

At this moment we see no way that we would be spending $9 million in the next 2 years. The reason I hesitate is that I have not discussed with HEW and FTC what their requirements might be and so on in the next year because we haven't put the program together.

Mr. MOSS. Let me rephrase my question. Insofar as the Department of Commerce is concerned, the amount proposed in the Senate bill for the Department of Commerce would not be excessive? That would not be in the bill itself, because it isn't broken down in the bill but it is broken down on page 8 of the Senate report. As a matter of fact, the bill does not increase the funding for the Department of Commerce, so the answer would be that you concur in the Senate proposal?

Mr. TRIBUS. That is correct.

Mr. MOSS. Insofar as it relates to the Department of Commerce?

Mr. TRIBUS. That is right.

Mr. MOSS. And would have no comment upon the levels proposed for either the FTC or Department of Health, Education, and Welfare?

Mr. TRIBUS. That is correct.

Mr. BLANTON. Mr. Chairman, could I ask a question of what agency asked for additional funds between the $6 and $9 million that is proposed by the House and Senate?

Mr. TRIBUS. I don't know.

Mr. BLANTON. Would you know, Dr. Tribus, whether these additional funds were asked to carry out the penalties of an amendment in the Senate or not?

Mr. TRIBUS. I am simply not aware, sir.

Mr. BLANTON. Thank you.

Mr. MOSS. It would appear that the Senate has increased the funds rather significantly for the Federal Trade Commission and they have increased to the extent of almost a million, roughly $940,000, the amount available to the Department of HEW. That would be in fiscal 1971. They have reduced the amount available in fiscal 1970 below that requested for the Department of HEW. And of course they increased the Federal Trade Commission in both years.

We will have the witnesses for both those agencies before us and be able to query them on the amounts.

Now, it is also my understanding that the Department of Commerce does not concur in the penalty provisions of the bill as reported by the Senate.

Mr. TRIBUS. As I said in answer to Mr. Blanton's comments, we felt that some of them were in the wrong direction.

Mr. MOSS. These are primarily matters under the jurisdiction of the Federal Trade Commission, the penalty provisions.

Mr. TRIBUS. Yes, sir.

Mr. MOSS. Now, obviously in the language, and I assume that the language of the House bill as introduced by Mr. Staggers and Mr. Springer reflected the original request of the administration, a program is contemplated beyond 1972.

Mr. TRIBUS. Yes, sir.

Mr. MOSS. Would you supply then for the committee for its further deliberations a budget figure for fiscal year 1973 and a justification for it so that we could consider it at the time we mark up the legislation?

Mr. TRIBUS. We will be able to supply an estimate concerning 1973, but obviously the budget that the administration forwards to the Congress——

Mr. MOSS. Mr. Secretary, I can assure you that we have the utmost respect for the right of the administration to submit a budget, but this committee reserves the right to authorize, and we want you to submit to us a definitive proposal for authorization. What the administration requests or the Appropriations Committee might provide are matters of their concern but ours is the responsibility of authorizing.

Mr. TRIBUS. Yes, sir.

Mr. MOSS. We will only authorize a figure which can be justified. If I were to report back to the full committee without a well-defended or well-founded request for authorization, I can assure you the committee would reject the recommendations of this subcommittee. So we would ask that that material be supplied for the record.

Mr. TRIBUS. We will certainly do that and I appreciate the value to our work of having your oversight and your investigation into this. This is one of the few occasions we have to explain what we do, to have questions, to have the matter laid open, so we will certainly do our best to comply.

Mr. MOSS. Thank you.

(The following material was received for the record:)

SUPPLEMENTARY STATEMENT OF PURPOSE AND NEED—FISCAL YEAR 1973

On April 7, 1970, H.R. 16824 was introduced into the House of Representatives "To authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended." During hearings on H.R. 16824 before the Commerce and Finance Subcommittee of the House Committee on Interstate and Foreign Commerce, Subcommittee Chairman John E. Moss requested a funding estimate for fiscal year 1973, and justification therefor. This supplementary statement is in response to that request.

The FY 1973 authorization is estimated at $1,883,000. This amount would provide the authorization necessary to carry out the program in FY 1973. However, actual appropriation requests might vary after the overall review of the President's budget.

We would anticipate an orderly continuation of the activities described in the Statement of Purpose and Need accompanying H.R. 16824. In brief, these activities are the continued development of test methods and standards, the carrying out of research in the flammability of fabrics, and conducting studies on the feasibility of reducing the flammability of fabrics, related materials, and products. Several standards will have been established before FY 1973. However, some of these may be interim standards set to provide prompt protection to the public at a minimum level while the necessary research and investigations were carried out to establish the optimum level of reasonable and appropriate protection to the public. This approach will be used further as appropriate. Test method development will have to continue in fiscal year 1973, not only for standards in new areas but to continue the development of optimum protection in areas for which interim standards will have been established.

Research will continue into the nature of flammability and into the nature of the real life hazards that result from the burning of garments and interior furnishings under use conditions. Preliminary research has been carried out by contract for two categories of interior furnishings, beds and upholstered chairs. A facility nearing completion will be used for further study by NBS of the hazards faced by the public. Only through such study can standards be developed that will be meaningful and effective in reducing the risks to which the public is exposed.

Mr. Moss. Mr. Keith, you have some comment?

Mr. KEITH. What is the relationship between your organization and the Federal Trade Commission?

Was there consultation and concurrence in any respect with reference to the change in philosophy as indicated by the Senate legislation?

Mr. TRIBUS. I will ask Mr. Jensen to respond to that since he has the most dealings with the people at his level in the FTC.

Mr. JENSEN. To the best of my knowledge there was no discussion between the Department of Commerce and the Federal Trade Commission with respect to the proposed amendments to the act that were submitted after Chairman Weinberger's testimony before the Senate subcommittee.

Mr. KEITH. It doesn't seem to me to be the way to run a good ship. I would think there ought to be much better coordination.

What are foreign governments doing in this area?

Mr. CLARK. Sir, we have attempted to obtain estimates from two countries which are very active in this area, from Japan and from the United Kingdom. The estimates leave very much to be desired and they are not nearly as certain as the numbers we can get from our own industry in this country. So I can only reply that I don't have a satisfactory estimate of the amount of money being spent at the present.

Mr. KEITH. Generally speaking, are they making similar efforts and is the breakdown of cost between industry and Government proportionately the same as ours?

Mr. CLARK. Well, sir, I would mention one specific example of an item that was pointed out to me recently in Japanese Government activities, in the apparel field. Some $8 million may be expended by the Japanese Government over the next 7 years simply to improve the technology of manufacturing one item of apparel, shirts. I am not aware of any such Government activities of that level in this country at this time.

Mr. TRIBUS. On the other hand, in our style of government we don't presume that it is the Government's responsibility to improve the manufacture of shirts, so that I don't think these figures compare. In the United Kingdom we have had some discussions regarding activities in flammable fabrics. There is a substantial Government activity. There is also a great deal of activity in the private sector. We haven't been able to get good figures on what is spent in the private sector for the reason that they don't care to discuss those figures with us.

Mr. KEITH. I want to clear up something before we go too far. You have said $8 million for improvement in manufacturing of shirts. I am not concerned about that at this particular point except as it relates to flammability.

Mr. CLARK. The point I was making——

Mr. KEITH. I am very much concerned incidentally from a competitive point of view and I am glad to have the record show that, but what about the flammability aspects of it?

Mr. CLARK. Sir, I have recently written a letter to the Ministry of International Technology and Industry in Japan requesting this kind of information, and I am awaiting that answer.

Mr. KEITH. Of course, and this isn't your bailiwick, although it is certainly the bailiwick of the Department of Commerce, which is concerned with Japanese import competition. The end product that comes over here is manufactured by an industry, subsidized by the Government, in some respect at least. We find that they are contributing $8 million for shirt manufacturing, and this sum is not related to flammability of products. If they are doing that for shirts they are doing it for many other items I would imagine too. Irrelevant perhaps to this discussion but very relevant to problems facing the industry as a whole.

How does the statute that we have compare with the statute that the Japanese or British have?

Mr. CLARK. I can't speak to the statutes, sir. We are gathering details on the scientific and technological aspects and I suspect our legal counsel or Dr. Tribus may be familiar with the statute.

Mr. TRIBUS. As far as we know they have not developed any standards yet in this area and I am sure they are watching us and we shall be talking with them. We have discussed this problem of standards with the British and again we have exchanged views. It is difficult for one not in the field, as I wasn't sometime back to appreciate, for example, that there are some European building material combustibility standards that have been promulgated and there was a test made by a professor at Harvard, Emmons. He took the standards available in six countries and took some 24 samples and tested them

by each of the methods and demonstrated that in some countries the sample that would be rated most flammable showed upon another country's standard as least flammable. In other words, when you took what was going on in the different countries and tested it to determine whether it made sense, you discovered that the data just doesn't add up. And so we have had discussions internationally amongst the experts in an attempt to resolve this. At this time I can only say that we watch with interest what goes on in other countries but we don't get much guidance from it. I am hopeful that as our program gets rolling as it is now that we will have much more international collaboration on what is, after all, a program of international concern. I can say this: That all imports will have to meet our standards and since we represent an enormous market for many countries they will watch with great interest. I have no doubt whatsoever that the Japanese are spending money at a very high rate to try to develop nonflammable fabrics just as I know our industry is.

Mr. KEITH. Mostly for export probably. They probably would want to comply with our standards for export and leave the balance of their industry free to operate as it has been.

Who has the responsibility to enforce the act with respect to imported fabrics?

Mr. TRIBUS. The Federal Trade Commission and Treasury Department.

Mr. KEITH. I think somebody from Commerce ought to know who is keeping an eye on our competition.

Mr. TRIBUS. Well, people in Commerce do, but you happened to ask the fellow who wasn't prepared to answer it.

Mr. KEITH. You are very honest and it is refreshing in that respect but discouraging too. Does anyone of your staff know exactly?

Mr. TRIBUS. Mr. Ellert does.

Mr. ELLERT. Yes, sir.

Mr. KEITH. Who has the responsibility of enforcing the act with respect to imported fabrics and their flammability?

Mr. ELLERT. Yes, that responsibility is with the Treasury Department. However, they work very closely with FTC. The actual procedural way that this works is that when a shipment is received from a foreign country the importer is required to post a bond of a certain value to assure that it does comply with the act. The customs people then will send samples to the FTC who actually do the testing. If a shipment does not comply with the act, they will take steps to either ask the shipment be returned or that there be some forfeiture of the bond.

Now, Treasury takes the action but the actions are at the request of the Federal Trade Commission, as I understand the procedures.

Mr. KEITH. Is Commerce sufficiently interested in this to make certain that there is a very strict and literal interpretation of our statutes in this respect?

Mr. TRIBUS. Yes, sir; for example the carpet-and-rug standard is in effect or goes into effect shortly. It has been promulgated and there is a year before it becomes effective. At that time we will have to be watching the whole business to see that it is done properly. We feel we have a responsibility to do that. Legally, once the standard is promulgated the responsibility as indicated in the act in section 9

falls on the Secretary of Treasury, but he is assisted by the Federal Trade Commission.

Mr. KEITH. These additional moneys.

Mr. TRIBUS. This is why in my previous response I spoke of Treasury and Federal Trade Commission both and seemed to waver. It was only because we have not had experience yet in actually applying the procedures because there has been only one standard against which they were to be applied.

Mr. KEITH. We on this committee find that there are varying degrees of supervision over imported products, and I would encourage you to maintain close liaison with the Federal Trade Commission and the Customs Bureau.

Are these moneys that they have requested and the changes in the statute that they are suggesting not for greater efforts to police imports but for more money to police our own manufacturers? Do you happen to know?

Mr. TRIBUS. I am not in a position to respond to that since I didn't request the funds.

Mr. KEITH. I think——

Mr. TRIBUS. I am sure that if they have requested money it is because they know they will have to do more things under the act; but how they apportion it, I wouldn't know.

Mr. KEITH. I think Commerce ought to interest itself in this. I know Mr. Stans is terribly interested in it since it relates to some legislation that is before the committee.

Mr. TRIBUS. Now that you have raised the point you can be assured there will be action at my desk and nearby.

Mr. KEITH. I have no further questions at the moment, Mr. Chairman.

Mr. Moss. Going back to your statement on page 3, item No. 6, the matter of the issuance of standards for large carpets and rugs. When will those standards become fully effective?

Mr. TRIBUS. April 1971.

Mr. Moss. In other words, those were issued in April of 1970?

Mr. TRIBUS. That is correct. According to the law there is a 1-year period. Actually, as a practical matter, not as a legal matter, the standards began to be effective much sooner than that because the industry knew the schedule was coming along and once it was understood that a standard was to be issued, buyers begin to react by not wanting to buy something that couldn't meet the standard. So that as a practical matter the effect of that standard will take hold much sooner than the legal date of April 1971.

Mr. Moss. Now, does that standard make any distinction between the use to which the larger rugs or carpets might be put?

Mr. TRIBUS. No.

Mr. Moss. I have in mind the nursing home fire in Ohio.

Mr. TRIBUS. Yes, sir. I am aware of what motivates the question. The answer to your question is "No," it does not make any distinction on end use. It is in our view an interim standard, it is a first cut at the problem. It is by no means a final standard.

Our difficulty is that for the given manpower we can only attack so many things at a time. We have given first priority to children's clothing and to bedding.

Mr. Moss. Have you issued a proposed standard on children's clothing?

Mr. TRIBUS. We have issued a finding that there may be a need and as I understand it, a proposed standard on children's clothing is imminent. I understand it is due on my desk for signature momentarily.

Mr. Moss. Would that be broad enough to cover receiving blankets and——

Mr. TRIBUS. No; there is another finding of need with respect to bedding and mattresses and that standard is moving along. With respect to receiving blankets, it is very interesting. We have a separate finding on blankets that covers infants blankets, but with respect to receiving blankets in particular, this is one of those interesting cases where you can in the laboratory demonstrate some of these blankets to be more flammable than you think ought to be used for little children, but we have been unable to uncover a case of a child wrapped up in a receiving blanket because a new infant is given so much care and attention and watched over carefully that they don't get burned up in receiving blankets. My guess is you could hand an infant off to new parents in tissue paper and he is not going to get burned up because of the way people take care of their children. We wouldn't advise that but what I am saying is you can't assume that in the case of receiving blankets that even if we find them to be flammable that they represent a real hazard. But I think that is about where it ends. After the first few weeks of an infant's life, it appears that people don't take as much care as they ought to, but the receiving blanket isn't the culprit.

Mr. Moss. Well, of course, as you are aware, it was mentioned specifically in connection with the study of consumer safety legislation.

Mr. TRIBUS. Yes, I know it was.

I don't mean anything I said to imply that when we issue a standard on blankets, the receiving blankets won't be included. I didn't mean anything like that. And we are quite aware of the fact that the statistical data are not complete and maybe on a very careful evaluation we would be able to turn up some cases. All I am saying is that we know of none whereas we know with respect to other things of quite a few incidents.

Mr. Moss. If the proposed finding is issued by the Department, what time period are we discussing before there could be the actual adoption and implementation of standards on bedding and on children's wearing apparel?

Mr. TRIBUS. Well, let's take bedding first. We issue a finding that there may be a need and unless there is a counter argument proposed, we then issue a statement that we have found there is a need and concurrent with that we issue a proposed standard. Now if that standard is not demonstrated to be unfeasible or unsound technically, if someone doesn't find a flaw in it, then shortly thereafter, that standard is finally issued and a year after issuance it becomes effective.

Now, what we find is that quite often when we are in the process of developing this standard someone finds a flaw in it and we have to do more work and I never can predict what the outcome of that will be. In the case of carpets and rugs, very strong arguments are presented that we ought not to include bath mats. We might decide to go back and rework our statement to say something about bath mats. If that

were done we would decide where bath mats are in the case and then we might get down to such thing as how do you define a bath mat. In the case of carpets and rugs, we determined that small carpets and rugs presented a different hazard, therefore we put out and released the standard that applies to the rest of the category. In the resolution of this we don't know how much difficulty we will run into before we can find a satisfactory solution.

Mr. Moss. What is a small carpet or rug?

Mr. TRIBUS. Well, by definition it is less than——

Mr. CLARK. I believe that small rugs are defined as having longest dimension less than 6 feet and total area less than 24 square feet.

Mr. TRIBUS. The throw rugs that people place around a home are often of a special character and they represent less of a hazard than a large rug or they can represent less of a hazard. A spark could consume the rug and creep over to the edge of the wall and ignite a drape. This is different than a small throw rug or something placed on the floor of the bathroom.

Mr. Moss. The flammability standards for large carpets, are they sufficiently stringent had they been in effect to have prevented the type of fire which occurred in Ohio?

Mr. TRIBUS. No.

Mr. Moss. Then are they deficient?

Mr. TRIBUS. Well, additional standards will be required pertaining primarily to smoke production as contrasted to flammability and also concerning itself with the padding and other materials laid under the rug which was not included, which considerations were not included in the first standard.

Mr. JENSEN. Mr. Chairman, I think the record should show very clearly that the purpose of the carpet standard that will become effective during April 1971 was to eliminate from the marketplace highly flammable materials, those that would ignite easily from a small ignition source and would provide propagation for the flame even in a relatively no-draft situation. People are at work now to find out what really happens when a fire occurs within a room, within a corridor. We are just completing facilities that are being fully instrumented. Once we know what happens, we can measure this and our job is to reduce it to a test method and determine whether this is technically appropriate.

Mr. Moss. I understand it has been characterized as interim, but I recall at the time of the adoption of the 1967 act that there was some sense of urgency in the committee. I recognize that you have only been with the Department for 18 months. Approximately 18 months. But here we are now 3 years later and I believe that we have one standard adopted which will become effective next year. It will be almost 4 years after the passage of the 1967 act. Somehow to me that doesn't reflect the sense of urgency I felt. I believe I was one of the coauthors of that act. That lack of urgency certainly was evident in the last administration in the failure to move ahead more rapidly. I hope that we are not going to have prolonged periods here before tackling these problems and I recognize again that there are many technical problems to be overcome in promulgating reasonable standards. And that goes back again to the adequacy of your budget requests because I note that on at least three occasions in the course of your testimony, not

your testimony, but your direct response to inquiries from myself and other members of the committee, that you have referred to the limitations of manpower. We are talking now of an agency with 23 persons. with a buildup by the end of 1971 to 25. Not an impressive buildup. It does seem to me that there should be more urgency here. I think it is quite evident in the report of the Senate that that was the consensus of the committee of the Senate. I don't know any separate or dissenting—yes, I do, too—there are individual views by two members of the Senate committee.

But in the main the committee reflects the same concern that I am voicing now. This is an important question and we know that with many of the new fabrics, the synthetics, that problems of smoke and of fumes that can be very dangerous arise along with the question of flammability. In arriving at the standards, do you consider that type of problem, smoke?

Mr. TRIBUS. Yes, we do. I would like to say that the capability that we have regarding funding and personnel speaks for itself. I think now we are geared up to be productive. But the date of the enactment, 1967, has to be considered in conjunction with the date on which funds and personnel become available. When you put a team together, they don't work right away, you have to organize them and direct a program and that takes time, and we have spent that time in getting set to do things and I think we are going to make progress now, sir, and I have put a good deal of my attention and time on this problem since coming into office and I intend to continue to do so. I think just looking at the chart you can see the difference between where we are now and where we were in 1968 and there is an enormous difference in the kind of productivity you can get. If you allow for the lag in getting people aboard, then I think you can understand why we have at this moment relatively little to show compared to the time from 1967. I think examining it in terms of manpower deployed and the funds deployed that we have done a pretty good job and I am confident we are going to do quite a bit better.

Mr. Moss. Thank you. Are there further questions?

All right, if not, I want to express the appreciation of the committee for your appearance here this morning and I would urge that you get the material requested by the committee into the hands of Mr. Borchardt just as quickly as possible.

The next witness will be Mr. George S. Buck, Jr., director of research of National Cotton Council of America, from Memphis, Tenn.

STATEMENT OF GEORGE S. BUCK, JR., DIRECTOR OF RESEARCH, NATIONAL COTTON COUNCIL OF AMERICA; ACCOMPANIED BY GEORGE W. DUNN, VICE PRESIDENT, J. P. STEVENS CO.; KENNETH V. CHASE, VICE PRESIDENT, NORTHERN TEXTILE ASSOCIATION; AND CURTIS H. PORTERFIELD, STAFF DIRECTOR, AMERICAN APPAREL MANUFACTURERS ASSOCIATION

Mr. BUCK. Mr. Chairman and members of the committee, my name is George S. Buck, and I am director of research of the National Cotton Council which has its headquarters in Memphis, Tenn. The council is a central organization of the raw cotton industry.

Mr. Keith, I am also a member of the National Advisory Committee on the Flammable Fabrics Act, about which you raised some question.

I appear here today as a representative of the National Cotton Council, but I believe that almost every fiber, textile, and apparel organization in this country firmly opposes amendments to the authorization bill for the Flammable Fabrics Act which were made a part of the Senate version of this bill. Representatives of some of these organizations are here with me today to answer any questions the committee may have. Some of them will ask to file statements on behalf of their organizations after this hearing.

I would like to introduce, on my left, Mr. George Dunn, who is a vice president of J. P. Stevens Co., a major textile manufacturer and also chairman of the Flammable Committee of the American Textile Manufacturers Institute, the central organization of the U.S. textile industry.

On my right is Mr. Kenneth Chase, who is president of Berkshire Hathaway Co., another major textile manufacturing firm, and Mr. Chase is vice president of the Northern Textile Assocation.

Further on my right is Mr. Curtis Porterfield, who is a staff director of the American Apparel Manufacturers Association, an organization of apparel and garment manufacturers in this country.

We support the increased authorization which H.R. 16824 would provide for administration of the Flammable Fabrics Act. As a matter of fact, we think there is probably a need for more than $6 million which the bill in its present form authorizes. The act, as amended in December 1967, authorizes and directs the Secretary of Commerce to conduct certain research and investigation on the flammability of products, fabrics, and materials, test methods and testing devices, and on the feasibility of reducing the flammability of textile products. In addition, the Secretary of Health, Education, and Welfare is authorized to investigate death, injuries, and economic losses resulting from accidental burning of products, fabrics, and related materials.

Fiber, textile, and apparel interests helped draft the original Flammable Fabrics Act and supported its enactment in 1953; they supported the amendments, which broadened the scope of the act, in 1967. In other words, they have consistently shown their interest in providing greater fire safety to the general public.

As a matter of fact, some industries have some special interests in producing safe textile and apparel products. They are naturally anxious to protect their customers. But in addition, fire resistant materials would free them from the civil lawsuits now frequently (and unfairly) directed against them for accidents involving normally combustible products.

I have another statement I would like to explain, and that is they may even be able to make greater profits from new fire-resistant materials, as is usually the case with specialty products. I do not mean that anyone in the textile industry plans to profit from producing these materials, but, as you know, in the normal course of selling most products in this country, there are trade markups, and what I am emphasizing is there is no resistance in the textile industry to producing fiber-resistant products with some fear they will lose money by it. That is just not a fact.

These industries, however, know better than anyone just how complex and difficult it is to produce satisfactory fire-resistant textile and apparel products. Combustibility—in some degree—is inherent in almost all textile fibers. To change the basic nature of these materials and yet preserve the functional and esthetic properties which consumers value so highly—absorbency, comfort, drape, color, strength, durability, etc.—is very, very difficult. Fiber producers, textile manufacturers, and the chemical industry are investing somewhere between $10 and $20 million a year to try to solve these problems. The U.S. Department of Agriculture and U.S. military services have spent many more millions on fire-resistance research during the past 20 years. I will describe later in my statement some of the progress which has been made.

Because we understand thoroughly how much research and study needs to be carried out, both by private industry and by the Federal agencies concerned with textile flammability, we feel that more funds should be made available to support the efforts of the Bureau of Standards and HEW. Just the matter of developing adequate test methods is extremely complicated and time consuming, but absolutely necessary. I will say more about test methods later.

In addition, there is a truly great need for reliable information on injuries and deaths which result from textile or apparel fibers. For years inaccurate, misleading, and obviously exaggerated statements have been made, quoted, requoted, published, and copied—yet the plain fact is that no one has any idea how many injuries and deaths actually and fairly can be attributed to textile products. And since this information is lacking, the textile and apparel industries have been victimized by every headline hunter who chooses to repeat the misinformation which now seems firmly entrenched in the literature.

The Department of Commerce concedes that this information is not available and agrees that it is needed to help set priorities in moving toward greater fire safety. HEW does not have the information—except for some sketchy figures in two or three cities—and HEW is apparently moving very slowly on getting more data, perhaps because of limited funding. We think this is a vital need, and we of course support the authorization for additional funds to get this job done sooner.

We are not, however, taking the position that nothing can be done until we have complete statistics on accidents involving textile products. As I indicated, the fiber, textile, apparel, and chemical industries are investing heavily in research to develop fire-resistant materials. Textile representatives are cooperating with Government agencies in many other ways, as Dr. Tribus indicated: in research, in evaluating new products, in developing testing methods. We feel that this type of cooperation between government and industry is absolutely essential to fulfilling the purposes of the Flammable Fabrics Act. We think that everything possible should be done to encourage even greater industry-government cooperation.

But now—when a need for cooperation and constructive development is so important—the fiber, textile, and apparel industries have been threatened with unreasonable, unfair, and impractical burdens in penalties which could seriously impede the progress being made. I am referring to the three amendments to the Flammable Fabrics Act

which the Senate Commerce Committee added to S. 3765, the companion bill to H.R. 16824.

May I say that after S. 3765 had been reported out by the Commerce Committee, we were given an opportunity to express our views on the three FTC-proposed amendments in the hearing on August 18. At that time, the Department of Commerce also filed an objection to those amendments, indicating their unreasonableness and impracticality. We were naturally pleased to have this support for our position.

There are many technical and legal reasons why the FTC-proposed amendments are unworkable. We do not, however, oppose any reasonable enforcement authority which FTC or other Federal agencies may need to make the Flammable Fabrics Act fully effective. We believe that the act already provides sufficient authorization to accomplish this purpose. However, as an alternative to the FTC proposals, the Department of Commerce, with the participation of the Department of Justice, has proposed revisions of the earlier amendments, and these are generally acceptable to the industries we represent here today.

If it is felt that the Flammable Fabrics Act should be amended, and if it is felt that this authorization bill is the appropriate place for such action, we strongly support the revised amendments offered by the U.S. Department of Commerce, and we just as strongly oppose the original amendments offered by FTC.

Mr. Chairman, I believe that Secretary Tribus has already asked to have his statement of August 18, 1970, before the Senate Commerce Committee included in the record.

Mr. Moss. That is correct.

Mr. BUCK. Fine. Then, if this has not been done, we would like to have the letter which the Department of Commerce sent to Senator Magnuson on, I believe, August 28, with the proposed amendments. We would like to have that made a part of the record, and I have a copy of this—August 27.

Mr. Moss. We will make a reservation and check the original request of the Department of Commerce to see if it encompasses the material in this request, and, if not, the item will be included at this point in the record.

(The letter referred to follows:)

DEPARTMENT OF COMMERCE,
OFFICE OF THE GENERAL COUNSEL,
Washington, D.C., August 27, 1970.

HON. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: At the hearings August 18, before the Consumer Subcommittee on S. 3765, the Flammable Fabrics Act Amendments of 1970, Deputy Assistant Secretary Simpson undertook to furnish amendatory language to remedy certain problems we see in implementing the bill in its present form.

For your convenience we have incorporated these amendments in a redraft of the bill which is attached. The reasons for individual amendments are discussed below.

1. S. 3765 contemplates amendment of section 3(a) of the Act to establish reasonable testing programs for assuring compliance with flammability standards. It does not distinguish between imported materials and domestically manufactured materials and, as drafted, would apparently permit testing by a foreign manufacturer.

We share the Committee's concern that any amendment of the Act should not result in the erection of nontariff trade barriers. On the other hand we are concerned that it may be difficult or impossible to enforce sanctions against for-

eign manufacturers, so that foreign testing may sometimes be meaningless from the standpoint of protecting consumers against the hazards of flammable fabrics.

Accordingly, we suggest amendments to the bill to provide:

(*a*) That the testing contemplated by amended section 3(a) of the Act be undertaken in the case of foreign goods either by the foreign manufacturer or the U.S. importer, employing tests approved by the Federal Trade Commission; and

(*b*) That language be added to section 7 of the Act, as amended, to provide that a U.S. importer (who would be subject to the jurisdiction of the FTC and U.S. Courts) who elects to rely on the testing of a foreign manufacturer is himself responsible as a manufacturer under the civil and criminal penalties in section 7 as amended.

These modifications would permit effective enforcement as to imported fabrics, but at the same time afford the importer an option to test imported goods himself or to rely on the tests of a foreign manufacturer. We do not believe that it is fair to require the importer to test if he is satisfied that tests have been properly conducted by the foreign manufacturer. On the other hand, because some foreign manufacturers will not be subject to the jurisdiction of the Federal Trade Commission, we should be able to look to the importer to insure compliance with the testing program contemplated by the bill. He should be required to assume the same burden of proof which is borne by the domestic manufacturer.

These amendments are accomplished in the attached redraft by addition of the words "or importer" after "manufacturer" in section 3(a), and by addition of the new subsection 7(d).

2. Further, we are concerned that the certifications apparently contemplated by the bill as reported might reduce effective enforcement by creating an unmanageable paper burden for the Federal Trade Commission. (As noted in our testimony, there are already some 32,000 textile manufacturers affected by existing flammability standards.)

To avoid this burden on the FTC we recommend deletion of the certification requirement in the reported version of section 3(a) and the substitution of a requirement for "testing in accordance with reasonable and representative tests approved by the Federal Trade Commission." We believe that this would permit the FTC to promulgate after appropriate hearings a series of approved statistical testing procedures which could be employed.

3. Any manufacturer who in good faith performs the approved tests and determines that his goods are in compliance should be permitted to establish these facts as an affirmative defense against the misdemeanor and civil penalty provisions of section 7. As indicated in our testimony before the Subcommittee, there is virtual statistical certainty that some fraction of the goods tested in an approved manner will fall short of the established standard. (This stems from the fact that flammability tests involve destruction of the fabric, and therefore not every yard of fabric subject to a standard can in fact be tested.) In view of this, we believe that "no fault" criminal and civil penalties are clearly inappropriate. We would urge instead that a manufacturer should be permitted to prove good faith compliance with the provisions of section 3(a) as a defense against a charge that a single item fails the test. This protection against the consequences of the statistical nature of the testing program is critical in cases where fabrics must be treated with fire retardant finishes to pass the more strict requirements contemplated for future standards.

This amendment is accomplished by the provisos added to the proposed subsections 7(b) and 7(c) of the Act contained in the attached redraft.

4. The Department of Commerce will likely be called upon to evaluate some of the testing programs under consideration by the Commission. As pointed out in our testimony before the Subcommittee, the techniques employed in the selection of test samples is technologically linked to the establishment of the standard. This Department's scientific and technological resources would be of substantial value in evaluating prospective test programs in light of the current state of technology. This amendment is contained in the amendment to section 14 of the Act found in section 6 of the attached redraft.

5. Under the proposed section 3(a) of the Act contained in S. 3765 as presently drafted, manufacturers would have to test all products manufactured after the date of enactment under a reasonable testing program approved by the Federal Trade Commission. There are some 32,000 textile manufacturers subject to the flammability standards now in effect. However, no testing programs are required by current law. Without a delay in the effective date of section 3(a)

as revised, its literal application would require manufacturers to interrupt production on the date of enactment of the bill or be subject to the felony provisions of section 7(a). To avoid such disruption of the market we believe the effective date of the proposed amendments to section 3, 7, and 8 should be one year after enactment. The new section 7 contained in the redraft so provides.

6. In addition technical amendments suggested by the Department of Justice are incorporated in the first line of section 7(a), in sections 7(c)(2) and 7(c)(3), and in section 8 of the Flammable Fabrics Act as amended by our proposed redraft.

We should note that it was not possible within the time available to obtain the views of the Federal Trade Commission on our proposed amendments.

We have been advised by the Office of Management and Budget that there would be no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

WILLIAM E. MURANE,
Acting General Counsel.

PROPOSED REDRAFT OF S. 3765 AS REPORTED BY THE SENATE COMMERCE COMMITTEE, JULY 29, 1970

Changes proposed to be made to the bill as reported are shown as follows (language deleted is shown in brackets, language added is italic).

A BILL To authorize appropriations for fiscal years 1971, 1972, and succeeding fiscal years to carry out the Flammable Fabrics Act, as amended

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Flammable Fabrics Act Amendments of 1970."

SEC. 2. Section 3 of the Flammable Fabrics Act (15 U.S.C. 1192) is amended by redesignating subsections (a) and (b) as subsections (b) and (c), respectively, and inserting the following new subsection (a) immediately after "Sec. 3.":

"(a) The manufacture for sale, the sale, or offering for sale, in commerce, or the importation into the United States, or the introduction, delivery for introduction, transportation or causing to be transported, in commerce, or the sale or delivery after a sale or shipment in commerce of any product, fabric, or related material, or any product made of fabric or related material, as to any of which an applicable standard of flammability has been issued or amended under the provisions of section 4 of this Act, which product, fabric, or related material has not been [certified] *tested prior thereto* by the manufacturer *or importer* thereof [to meet the requirements of the applicable standards or other regulations] *in accordance with reasonable and representative tests approved by the Federal Trade Commission, and determined by said manufacturer or importer to be in conformity with the applicable flammability standards* issued or amended under the provisions of section 4 of this Act, shall be unlawful and shall be an unfair method of competition and an unfair and deceptive act or practice in commerce under the Federal Trade Commission Act. [Such certification shall be based upon a reasonable testing program conducted by the manufacturer and approved by the Federal Trade Commission.] Provided, That this subsection shall not apply to such product, fabric, or related material, or any product made of fabric or related material, which has been exempted from this subsection by rule or regulation issued by the Commission pursuant to the provisions of section 5(c) of this Act."

SEC. 3. Section 7 of the Flammable Fabrics Act is amended to read as follows:

"PENALTIES

"SEC. 7. (a) Whoever *knowingly and willfully* performs any act in violation of section 3 or section 8(b) [with knowledge that such act is in violation of that section] shall be guilty of a felony and upon conviction shall be fined not more than $10,000, imprisoned for not more than three years, or both, in addition to any other penalties, civil or criminal, imposed for such violation.

"(b) Whoever performs any act in violation of section 3 or section 8(b) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $1,000, imprisoned for not more than one year, or both, in addition to any other penalties, civil or criminal, imposed for such violation: *Provided, however, no*

person shall be held in violation of this subsection if such person establishes that in the manufacture or importation of the product, fabric, or related material the tests and determinations required under section 3(a) have been made in good faith.

"(c)(1) Whoever performs any act in violation of section 3 or section 8(b), in addition to any other penalties imposed for such violation, shall be subject to a civil penalty *imposed by the Federal Trade Commission* of not to exceed $10,000 for each such violation: *Provided, however, no person shall be held in violation of this subsection if such person establishes that in the manufacture or importation of the product, fabric, or related material the tests and determinations required under section 3(a) have been made in good faith.*

"(2) [Any such civil penalty may be compromised by the Commission. In determining the amount of the penalty, or the amount agreed upon in compromise, the appropriateness of such penalty to the size of the business of the person charged and the gravity of the violation shall be considered.] *Upon failure of the offending party to pay the civil penalty, the Commission may request the Attorney General to commence action in a court of the United States for such relief as may be appropriate.*

"(3) [Any such civil penalty may be enforced by the Commission through a civil action brought in the name of the United States by attorneys of the Commission in the district court of the United States in the judicial district in which the defendant resides or does business."] *Prior to referral to the Attorney General for appropriate action, the Commission may compromise such civil penalty.*

"*(d) Notwithstanding section 8, an importer who chooses to rely on the tests and determinations of a foreign manufacturer under section 3(a) shall be responsible as a manufacturer under subsections (b) and (c) of this Section for any violation of Section 3 resulting from his importation of a product, fabric, or related material produced by such foreign manufacturer.*"

SEC. 4. Section 8 of the Flammable Fabrics Act is amended by adding after the word "prosecution" in the first sentence the words "or penalty".

SEC. 5. Section 13 of the Flammable Fabrics Act is amended to read as follows:

"AUTHORIZATION OF APPROPRIATIONS

"SEC. 13. There is authorized to be appropriated a sum not to exceed $9,000,000 for the period beginning July 1, 1970, and ending June 30, 1972, to carry out the provisions of this Act."

SEC. 6. Section 14 of the Flammable Fabrics Act is amended by omitting the word "and" after subsection (b)(3) and by adding after subsection (b)(4) the following:

"and,

"(5) evaluate, upon request by the Commission the reasonable and representative tests required by section 3(a) of the Act."

SEC. 7. The amendments to sections 3, 7, and 8 shall be effective one year after the enactment of this Act.

Amend the title so as to read: "A bill to amend the Flammable Fabrics Act to increase the protection afforded consumers against injurious flammable fabrics."

Mr. BUCK. Thank you, Mr. Chairman.

With your permission, Mr. Chairman, I would now like to describe briefly some of the technology of fire-resistant finishing (mainly for cellulosic fabrics), of fire-resistant man-made fibers, and of fire-resistance and flammability testing. I believe that this information will give you and your committee members a better appreciation of the problems which the fiber, textile, and apparel industries face.

There are three main classes of fire-resistant finishes: the water soluble—or nondurable; the semidurable class; and the fully durable finishes. Each of these classes have several different species, some of which I will describe.

Water soluble or nondurable treatments are the easiest to apply and the least expensive. They range from mixtures of borax and boric acid, or ammonium phosphate, to more complex combinations and compositions. They are suitable for certain interior furnishings in public build-

ings and this is their main application. They lose their effectiveness in most cases with a single washing or leaching, and sometimes will migrate from fabrics even under conditions of high humidity.

The class of semidurable finishes also includes many different species. Examples include insolubilized inorganic salts and organic compositions, mainly those containing nitrogen and phosphorus. Urea-phosphate is a semidurable composition which has had extensive use. Some of these finishes will withstand a number of home launderings and even some commercial launderings. They may, however, lose their fire-resistant properties in hard water leachings through ion exchange.

The semidurable finishes are quite satisfactory for certain applications in which laundering is not customary and exposure to leaching is not excessive. Examples include the padding of mattresses and furniture, and mattress ticking and furniture upholstery. Using these semidurable finishes we can now produce mattresses which are fully fire resistant, reasonable in cost, and entirely satisfactory in their performance characteristics. For that reason, the National Cotton Council is giving full support to the development and promulgation of new flammability standards for mattresses.

Durable fire resistant finishes tend to be more expensive than semidurable types and considerably more expensive than the water soluble or nondurable class. Their durability also is a matter of degree, in most cases, and highly dependent on the exposure and handling of the textile article.

Durable outdoor finishes have been used since World War II. The biggest outlet is still in military fabrics, mainly canvas products. However, these materials are also used in such nonmilitary applications as awnings and campers' tents. Most are based on combinations of antimony oxide and other pigments with chlorinated organics. A good fire-resistant finish of the outdoor type is durable for the life of the fabric. These finishes are entirely unsuitable for clothing and household use, however, because of added weight, crocking, poor esthetic properties, and nonlaunderability.

Up to this time almost all the durable fire-resistant treatments which are suitable for apparel and household textiles have been based on organic compositions containing nitrogen and phosphorus. Phosphorus is a fairly expensive element and some of the phosphorus-nitrogen compositions are rather difficult to synthesize. This is basically the reason why these finishes are all relatively expensive at this time.

How durable are these finishes? It depends. One type now in commercial use has passed as many as 1,000 home launderings (in the laboratory) when applied just right. If the application conditions are not under complete control, the finish may fail in much less than 50 launderings. And under any circumstances the finish fails if washed in a commercial laundry, or if home laundered with soap in areas which have hard water.

Another durable finish in commercial use, which was considered highly durable to laundering, has recently been found to be nonpermanent when a garment is exposed to sunlight between launderings, or sometimes when it is pressed with a hot iron between launderings.

The application of these fire-resistant finishes can be a very tricky business indeed. With some finishes the moisture content of the fabric

must be just right. If the moisture content is too low, the material doesn't react and fire resistance is not obtained. If the moisture content is too high, the product is fire resistant but the finish is not durable. And, since the moisture content of fibers varies with the relative humidity of the atmosphere, this is a very difficult thing to control.

It is important that just the right amount of fire-resistant finish be applied. If too little is applied the product may not be fully fire-resistant or its fire resistance may not be fully durable. If too much is applied, the hand, absorbency, strength, and wear life may be seriously affected, and of course the cost is raised. Under the best circumstances, some of the present durable finishes reduce fabric strength by one-half, and also cut abrasion resistance. This is, of course, reflected in shorter wear life.

The commercial or custom finisher—that is, a finisher who processes fabric made by other firms, generally on behalf of a mill or converter—has some special problems. The same fabric type, as made by different mills, may differ in construction. The cotton may be different, the yarn twist may be different, the tightness of the weave may be different. The harder yarns and tighter fabrics will not take up as much finish as softer constructions. When some of the tighter constructions suddenly show up, therefore, immediate adjustment of the pad-bath concentration, roll settings, processing speed, and temperatures may be impossible.

The finisher who is applying a fire-resistant treatment cannot be 100 percent certain that everything is right until he has drawn samples and tested their burning characteristics. He must also launder the sample, drying it between each laundering, and do this at least 50 times under present proposals. Additional requirements may be added, such as sunlight exposure, hard-water washing, or hot-iron pressing. All of this takes so much time that when the first test is completed 100,000 yards or more of fabric may have been processed.

At this point let me make these observations: First, a fabric which has been given a good fire-resistant finish but not quite enough to pass the standard test is still a lot safer than an untreated fabric. It usually burns more slowly, gives off less heat, and is much easier to extinguish. So, while the manufacturer or finisher is fully exposed to the penalties of the act for such a fabric, the public is not similarly exposed to hazard.

The second point is that a mill or finisher, at a minimum, faces somewhere between a million and a hundred million times greater risk of being penalized for inadequately finished yardage than the chance that any person will be involved in a flammability accident with that yardage, even assuming it had no fire resistance whatsoever.

Some textile finishers I know have gone to great pains to develop elaborate quality control procedures to make certain that their products remain fully fire resistant. This is at a time when fire resistance is not even required by law.

We are confident that the textile industry is going to, under any proposed standard, carry out flammable tests very, very carefully, but, as Dr. Tribus has testified, some yardage, even a small quantity, is bound to get by, and we object to any proposal that would subject these manufacturers, who are trying to do their best to furnish new fire-resistant products, to criminal penalties.

After considerable research and study it has been found that the present durable fire retardants can be applied successfully to certain mediumweight fabrics—cotton flannel for example. These finishes are not satisfactory, however, on lightweight fabrics in the range of 3 ounces, plus or minus, per yard. They will not work on the very popular cotton polyester blends, and they will not work on the rayon-polyester blends. They will not work at all on noncellulosic manmade fiber fabrics.

It is possible to produce certain manmade fibers which are inherently fire resistant. Fiberglas, for example, doesn't burn at all. Some special nylons and mod-acrylic fibers are fire resistant. I think most textile men will agree, however, that these fibers are not the answer, at least at this time. From one fiber to another the disadvantages include high cost, nonabsorbency and lack of comfort, low strength or low abrasion resistance, poor dyeing properties, poor sewing characteristics, and other problems. I do not cite these matters in disparagement of the synthetic fibers, but simply as facts which bear upon the ability of the fiber, textile, and apparel industries to meet the requirements of the act at this time.

There are other manmade fibers which have an intermediate degree of flammability, and which superficially would seem to have some resistance to burning. Under a wide variety of conditions, including laundering with soap and hard water, exposure to solvents, the application of certain dyes, and the way the fabrics are sewn into garments, entirely different flammability characteristics may be exhibited. This enormously complicates the testing requirements. Unless adequate test methods are developed so that these evaluations can be performed by the fabric manufacturer, much of the burden of testing may be shifted to apparel manufacturers. More than 25,000 firms would be involved—most of them small, and the burden and cost of testing would be fantastically higher. Apparel manufacturers must cut up entire garments, locate the most flammable portions, and make tests in those areas. It is not difficult to see how expensive this can become.

Unfortunately both flammability and fire-resistant tests themselves leave much to be desired from the standpoint of reproducibility and from the standpoint of their interpretation of potential hazard. At this time none of the tests measures some of the key factors involved in injuries and deaths, such as exothermal properties, the evolution of toxic gases, or the influence of flaming molten material.

During recent hearings before this committee the Bureau of Standards reported that certain fabrics which pass a standard test involving a 12-second flame exposure failed under only 3 seconds of exposure. There are other types of anomalous behavior in both the vertical and 45° test—in fact in any flammability test at this time—which make agreement between laboratories less than perfect at all times, and quite uncertain in specialized cases. Thus, it is entirely possible that an enforcement agency might obtain one result in performing a so-called standard test; a mill might obtain an entirely different result, even though both follow specified procedures.

The chairman raised the question of receiving blankets a while ago. Receiving blankets are really no more combustionible than the shirts you are wearing, if it is a cotton shirt, but, due to the interpretation of the test which was developed in 1953 for garments and garments

which had raised fiber surface—this test was not intended for blankets—but it may make these blankets appear to be flammable, or highly flammable, simply because they do not pass the tests.

What you get, Mr. Chairman, in a receiving blanket sometimes is a tiny little surface flash which moves across a blanket rather rapidly and burns the string on a testing machine, but the fabric itself may not ignite when this happens. So, that is an indication that what we may call flammable or highly flammable depends on the tests; with certain tests, any fabric could be made to appear highly flammable.

I will not repeat the demonstration that Secretary Tribus gave you about the 12 seconds and 3 seconds. This is an example of these test methods difficulties.

In this review of the technology of textile resistance, I have not meant to paint a gloomy picture. What I have told you are facts. This is the situation we face today. In this situation I think it is clear that the amendments which FTC proposed in the Senate Commerce Committee were premature, unfair, and impractical, and that they would actually impede progress toward greater safety.

As anxious as we all are to provide greater fire safety to the public, we will not reach that goal quicker by adopting police-state procedures. We won't invite useful cooperation at the point of a gun.

In summary, we think there are compelling reasons for rejecting the amendments to this bill which have been proposed by FTC. We doubt that any amendments are needed, or that they are appropriate in an authorization bill. However, if this committee feels that it is desirable to amend the act at this time, we strongly urge that the amendments offered by the Department of Commerce and the Justice Department be adopted.

Mr. Chairman, in regard to these amendments, these amendments proposed by the Bureau of Standards, we would ask that one correction be made. The Department of Commerce suggests a 1-year delay after promulgation of a new standard before compliance with new pretesting requirements becomes mandatory. These testing requirements, however, are to be determined by the Federal Trade Commission. If the Commission waits 6, 8, or 10 months after Commerce has promulgated a new standard to publish FTC rules and regulations on the testing requirements, the textile and apparel industries could not possibly obtain equipment or train the personnel to make the necessary tests. We recommend, therefore, that so far as compliance with the new testing requirements is concerned, a time of 1 year be provided from the date on which FTC makes public what those requirements will be.

On that point, Mr. Chairman, Dr. Tribus testified that the standard on carpets and rugs was issued in April of this year. This is September, 6 months having gone by. I do not know what, if anything, the FTC has done to promulgate rules on how often or how carpets and rugs should be tested. I think that if the Commission does appear here later, the industry would be interested in knowing what the answer to that is, because, you see, we now have only 6 months left, and if they wait 4 more months to come out with rules on how you test these carpets, then our available time to adjust and adapt to these test methods is almost dissipated.

Mr. Moss. Wouldn't it be obvious that one of the problems of the FTC in acting has been the fact that it had a new Chairman for a

very brief period of time; he was then appointed to another position, and I believe the new Chairman has only recently been confirmed.

Mr. BUCK. Mr. Chairman, I am sure that is an explanation, but I use this as an illustration of the problem we, in the industry, may face on any new standards.

Mr. Moss. I would hope that we would not have as rapid a turnover in the future as characterized the Commission this year.

Mr. BUCK. Thank you, Mr. Chairman. We would hope so, too.

May I make informally just a few additional points?

Dr. Tribus mentioned the point which was not developed in detail—the fact that the amendments as proposed in the Senate, as proposed by the FTC, would not place an even burden on domestic manufacturers and on importers or exporters of fabrics to the United States. The fact is, as the amendments were proposed, there would be various ways to penalize and unfairly penalize domestic manufacturers, but no way to get at the foreign manufacturer. And we think that the amendments proposed by the Department of Commerce are an improvement on the original proposal.

Dr. Tribus also pointed out in his statement in the Senate that the effect on the FTC proposed amendments would be to shut down the textile industry almost immediately, because there is no way to comply with these standards which have not yet been developed, no way to carry out these test methods.

Dr. Tribus points out that the proper testing requires destruction of a fabric, so there is no way, really, to be sure that every yard is satisfactory.

I might say that he used an analogy in some conversation which I think it is reasonable to repeat. If a manufacturer of cartridges, rifle cartridges, were to be penalized for one misfire and subject to a criminal penalty for one misfire of a cartridge, that is directly an analogous situation to the one the textile industry faces. We are producing hundreds of thousands of yards, and if one yard fails to meet an arbitrary test—it may be relatively very safe, but it fails to meet the arbitrary tests—those manufacturers who are exercising good practice, who are testing in good faith, who are doing their best to produce a satisfactory product should not be subject, in our opinion, to this type of a criminal penalty. We think it would be most discouraging to those who are now leading the field, who are developing and marketing fire-resistant fabrics where none is required by law, to be facing this type of a penalty.

Mr. Chairman, the gentlemen with me are experts in their fields. They are manufacturers, representatives of—in the case of Mr. Porterfield, of the apparel industry, and together we will try to answer any questions that you and your committee may have.

Mr. Moss. Getting back to the matter of the FTC and the Department of Commerce, perhaps the problem would be best met by requiring the agency promulgating the standard to also prescribe the test procedure, because a standard without a test does not appear to be a reasonable standard. I would assume that they do their own testing to arrive at what would be a desirable standard, and, therefore, in the process of arriving at the standard, they have developed an appropriate test procedure?

Mr. BUCK. Mr. Chairman, I can react to that question on my own behalf, as a technologist for the Cotton Council, and these gentlemen may want to react for their own organizations.

I think it makes an awful lot of sense for the Department of Commerce, which has professionals in the Bureau of Standards to specify not only the test method but the amount of testing which is statistically adequate for that particular test method and for certain types of products and goods, because these two things are tied together.

The inherent variability of the test method is related to the number of times you need to use that test method to assure that you have reasonable performance levels, that you have achieved those reasonable performance levels.

So, I personally and we in the council would favor having the Department of Commerce not only develop the test method but also specify what is a reasonable application of that method to assure compliance.

Mr. MOSS. I think we will ask the other agencies in their appearance to comment on that also.

I gather, from your statement, that while you disagree with the Senate amendments on the penalties, you concur, at least, on the principle of increasing the amount of money available as provided in the Senate bill. Am I correct in that?

Mr. BUCK. Yes, Mr. Chairman. We, as I indicated, these various industries, have, themselves, invested very heavily in fire-resistance research. The problem is enormously complicated. I think that more is needed, more needs to be done, on almost every aspect, investigation of deaths and injuries, development of improved test methods, development of improved fire-resistant materials.

Mr. MOSS. Thank you.

Mr. Keith?

Mr. KEITH. Thank you, Mr. Chairman.

I would suggest that you amend your statement, on page 1, line 7—to insert after the word "opposes" the word "the" so that the record is clear that you do not have any objection to amendments that are accomplishing the purpose of your testimony.

Mr. BUCK. Thank you, Mr. Keith. That is a good point.

Mr. KEITH. It is just nit-picking, and I know we all have the sense of your testimony. It has been very helpful.

I unfortunately, have to leave shortly to go back to my constituency which I left this morning. But I think that you have a responsibility to the public and to your industry in particular to keep the feet of the Department of Commerce to the fire to make certain that all imported products really are—at least, equally observed and tested. It shouldn't be so easy for them to get into this country. I see it in so many industries. The fishing industry is one. Foreign imports do not get as close a surveillance as do the domestic products, in my view.

Mr. BUCK. Mr. Keith, I think your statement, in the first place, was perhaps correct. They may need to be tested more carefully, because we will not have the same surveillance over their manufacture that we have over the manufacture of goods in this country, and, therefore, since we do not know how they have been tested during the course of manufacturing, they ought to be tested very carefully when they come in.

Mr. KEITH. I am willing to accept your amendment to my amendment.

I do not have any further questions at this time, Mr. Chairman.

Mr. Moss. Mr. Blanton?

Mr. BLANTON. Thank you, Mr. Chairman.

And I want to say thank you to Mr. Buck and his people and the Cotton Council for appearing before our committee, and to say welcome to a fellow Tennessean.

I think your testimony has been adequate, and since Mr. Keith has opened up the door on foreign imports, I would like to get this 2 cents worth in for urging that we become aware of unfair treatment in products whenever we have a large industry that has people to represent it. But whenever we get to the farmer or the beef grower we do not even provide that the imported beef has to be labeled as to the country it comes from, and this is rather amazing to me that we have this disparity among our agencies of government.

But not only do we not have the inspection methods of food that goes into our family's mouth, but we do not even require that they label the beef as to the country it originates from.

But be that as it may, this is a different story.

I do not want to ask one question about the increased authorization that you support.

It is your understanding that the increased authorization is for promulgation of new methods of tests and for new methods of achieving the goal of inflammability of products and not that this increased authorization would be used to enforce the civil penalties as proposed by the Senate amendment. Is that correct?

Mr. BUCK. Mr. Blanton, as I understand it, the increased authorization as proposed by the Senate would go to three agencies—would go to Commerce, largely for the Bureau of Standards; would go to HEW for the studies and investigation; and some increased authorization would go to the FTC.

Now, we are not opposed to sound administration and adequate enforcement of any reasonable provisions of this act. We are not opposed to that, and we are not opposed to adequate funds for the FTC to carry out any reasonable provision. All we are opposed to are things that we simply can't live with, that are entirely unreasonable, unfair, and unjust.

I might say that this is going to be an enormously difficult problem to cope with by both Commerce and the Federal Trade Commission. Just consider, for example, the difference between a manufacturer or finisher who is turning out hundreds of millions of yards of print cloth, each yard identical, and so forth. He may turn out several hundred thousands, more than a million yards a day for a given manufacturer. Now, you develop one testing procedure for that, and it is reasonable. You test—I don't know—every 10,000, 100,000, or a million yards, whatever the Bureau of Standards would say is reasonable. But, then, consider the garment, the apparel manufacturer, and there are so many of these, over 25,000. Consider the one who is producing couture garments that may retail for $300 apiece. Under the regulations as proposed, presumably you would have to burn up several of these dresses, and that gets pretty expensive and complicated. So, we think that both Commerce and the FTC need to study this matter of

testing very carefully, and I am sure they are going to need funds to do that.

Mr. BLANTON. I have no further questions.

Mr. Moss. I have just one other.

Mr. Buck, you appear here today strictly as the spokesman for the cotton council?

Mr. BUCK. Yes, sir, Mr. Chairman, I represent the National Cotton Council here today. I know that there are some others who may wish to file statements later if the record might be held open for that.

Mr. Moss. They would have to address their requests to the committee, and at the time of receiving the request the committee would then pass upon it.

Mr. BUCK. I will ask Mr. Dunn if he has any comments.

Mr. Dunn is chairman of the Flammable Committee of the American Textile Manufacturers Institute.

STATEMENT OF GEORGE W. DUNN

Mr. DUNN. No; we endorse Mr. Buck's statement as far as the appropriations and also as to the objections to the criminal penalty for inadvertently having goods out that may not pass a standard.

We operate today under a penalty under the old 1954 act for willful violation. We have no objection to that.

I think if somebody willfully ships out a dangerous fabric, there should be a penalty and a severe one. But, as Mr. Buck and Dr. Tribus said, testing from laboratory to laboratory, from machine to machine, from yard to yard, there are variables. We recognize that; we recognize it when we write the specifications. This is why we have tolerances. We deal with human beings, and we deal with machinery. This is why we have defects in fabric.

I think Dr. Tribus is on the right track when he talks about setting up testing procedures based on statistics.

Frequency of testing is generally determined in quality control by how critical the property is that he is testing for, or the fabric that he is testing, and how much under control your process is.

If somebody had a process that he was absolutely sure was under control—nobody ever has—theoretically, we have to test only once, and that would be the end of it. But we do not know, in our business—or at least I have run into it in your company. We do not have processes that we are so sure of being under control that we can depend on one test. Therefore, we determine the frequency of the test by how critical the end-use is, the property is, and I think this is something that Dr. Tribus and his group at the Bureau of Standards is particularly well equipped to do. And I think that whatever standard they come up with and, of course, we keep talking about fire-retardant fabric. There are not many fire-retardant fabrics around. There are a couple, but, frankly, I do not see in the very near future very many of them. There are too many "ifs."

I think there is a lot of wishful and hopeful thinking. There are too many esthetics that change with fire retardants. For example, a little boy's slacks today, the mother loves that durable press and easy care. It took her away from the ironing board. I do not know whether or not that same property will remain with those slacks when a fire-retardant finish is developed. It is not here yet. Whether the Mrs.

Average Consumer will be satisfied to have that pair of slacks fire retarded but she has to wash it and iron it again, I do not know. I do not believe most women will. I think that is something in the future. I think this is research and development.

Our own people and our competitors are working feverishly and spending a great deal of time and money on these problems. We endorse the appropriation. I do not think you can spend too much money to make things safe for people. I think how it is spent is something else again. I think the money should be spent in determining what needs to be made safer.

My coat does not need to be made any safer than it is. Girls nightgowns probably should be made safer. So, I think it is a matter of appropriating enough money to spend it where it will do the most good, and I think Dr. Tribus and his group are approaching that problem very satisfactorily.

As far as the penalties are concerned, making a man a felon or a criminal because the frequency does not take into consideration that every yard will be absolutely right, because the only way to determine if it was right is to destroy it, and I think that is most unfair. And, generally, like prohibition, unfair laws teach people to break the law. People circumvent them.

A fair law to a reputable manufacturer, whether he is a textile or fabric producer as we are in Stevens, or an apparel manufacturer, a fair standard, fair laws are good for the reputable manufacturer. It makes your competitors do the same thing you are doing. We are in favor of the appropriations; we are not in favor of the penalties.

Mr. Moss. Thank you, sir, and at this time the committee will adjourn, subject to the call of the Chair, and I thank you gentlemen for——

Mr. Buck. Could I ask on one final point?

We are in a little bit of a peculiar situation. In regard to the position of the Federal Trade Commission, we do not know exactly what, if anything, they are going to ask of you. We would hope that the Commission would recede from its earlier amendments and accept those of the Department of Commerce or something along that line. But their statement is being filed after the fact of this hearing, and we wonder if there will be any opportunity for us to comment on what the Commission may say?

Mr. Moss. I would not think that there would be that opportunity other than in communications with the individual members of the committee. It is not because the Chair is unwilling to cooperate, but we are under a great deal of pressure all the time to try to expedite the business of the Congress.

There are a great many people who delight in pointing the finger at the Congress and saying: "You are going too slow; you are not doing anything." The fact is we are trying desperately to move the schedule of this House just as rapidly as possible, and we are constantly being confronted with requests for delay, and there is a point beyond which we cannot delay and complete our work. And, so, in that spirit, we would not find it feasible to permit that kind of comment.

Now, I have pending a request from the Federal Trade Commission for a rather prolonged delay in order to permit their appearance, the appearance of the new Chairman. I am going to resist that, because

of my conviction that it would take the committee into a period so late in the year that the probability of extending the act this year would be virtually ruled out. There should be a certain continuity within the Commission, and the ability to deal with these matters on a more expeditious basis than has been true in this instance.

So, we are going to try to move the legislation.

Mr. DUNN. One further question. Is there a date by which those industries, those members of the industries, those industry associations, have to get their written statements in?

Mr. Moss. I would strongly urge them to do it promptly. They were alerted to the fact of these hearings today, and they should be prepared to file their statements promptly in order to meet the schedule of the committee.

The House is still attempting to aim for a mid-October adjournment. After all, we adopted an amendment to the Constitution to outlaw the lame-duck sessions of the Congress, and I, for one, do not want to see us reconvene after an election in what would constitute a lame-duck session of the Congress, which, in my judgment, would contravene the express desire of the American people when they adopted the amendment outlawing such sessions.

Mr. DUNN. Would you consider 10 days as promptly, within 10 days?

Mr. Moss. I do not want to set a date. We will be reasonable and we want them to be reasonable. I would ask that they expedite their statements.

Mr. DUNN. Thank you, sir.

(The following statements and letter were received for the record:)

STATEMENT OF SIDNEY S. KORZENIK, COUNSEL, APPAREL INDUSTRIES INTER-ASSOCIATION COMMITTEE AND THE NATIONAL KNITTED OUTERWEAR ASSOCIATION, KNITTED FABRIC GROUP

This statement is submitted in behalf of the Apparel Industries Inter-Association Committee as well as the Knitted Fabric Group of the National Knitted Outerwear Association.

The Apparel Industries Inter-Association Committee is a council or representatives of 31 trade associations all reflecting the interests of different branches of the nation's diversified garment industry. Their names are annexed. The Committee takes action on matters of common interest to the constituent associations and their members.

The Knitted Fabric Group of the National Knitted Outerware Association which joins in support of the views expressed here consists of producers of knitted fabrics for sale in the piece for apparel, household and industrial uses.

The associations in the Apparel Committee have a membership of approximately 5,000 concerns. The Knitted Fabric Group has a membership of 130 companies which, it is estimated, produce over 75% of the knitted fabric produced in the country.

We have no special knowledge as to whether the sum to be appropriated to better enforcement of the Flammable Fabrics Act is proper. We have no comment in that respect. But when a bill appropriating special funds for the better enforcement of the Flammable Fabrics Act, like the measure presently before your Committee, came under study of the House Committee, it emerged with the addition of a number of substantive changes in the Act itself. Those proposals appear to have originated in certain recommendations made by Mr. Casper Weinberger while he was still Chairman of the Federal Trade Commission. That Senate measure as thus revised was so very different from the one on which the initial Senate hearings had been held that it was felt necesary to schedule new hearings to receive comment on the new bill.

Anticipating now that the study by your Committee may also involve consideration of the same substantive proposals, our statement is addressed to those

suggested amendments. It expresses the unanimous opposition of our associations to such amendments to the Flammable Fabrics Act as were recommended by Mr. Weinberger as were set forth in Senate's Bill (S. 3765).

We consider that the changes proposed in the existing law will introduce great confusion and difficulty without in any way promoting the stated objective of safeguarding the consumer.

We should like to make it clear at the outset that we are no less concerned than your honorable Committee in seeking the best possible enforcement of the Flammable Fabrics Act and the best possible solutions to problems remaining in this area. We are also as concerned as your Committee must be that our public responsibilities under the law be defined as clearly as possible so that we may properly discharge and be acquitted of those obligations. Therefore, precision and practicality are as much in the interests of the industry as of the public.

The fact that the development of new flammability standards has, despite the best efforts of the Department of Commerce, been less rapid than had been hoped is indicative of the great difficulties that are inherent in the subject matter under study. Even though a streamlining of the procedures followed by the Department of Commerce in the development of new flammability standards may be helpful, as has been suggested on the Senate side, any procedural recommendation ought nevertheless not obscure or distract from the principal barrier: the intrinsic complexity of the problem itself.

The perplexing character of the technical problems involved have been discussed by other witnesses who have appeared before your Committee. Our statement need not further emphasize them. It is principally concerned with other questions, questions touching upon the legal and logical considerations involved in the proposed amendments.

Chiefly we object to the proposal that criminal penalties of a severe nature be imposed for infringements of the law which are not willful, which do not occur deliberately or with knowledge but which may in fact be innocent and free of any failure of caution. This proposal seems more like an expression of impatience over the complexities inherent in the subject matter than it is a reasonable analytical effort to deal with them. The underlying premise appears to be that if we cannot more rapidly reduce flammable fabrics risks to the consumer, then we ought at least to increase the risk of jail sentences for several hundred thousand persons engaged in the manufacture and sale of textile products. If it is not possible to row the boat as rapidly as we might wish, then obviously the thing to do is to flog the oarsman.

But apart from this counsel of impatience, there is another point involved: In criminal law it is essential that a statutory crime be defined most precisely, that the criminal act be specified in the most exact terms. Here, scientists and laboratory technicians have been grappling with the intricate problems involved in the establishment of testing procedures and in developing standards. Solutions are still nebulous and undefined. Yet even in advance of their being promulgated and evaluated over a suitable period of time, provision would be made that anyone who unwittingly violates will be subject to criminal penalties.

Besides, the effect of other amendments proposed in S. 3765 would be to introduce confusion rather than clarity, dubiety instead of distinctness, and to render vague those matters which in practice up to now have at least generated a broad and common understanding in the trade. Setting new penalty provisions for unwitting violations in the context of a great many new legal doubts compounds the dangers and inequities of this penal provision.

Several examples will demonstrate the point.

Under a new paragraph to be added to the Flammable Fabrics Act a product covered by the law may not be shipped unless it has been "certified" to meet the requirements of applicable standards. Certification is a new concept. It has never previously been mentioned in the Act. Nowhere is it defined. The term "guaranty" is a term of art under the present statute, and the Commission is specifically authorized to prescribe its nature and has done so by regulation. But nothing of the sort exists for the new concept of certification. Whether it is the same as a guaranty or just how it is different are among the questions to which no anwers appear in the bill.

It is proposed that such certification be made only by the manufacturer. One who ships but is not the manufacturer may or may not have personal knowledge as to who manufactured it. For this he must rely upon information from others. Should that information be mistaken or otherwise false, and if the party whose

certification he relied upon was not truly the manufacturer of this particular product, the shipper is a criminal, however innocent his motives or careful and reasonable his practices. Why certification should be limited to manufacturers is certainly not clear. In the case of imports, manufacturers are abroad. Why not certification by importers? Why not by processors, dyers or finishers who may affect the flammability of fabrics they handle? Is the certification of the manufacturer of the fabrics still applicable after they have been subsequently dyed and finished or otheriwse treated?

Again, under the proposed and new Section 3(a), the products required to be certified "by the manufacturer thereof" would not be limited to fabrics. They would also include "any product made of fabric." Such product would also have to be "certified" by the manufacturer thereof. The certification of the fabric manufacturer would apparently no longer suffice. This injects a highly significant change in the statute. The implications could hardly have been fully seen or analyzed by the authors of this language. For it means that if, for example, a shirt or a dress manufacturer receives fabric properly certified, he may not ship the garment he makes, the "product made of fabric," unless he makes another test and undertakes his own additional certification. How the test on the fabric in the shirt or dress is to be different from the test made on that same fabric by the fabric manufacturer is not apparent, though this notion opens an area of testing hardly yet explored. From what has been said, it contemplates the possibility of a multiplicity of tests for different types of fabric products—as if a flammability test might ultimately be set up for a shirt as distinguished from the test for the fabric it is made of, and a test for every other type of garment as distinguished from the test for the material going into it. Whatever far-off visions of technological perfection and exactitude may have attended the writing of this concept into law, its effect would be to produce unnecessarily repetitive fabric-testing by every garment manufacturer of the fabric he uses, despite that he has guaranties and "certification" by the fabric manufacturer that it has already been tested under appropriate procedures and has been found satisfactory.

Perhaps those who contemplate the need for flammability testing at the garment stage were concerned over the possibility of further fabric processing by the garment manufacturer by way of permanent press or otherwise affecting the flammability characteristics of the product; or combinations of fabrics that might in some remote circumstances affect flammability. If so, the impact of this section might at most have been specifically limited to these instances. In any event we respectfully submit that to be concerned so far in advance of technical solutions with such possibilities and to contemplate involving all garment manufacturers in a multitude of new tests is to strain at gnats while swallowing camels.

It should be carefully understood that garment manufacturers—there are over 25,000 of them in the United States—are characteristically small enterprises. The average number of employees per establishment is under 60. Legislators should recognize that they do not have and are not likely to have laboratories or testing equipment. Ordinarily they do no testing. They rely on the guaranties of their suppliers that tests have been made on the fabric they receive and that the tests have shown the fabrics to qualify. If they make tests, they must do as most others do, namely, they must use independent testing laboratories and they rely upon the test results they receive. Whether there are enough such facilities to handle the immense increase in tests that this amendment would provide is a serious practical question. But without understanding its seriousness it need not detain us from considering other attendant difficulties no less severe.

If through errors made in good faith a garment manufacturer, or for that matter a fabric manufacturer, relies upon a laboratory report which later proves to be mistaken, the manufacturer may be a criminal under the new provisions of this proposed amendment even though he is wholly without fault The laboratory on the other hand which makes the error may continue testing with impunity. We are not suggesting that the same wild penal provisions be imposed upon testing laboratories. Should that be done, the effect may be so to discourage independent laboratory testing as to further curtail, instead of to enlarge, the testing facilities that we would all need

Suppose, on the other hand, that a manufacturer deliberately provides a false certification. If he certifies that the necessary tests have been made when in fact he has not done so, this would be no offense under the statute. For there is no provision against a false certification. (Possibly he would be amenable to

civil prosecution for breach of Section 5 of the Federal Trade Commission Act.) Section 8(b) of the Flammable Fabrics Act makes it unlawful to provide a false guaranty, but no parallel provision appears concerning certifications. If a product is shipped by a manufacturer who, without testing, certified it to have been properly tested and thereby knowingly circulated a falsehood, this practice would constitute no crime under the law, if his untested assumption that the product was not dangerously flammable later proves correct. But on the other hand a person who shipped goods on the error in good faith that they had been properly certified by another or that the tests had been properly conducted by an outside laboratory when that was not the case, may be involved unknowingly in a violation and may be subject to a year in jail for every garment shipped.

The bill would seek better enforcement by imposing extreme and inequitable burdens on domestic manufacturers and shippers—a kind of Operation Overkill. Yet it omits any special provisions to deal with the dangers of flammability in imports. And this omission is glaring. Although the problem of enforcing the law with respect to imports is a serious one, although the number of violations of the law in the case of imports has been very great, and although the proportion of our total textile and apparel supplies contributed by imports has been growing, this bill does virtually nothing to improve enforcement or surveillance in this large and expanding area. As indicated above, Section 3(a) under the bill would require certification by the manufacturer of the product. In the case of imports the manufacturer is, of course, abroad. But for anything that appears in this bill, the mere fact that he is in Japan, Hong Kong, or Italy does not disqualify him from providing the required certification. But the meaning of such a certification in terms of enforcement would, of course, amount to zero. Such certification could never be properly supervised, the manufacturer being legally and for all practical purposes beyond the reach of the FTC.

One would have thought that a revision of the Flammable Fabrics Act would include provisions for improved surveillance and enforcement in the case of imports. The fact that imports of textiles come into our market through a manageably small number of ports of entry should make it relatively easy and appropriate to give the Commission authority to demand tests whenever it has reason to believe that tests should be performed here before the goods are permitted to enter into the country and before they are scattered irretrievably throughout the channels of trade. The penalty of a mere 10% under a redelivery bond, and even then only in the case of a second offense, is light treatment indeed compared to the burdens imposed on domestic manufacturers in record-keeping, repetitive testing, etc.

The Federal Trade Commission was confronted with an analogous problem under the Wool Products Labeling Act. Numerous violations were found and attributable to those labeling goods abroad and to importers. With an appropriate degree of innovative boldness the FTC promulgated Rule 36, the purpose of which was to require testing before entry whenever the Commission thought it appropriate. But the courts, on application by the importers, struck down Rule 36 as an invalid exercise of power by the FTC in the absence of specific statutory authorization.

Present consideration of amendments to the Flammable Fabrics Act should provide the occasion for giving the Commission the kind of authority it sought to exercise under Rule 36 of the Flammable Fabrics Act. Provision should be made to arrest dangerously flammable textiles at the point of entry instead of relying upon suits under redelivery bonds when the goods can no longer be recovered and redelivered and when a suit against an importer on a redelivery bond does absolutely nothing to protect the consumer from goods already in circulation. The Commission should certainly be in a position to ascertain that identical methods and levels of testing are used on both domestic and imported goods.

The statute originally recognized the need to avoid a multiplicity of tests on the same fabric. The chain of guaranties from the source to the end distributing link was intended to provide adequate assurances for consumer safety without the need for repetitive testing. That concept is sound and should be retained. It exculpates from criminal liability any person who relies in good faith on a guaranty he received from his supplier. But the new provisions, coupled with statements made in the Committee Report, raise questions as to whether this

provision would any longer operate in this way or exactly what standards of good faith are now to be observed. To what degree must any receiver of fabrics not only test fabrics but test the validity of the guaranties he receives?

Can a receiver of goods also rely with the same effect on a certification? Must he receive a guaranty in addition to a certification? Nor are these the only puzzles involved in S. 3765. A particularly confusing element in newly-proposed Section 3(a) is that which prohibits "the manufacture for sale of any fabric . . . or any product made of fabric" not certified by the manufacturer thereof to meet the requirements of applicable standards based upon a reasonable testing program. Thus the manufacturer is required to certify certain goods which he may manufacture for sale but for which he does not yet have an identifiable customer. A certification presumably is a representation made by one person to another. Where there is not yet any customer, to whom does the manufacturer make the certification? To himself? And how, please, does he do that?

Further, how can he test goods for the purpose of providing a certification without first manufacturing them? And how does he manufacture them before testing without being involved in criminal penalties? The bill prohibits manufacture without certification, and certification requires testing, and testing requires that the goods first be brought into being through manufacture. This circle of absurdity is but another demonstration of the vagueness which this bill would inject in an area already troubled by technical testing difficulties and the determination of standards.

The proposal to require the manufacturer's certification appears to be mistakenly grounded in the premise that "pre-market testing" would provide a new and improved safeguard. The slogan, "pre-market testing," has a certain superficial appeal. But nothing more. It is certainly not new. The present law also contemplates pre-market testing and in its actual operation virtually all covered products are shipped under statutory guaranties and hence are tested before shipment.

Goods coming under the law should, of course, be tested before marketing. The problem, however, lies in this: Obviously every particular textile article cannot be tested before sale because, apart from other difficulties, to test it is to consume and destroy it. The only kind of pre-market test possible is the test of a representative sample. Apart from determining the test method and the standard to be met, there is the problem of determining that the sample tested is properly representative of the lot. Some variations will unavoidably occur in production, but these, if a margin for error be allowed in the test procedures on standards, should not be serious in terms of risk exposure. It is obviously wrong, however, to make it a legal requirement that the manufacturing of textiles achieve an impossible degree of perfection, and besides that all the legal doubts and ambiguities and possibilities of error despite the greatest degree of care be perfectly avoided under pain of criminal penalties.

Upon all these considerations it is urged that the new criminal provisions proposed for the Flammable Fabrics Act be deleted, and that the new concept of certification by manufacturers be deleted. The same benefits can be achieved by making statutory guaranties mandatory.

APPAREL INDUSTRIES INTER-ASSOCIATION COMMITTEE

The Apparel Industries Inter-Association Committee is made up of the following constituent trade associations:

Affiliated Dress Manufacturers, Inc.
Allied Underwear Association.
American Cloak and Suit Manufacturers Association.
American Millinery Manufacturers Association.
Associated Corset & Brassiere Manufacturers Association.
Associated Fur Manufacturers, Inc.
Clothing Manufacturers Association of the U.S.A.
Covered Button Association of New York City.
Greater Clothing Contractors Association.
Infants' & Children's Coat Association.
Infants' & Children's Novelties Association.
Lingerie Manufacturers Association of New York.
Manufacturers of Snowsuits, Novelty Wear and Infants' Coats.
New York Coat and Suit Association, Inc.
National Association of Blouse Manufacturers.
National Handbag Association.
National Board of the Coat and Suit Industry.
National Dress Manufacturers' Association.
National Hand Embroidery Association.
National Knitted Outerwear Association.
National Skirt & Sportswear Manufacturers Association.
National Women's Neckwear and Scarf Association.
National Millinery Planning Board.
Negligee Manufacturers Association, Inc.
New York Clothing Manufacturers Exchange.
Pleaters, Stitchers and Embroiderers Association.
Popular Price Dress Contractors Association, Inc.
Popular Price Dress Manufacturers Group.
Tubular Piping Association.
United Better Dress Manufacturers Association.
United Infants' and Children's Wear Association.

STATEMENT OF THE AMERICAN APPAREL MANUFACTURERS ASSOCIATION

The American Apparel Manufacturers Association (AAMA) is the principal trade association of the apparel manufacturing industry. The association supports H.R. 16824 with its increased authorization for administration of the Flammable Fabrics Act. The authorization provisions of S. 3765, the companion bill to H.R. 16824, is also supported by AAMA, however, the association is strenuously opposed to the FTC-proposed amendments to the Flammable Fabrics Act which have been incorporated into S. 3765. The Department of Commerce is also opposed to the FTC amendments (Statement of Dr. Myron Tribus, Assistant Secretary of Commerce for Science and Technology, before the Consumer Subcommittee of the Senate Commerce Committee on August 18, 1970), and has submitted proposed alternative amendments to the Flammable Fabrics Act. In view of the substantial effect that the amendments to the Flammable Fabrics Act could have on our industry, we wish to submit this statement on behalf of our association.

TESTING AND CERTIFICATION

Under the Flammable Fabrics Act as presently enacted, the apparel manufacturers receive a guaranty or certification from their fiber and fabric suppliers. This certification signifies that the fiber and/or fabric meets the flammability standard imposed by the Act. Relying upon this certification, the apparel manufacturer incorporates the fabric into a finished product for sale to the consumer. Since the product manufactured for sale consists of components which meet the flammability standard, the apparel manufacturer does not test each finished product for flammability.

With respect to the amendments presented by S. 3765 in its present form, Section 3(a) would require apparel manufacturers to certify that their products meet the applicable standards established by the Flammable Fabrics Act. Such certification would be based upon a reasonable testing program approved by the Federal Trade Commission. Such requirements would impose an added expense

upon the apparel manufacturer which he could not possibly absorb. These expenses would include:

1. Testing facilities—the apparel manufacturer would have to establish laboratory facilities and purchase equipment for flammability tests.
2. Personnel—the manufacturer would have to hire a technical staff to conduct the flammability tests.
3. The actual testing—the apparel manufacturer can only test his products by burning samples of the finished garment.

These increased manufacturing costs would have to be passed on to the consumer. It is difficult to estimate what the full effect of such increased expenses will be upon the ultimate price of each garment, but it is certainly conceivable that the consumer will be faced with substantially increased prices for the apparel which he buys.

In addition to creating a financial burden to be ultimately borne by the consumer, the testing and certification requirement will impose a disproportionate hardship on many small apparel manufacturers. There are approximately 25,000 apparel manufacturers in the U.S. and about half of them are small companies with less than 20 employees. The small businessman may not have the technical, managerial or financial resources to maintain such a testing program. Thus, if Section 3(a) is enacted, many small companies may be forced to leave the apparel manufacturing business.

While the Commerce Department's suggested amendment to Section 3(a) successfully brings the importer within the Act's testing requirement, it in no way alters the FTC amendment's imposition of testing upon the apparel manufacturer. Therefore, even though the Commerce Department's proposal is an improvement, AAMA cannot endorse it because the same reasons enumerated above with respect to S. 3765 apply to this version.

Under the present statute, the apparel manufacturer's reliance upon his component supplier's certification is based on the concept that if an item of apparel is made up of components which meet the flammability standard, then the finished product will also meet that standard. While it is true that a few apparel products might not meet the flammability standard even though all their components do, such situations are extremely rare and in no way justify the imposition of testing and certification upon the entire apparel industry.

Accordingly, AAMA recommends that the amendments to Section 3 of the Flammable Fabrics Act be rejected since the present system of textile fiber and fabric certification, coupled with the apparel manufacturers' reliance upon that certification, provides adequate protection to the consumer without unduly increasing the price charged for apparel products.

PENALTIES

As presently constituted, Section 7 of the Flammable Fabrics Act provides that a willful violation of Section 3 or 8(b) is a criminal misdemeanor punishable by a fine of not more than $5,000 or imprisonment up to one year or both. The amendments to Section 7 contained in S. 3765 seek to increase the criminal penalty for willful violations while at the same time creating a new criminal sanction against a violation, regardless of knowledge, plus establishing a civil penalty for all violations.

AAMA concurs that willful violators of the Act should be severely punished; however, the association believes that the penalty for willful violations provided for in the presently enacted statute is adequate. The association opposes the enactment of Section 7(a) because it is excessively harsh.

AAMA strenuously opposes proposed paragraph 7(b) because it objects to the criminality of unintentional violations of the Act. The apparel industry's present technological development has not yet reached the point at which it can avoid accidental violations of the Act. Therefore, Section 7(b) should not be added to the Act.

Proposed Section 7(c) creates the imposition of civil penalties upon each violation of not more than $10,000 per violation. If a violation under this proposed amendment consists of the sale of a single garment which fails to meet the flammability standard, then imposition of a fine in each such instance could be ruinous to any apparel manufacturer. Accordingly, AAMA opposes the civil penalty proposed by Section 7(c) because the maximum fine is excessive and if the term "each violation" is construed literally to mean a single garment failing to meet the standard, apparel manufacturers could be driven out of business.

The Section 7 amendments proposed by the Commerce Department leave subsection (a) of S. 3765 basically unaltered and therefore the penalty imposed is too

severe. Subsections (b) and (c) are identical to the provisions contained in S. 3765 except that the Commerce version frees manufacturers from liability if they test their products in accordance with Section 3(a) of the Act. Since the freedom from liability in subsections (b) and (c) is contingent upon testing, AAMA cannot support these provisions since the testing requirement imposes an unnecessary burden on the apparel manufacturer and would result in substantially increasing the cost of apparel to the consumer. Therefore, AAMA opposes the Department of Commerce's proposed amendments to Section 7.

SUMMARY

AAMA supports the appropriations provisions contained in H.R. 16824 and S. 3765.

The pretesting and certification requirement when applied to the apparel industry would result in an unnecessary burden upon the industry which would result in substantially increasing the cost of apparel to the consumer. Therefore, Section 3(a) of S. 3765 and Section 3(a) as proposed by the Department of Commerce should be deleted.

The penalty provision of the present Act is adequate and need not be amended. Accordingly, the association opposes both the Department of Commerce and FTC version of Section 7(a) because it is unduly severe. Section 7(b) of S. 3765 is technologically unrealistic and Section 7(c) of S. 3765 is potentially ruinous to industry members. Since Sections 7(b) and 7(c) of the Commerce Department version are exactly like those provisions of S. 3765 except for the exculpating clause which is contingent upon testing, these sections are unacceptable.

STATEMENT OF ALVIN L. KASSEL, COUNSEL, ON BEHALF OF THE FLAMMABLE TEXTILE PRODUCTS GROUP OF THE AMERICAN IMPORTERS ASSOCIATION, INC.

The American Importers Association, Inc. (Association) was organized in 1921 (originally under the name of the National Council of American Importers, Inc.) as a non-profit, non-partisan association to represent the United States import trade. The Association is the only national trade organization representing United States importers. Its members are required to be United States corporations, partnerships or citizens and therefore subject to the laws of the United States. The Flammable Textile Products Group of the Association is a special group concerned primarily with and vitally interested in the subject of flammability.

The Members of the Association import into the United States the widest range of products and bring to the industry of this country, as well as to its consumers, goods, wares and merchandise produced abroad. The value of these imports and the importance to the United States economy is immense and not possible to calculate in dollars and cents. The Members of the Association play a vital role in the development of the economy of many foreign nations of the Free World. Indeed the bedrock of many foreign economies is the trade conducted with Members of the Association.

Since 1921 the Association has been a major voice for the import trade, which is recognized as a most important segment of our economy. It is one of the major purposes of the Association to protect and foster the import trade and to keep its Members abreast of any changes or proposed changes in the law and equally important to make known to the public and the Congress the views of its Members.

The Flammable Textile Products Group of the Association submits this statement for the record as its position on H.R. 16824, to authorize appropriations to carry out the Flammable Fabrics Act, as amended. At the hearings before the House Subcommittee on Commerce and Finance of the Committee on Interstate and Foreign Commerce held on September 10, 1970 discussion was had regarding amendments to the Flammable Fabrics Act which were proposed by the Federal Trade Commission to the Senate Consumer Subcommittee of the Commerce Committee. The Senate Commerce Committee reported out its bill S. 3765 which included not only an appropriations feature, but also amendments to the Flammable Fabrics Act relating to a pre-marketing test procedure and increased penalties. This bill was recalled to the Senate Consumer Subcommittee which held hearings on August 18, 1970. Our Association submitted a statement to the Senate Consumer Subcommittee opposing the amendments to the Flammable Fabrics Act.

While technically H.R. 16824 which is before the Subcommittee at this time is limited to the appropriation feature, we feel that we must respond to the proposed amendments to the Flammable Fabrics Act which are included in S. 3765. At the hearing before the House Subcommittee on September 10, it was made clear by Chairman Moss that the Federal Trade Commission has requested a delay in order to permit the appearance of their new Chairman. We can only surmise that any testimony by the Federal Trade Commission or any statement submitted by that Commission would include proposals for the amendment to the Flammable Fabrics Act. In view of this, and not knowing what proposals may be made by the Federal Trade Commission to the House Subcommittee, we are basing our comments on the proposals for amendments to the Flammable Fabrics Act as contained in S. 3765. In the event the Federal Trade Commission submits proposals different from those contained in S. 3765 we earnestly request an opportunity to respond thereto.

We support whole-heartedly the appropriation proposed in H.R. 16824. We believe that the Department of Commerce and the National Bureau of Standards require additional funds for their work in research and development in the area of flammability. We oppose unequivocally amendments to the Flammable Fabrics Act as proposed in S. 3765. We do not believe that the state of the art in flame retardant fabrics and apparel has reached the point where these amendments are either reasonable or practical. As Congressman Blanton so aptly remarked during the hearings it does not appear to be fair in light of the inadequacies and the infancy of the Flammable Fabric test and the state of the art in flame retarding to have the proposed amendments become effective at this time.

As a general comment, we believe that these amendments to the Flammable Fabrics Act are not necessary or required to protect the public against unreasonable risk or injury to life and limb or damage to property as a consequence of burning articles of wearing apparel, fabric, related materials, etc.

S. 3765 seeks primarily to amend Section 3.(a) and 7. of the Flammable Fabrics Act. The purpose of the proposed amendment to Section 3.(a) of the Act is to include in this section a provision for pre-marketing test procedures. The proposed amendment to Section 7, of the Act seeks to increase and add to the penalities for violations, whether such violations were wilful or inadvertent. A minor amendment is suggested for Section 8.(a) of the Act to bring this latter section in line with the proposed amendment for penalties under Section 7.

At the hearing held on August 18, 1970, before the Consumer Subcommittee of the Senate Commerce Committee, chaired by Senator Moss, it was stated by the Chairman that the proposed amendments were requested by the Federal Trade Commission. In these comments we will analyze separately each of the two major areas of the proposed Bill; to wit, the pre-marketing test procedure and the criminal and civil penalties.

PROPOSED AMENDMENT TO SECTION 3.(a) OF THE FLAMMABLE FABRICS ACT

As presently written S. 3765 would require a manufacturer to certify that its product, fabric or related material meets the requirements of the applicable standards or other regulations issued or amended under the provisions of Section 4 of the Act, such certification to be based upon a reasonable testing program conducted by the manufacturer and approved by the Federal Trade Commission. At the hearings before the House Subcommittee on Commerce and Finance held on September 10, 1970, George S. Buck, Jr. appeared on behalf of the National Cotton Council, Mr. George Dunn appeared on behalf of the American Textile Manufacturers Institute, Mr. Kenneth Chase appeared on behalf of the Northern Textile Association and Mr. Curtis Porterfield appeared on behalf of the American Apparel Manufacturers Association. Mr. Buck submitted a written statement and he, Mr. Dunn, Mr. Chase and Mr. Porterfield orally testified. These gentlemen and the associations they represented opposed the proposed amendment to Section 3.(a) of the Act on three major grounds:

1. The present state of the art has not developed highly durable fire resistant treatments suitable for all fabrics and apparel. Some can not be used on the cotton and polyester blends whereas others can not be used with other synthetic fibers. Even durable finishes for particular fabrics at times are found to be non-durable when the items are washed in commercial laundries or home laundered with washing in areas which have hard water. Other durable finishes have recently been found to be non-permanent when the item is exposed to sunlight between launderings or pressed with a hot iron between launderings. Mr. Buck, more eloquently than we could argue, expounded at great length on the technical

objections to the problem with regard to the fire resistant treatments. Some of the present tratments which are durable result in substantial increases in costs which ultimately increase the price to the consumer. Consequently, to that extent they are seriously inflationary.

2. A reasonable pre-market test program would itself add substantially to the cost of the finished product and result in a substantial increase in the price to the consumer. Here again the measure would be inflationary. Under the present test procedures, the sample tested is destroyed in the test itself. A reasonable testing program would take substantial time, during which time large quantities of the items would be produced so that when first test is completed a tremendous quantity has already been processed. Despite the most reasonable quality control procedures, there are bound to be some rejects which might well mean that the total quantity produced at that time would be unsuitable for public consumption, although certainly the products would be less dangerous than those not treated with a fire resistant process.

3. Insofar as the flammability tests themselves are concerned, they are still under development and at this time are not precise. A manufacturer in good faith and following present test procedures might get one result, a second manufacturer might get a second result and the Federal Trade Commission, as the enforcement agency, might get a third result.

The Association opposes the proposed amendment of Section 3(a).—It supports wholeheartedly the statement and testimony given to the House Commerce and Finance Subcommittee by Mr. George S. Buck, Jr. and his associates above referred to. The Association's objections to this proposed amendment go beyond those raised by the witnesses at the Subcommitte hearing.

We wish to point out to the Committee that under the law as it now exists, there is presently an extensive program provided for pre-marketing test procedures. The Flammable Fabrics Act as it is presently written provides a guarantee which may be given by those engaged in the marketing of the products covered by the Act. In connection with these guarantees, the Federal Trade Commission has promulgated its Rule 7 under the Flammable Fabrics Act, which provides for reasonable and representative tests to be conducted to support the guarantee. It is essential to understand that the tests provided in Rule 7 to support the guarantee are made prior to as well as during the marketing program of the item covered by the Act. In today's market, as a practical matter manufacturers, importers and distributors of products covered by the Act are continuously required by their customers to furnish these guarantees. Therefore, at the present time and under the Act as it is presently written, the public is now adequately protected by the reasonable and representative tests required by the Federal Trade Commission Rules to support the guarantee.

In addition to the tests referred to above, the Federal Trade Commission presently has very substantial enforcement tools. Section 5(b) of the Flammable Fabrics Act, provides that the Commission has all of the powers and duties under the Federal Trade Commission Act to the same extent as if the Federal Trade Commission Act were set forth in full in the Act. Rule 5(d) of the Commission's Rules under the Act authorizes the Commission to inspect, examine and test any product and to cooperate on all matters related to the purposes of the Act with all other departments and agencies of the United States Government. Under Section 6 of the Act, the Commission has broad and sweeping injunction and condemnation powers. We submit that a reading of the present Act and the rules and the regulations of the Federal Trade Commission thereunder provide all of the necessary enforcement provisions which the Commission could reasonably expect.

We do not believe that the pre-marketing test procedures provided for in S. 3765 would result in substantially added protection to the public, commensurate with the inflationary effect of such program which would result in substantial price increases. The Department of Commerce testified before the Senate Consumer Subcommittee that there was in 1969 over sixteen billion linear yards of fabrics produced domestically and imported from abroad. This does not take into consideration the garments manufactured domestically from these fabrics nor the imported garments not considered in that number. The Commerce Department further testified that based on a high level of quality control there still would be 0.5% undetected rejects reaching the public. Therefore, despite any pre-marketing test procedure and assuming a high level of quality control, there still would be some non-conforming fabrics and/or garments reaching the public. If this result is weighed against the ultimate costs of testing under the pre-

marketing test procedures, we believe that it becomes self-evident that such pre-marketing procedures are not in the best interest of the public. Certainly no one can dispute the inflationary effect of such pre-marketing procedures and there is serious doubt as to their effectiveness.

During the hearings on September 10, 1970, before the House Subcommittee of Commerce and Finance, questions were raised with regard to imported products. It was apparent that the members of the Subcommittee were concerned that imported products might not be adequately policed to the detriment of the American consuming public. There was a question as to whether the Federal Trade Commission and/or the Bureau of Customs had, at the present time, sufficient powers for enforcement regarding foreign manufactured products. The truth of the matter is that the enforcement procedures and penalties in the Act as it presently exists, are more severe against imported products than against domestically manufactured ones. No product can enter commerce in the United States unless some corporation, partnership or individual subject to United States Law, including both the Flammable Fabrics Act and the Federal Trade Commission Act, enters such products through United States Customs. Any such importer when it thereafter sells or distributes the products into commerce in the United States is itself subject to all of the civil and criminal penalties of the present Act, including without limitation the injunction and condemnation procedures.

In addition to all of these proscriptions, the importer is subject to further penalties under Section 9 of the Act. Each importer must post a bond with the Treasury Department, Bureau of Customs, covering importations. In the event that a product is found to violate any law of the United States, the Bureau of Customs will demand the return of the non-conforming products to Customs' custody. Under the Tariff Act of 1930 and the Rules and Regulations prescribed by the Secretary of Treasury thereunder, severe penalties may be assessed against the importer for failure to return to Customs custody *all* of the non-conforming products. Consequently, imported products, and the importers thereof, are subject to additional penalties over and above those provided for domestically manufactured products and the American manufacturers.

SECTION 7 OF THE FLAMMABLE FABRICS ACT

The provisions of S. 3765, amending Section 7 of the Flammable Fabrics Act, are, in our opinion, unreasonable, unwarranted and unnecessary. The present Section 7 provides for criminal penalties of jail sentence and/or fines for willful violations of the Act. In addition, the Federal Trade Commission Act, which is incorporated by reference under Section 5 of the Act, provides additional penalties for violations. Therefore under the Act as it presently exists manufacturers, distributors and importers are all subject to very severe penalties. In addition, as explained above, importers are subjected to additional penalties under Section 9 of the Act.

During the hearings before the House Subcommittee on Commerce and Finance, Dr. Myron Tribus, Assistant Secretary of Commerce for Science and Technology, during his testimony, submitted for the record the statement and testimony given before the Senate Consumer Subcommittee. Dr. Tribus in his testimony before the Senate Consumer Subcommittee pointed out most clearly many reasons why the "no fault" criminal sanctions proposed in S. 3765 are unreasonable. This statement, as well as the oral testimony of Mr. Richard Simpson, Deputy Assistant to Dr. Tribus, given to the Senate Subcommittee, indicated that the entire purpose of the Act might well be subverted if the increased criminal sanctions are enacted.

He proposed that the criminal misdemeanor penalty presently in the Act be realistically modified so that the manufacturer is not forced to assume the burden of insuring absolute compliance of every piece of fabric, related material or product within a given flammability standard. He also pointed out that the penalty as proposed in Section 7(c) would apply equally to manufacturers acting in good faith and without knowledge as well as to those willfully violating the Act. Again he suggested that it would appear appropriate to make some suitable modification in Section 7(c). The statement read into the record concluded with the recommendation that unreasonable sanctions against a manufacturer who without knowledge violates the Act not be part of the amendment proposed.

Mr. Simpson in his oral testimony before the Senate Consumer Subcommittee, in support of his position that unreasonable sanctions might subvert the very purpose of the Act itself, referred to the situation which occurred in England

which resulted in a lowering of protection to the public. He also pointed out the possibility that a manufacturer, in attempting to guarantee that his products met the standards might add more fire retardant chemical to the point where it would add substantially to the price and produce a product objectionable from a wearing point of view.

Dr. Tribus, in answer to Congressman Blanton's question, stated that he did not feel it would be either fair or in the best interests of the flammability program to increase the penalties at this time. He explained that his Department has been working cooperatively with people in industry and he believes that they are working with good-will toward resolving the problem. He stated that at this moment to hold over the heads of the industry this extra kind of whip just wasn't needed. Congressman Blanton, agreeing with Dr. Tribus' testimony, stated that he felt it was premature at this time to initiate criminal penalties and aggravate the wonderful cooperation now enjoyed between industry and Government. Congressman Blanton further stated that it seemed to him the cease and desist powers were adequate until a proven test method had been established because, as he said, at the present time there were certain failings of the test methods now used and the entire subject of testing is still in its infancy. He felt that further research was required to provide a definite technological yardstick by which to measure industry before prosecuting criminal penalties. Dr. Tribus agreed with Congressman Blanton's statement.

Mr. Robert B. Ellert, Assistant General Counsel of the Department of Commerce also testified before the House Subcommittee on Commerce and Finance on September 10, 1970. He pointed out to the Subcommittee that despite the most careful quality control there would have to be errors of "perhaps 5%". He stated that there will be some items which will escape into the marketplace through no fault of the manufacturer. He felt rather strongly that if there is a statistical error the manufacturer shoud not be forced into the criminal penalty which the Senate bill would provide. He said that the same philosophy applied to the Civil penalty.

Mr. Buck in his testimony before the Senate Consumer Subcommittee, on August 18, 1970, and in his testimony before the House Subcommittee on Commerce and Finance on September 10, 1970, supported the testimony given by the Commerce Department in opposing the amendments to Section 7 of the Act as proposed in S. 3765. He made quite clear that the present technology of both fire retardant finishes as well as testing methods are not adequate at this time and that manufacturers would be placed in terrible jeopardy under criminal and civil sanctions which could be ruinous to their business. As stated above, Mr. Buck in his oral testimony pointed out that the present flammability tests are not precise and different results might be obtained from different testing laboratories. For this reason, as well, he felt it eminently unfair to impose the increased criminal penalties and the ruinous fines on those who are acting in good faith. He considered such amendment to be a deterrent to the progress of flammability protection that the Committee seeks as well as a deterrent to the type of industry cooperation the Committee expects. He concluded that, in his opinion, and in the opinion of the organization he was representing, the penalties presently in the Act were entirely adequate and reasonable.

We oppose unequivocally the proposed amendments to Section 7 of the Act.—We believe that the present penalties, not only those in Section 7 of the Act but also those under the Federal Trade Commission Act which is made a part of the Flammability Fabrics Act, together with the injunction and condemination procedures contained in the Act, are more than adequate for the enforcement of the Act by the Federal Trade Commission and for the protection of the public.

We further oppose the amendment to Section 7 on the ground that under this proposed amendment, the Federal Trade Commission becomes investigator, prosecutor and judge. We believe that the activities of the Federal Trade Commission should be strictly limited to the investigation under and enforcement of the Act. If the Federal Trade Commission determines a violation, we believe that it should, when proper, certify the same to the proper United States Attorney for either civil or criminal prosecution. We see no valid reason why the United States Attorney, through his own staff, should not be charged with the responsibility of such prosecutions. We believe that it would be a miscarriage of justice if the attorneys for the Commission themselves were enforcing the civil penalty proceedings in the United States Courts.

We also object strongly to Section 7 (c) (2) which provides that, in compromising a civil penalty, the Commission consider the size of the business of the

person charged with the violation. The mere fact that a violator happens to be a large corporation should not increase the size of the penalty. If a civil action is instituted against the violator by the United States Attorney, it should be this responsibility to determine any compromise of the civil penalty. Such determination should be based on the gravity of the violation rather than the business volume or net worth of the violator. It might well be, as was pointed out by Mr. Simpson of the Commerce Department to the Senate Consumer Subcommittee and by Mr. Ellert to the House Subcommittee, that despite all reasonable quality controls some products would reach the market which violate the Act. If such violations resulted and it represented only an insignificant quantity, there would appear to be no valid reason why a compromise of the civil penalty should in any way be based on the total volume or total net worth of the violator.

Under the Flammable Fabrics Act as it exists today, the testing of all wearing apparel for flammability is conducted in accordance with the test procedures prescribed in CS 191–53. This test procedure is not sufficiently scientifically accurate to produce uniform results. To the best of our knowledge, there are only two independent testing laboratories in the United States, i.e. Better Fabrics Testing Bureau in New York City and United States Testing Company in Hoboken, New Jersey. There have been instances where pieces of fabric have been cut into two identical samples and submitted to both of these independent testing laboratories. The results of the test have been dramatically different. The same legal test procedure was followed by both laboratories, but the test itself does not produce consistent results. It has also been experienced that finished garments, i.e. dresses, were divided into three separate samples, with one sample of each being given to the Federal Trade Commission, Better Fabrics Testing Bureau and United States Testing Company. Here again the results among the three laboratories differed.

Several years ago, Dr. Sandholzer and Mrs. Vaishnev of the National Bureau of Standards reviewed the test procedures under CS 191–53. At the conclusion of their research, they wrote a report setting forth various inadequacies of the present test system. In it they explained some of the reasons why results might differ among test laboratories, despite the fact that all laboratories were following the legal procedure set forth in CS 191–53.

In view of the present state of the test procedure, it appears to be totally unreasonable for severe penalties to be assessed or imposed upon industry for nonwilfull violations of the Act. If for no other reason but this, it would appear that the present penalties set forth in the Act, as well as those set forth in the Federal Trade Commission Act, are sufficient to penalize violators and reasonably protect the public.

In conclusion, we strongly urge that HR 16824 be limited entirely to the appropriation provision. We urge that the present Flammable Fabrics Act contains all necessary and reasonable provisions to protect the public against unreasonable risk. We urge that under the present state of the art and the present conditions existing in the market place it is not necessary or practical to provide for premarketing test procedures as proposed. We also urge that the present sanctions contained in Section 7 of the Act and those contained in the Federal Trade Commission Act are sufficient for the proper enforcement by the Federal Trade Commission and for the reasonable protection of the public.

Notwithstanding our objections to the pre-marketing test procedures as set forth above, as well as the objections included in both the written comments and the oral testimony of the industry groups appearing before the Senate Consumers Subcommittee on August 18, 1970, and before the House Subcommittee on Commerce and Finance on September 10, 1970, if the House Committee on Interstate and Foreign Commerce determines that it is necessary to have a pre-marketing test procedure, we respectfully submit that there must be certain safeguards written into the bill.

1. The procedure for testing must, under all circumstances, be that prescribed by the Secretary of Commerce under Section 4 of the Act.

2. The Department of Commerce, through the National Bureau of Standards, should be the agency charged with the responsibility for developing and promulgating a reasonable pre-marketing testing program on which the certification of the manufacturer or importer is to be based. The Federal Trade Commission does not have the expertise, nor the technical staff to develop such testing program. This point was forcefully presented by the industry witnesses at the August 18, 1970, hearings before the Senate Consumers Subcommittee. This was also pointed out forcefully at the hearings on September 10th before the House Subcommittee

on Commerce and Finance. As Chairman Moss stated at the hearings on September 10th:

"Getting back to the matter of the Federal Trade Commission and the Department of Commerce, perhaps the problem would be best met by requiring the agency promulgating the standard to also prescribe the best procedure, because a standard without a test does not appear to be a reasonable standard. I would assume that they do their own testing to arrive at what would be a desirable standard and, therefore, in the process of arriving at the standard, they have developed an appropriate test procedure."

Mr. Buck in responding to this remark, stated:

"I think it makes an awful lot of sense for the Department of Commerce which has professionals in the Bureau of Standards to specify not only the test method but the amount of testing which is statistically adequate for that particular test method and for certain types of products and goods, because these two things are tied together.

"The inherent variability of the test method is related to the number of times you need to use that test method to assure that you have reasonable performance levels, that you have achieved those performance levels.

"So, I personally, and we in the Council would favor having the Department of Commerce not only develop the test method, but also specify what is a reasonable application for that method to assure compliance."

The Department of Commerce witnesses pointed out to the Senate Consumer Subcommittee the problems of statistical sampling which would have to be considered as a basis for any testing program. They emphasized that scientific and technological knowledge was required to formulate such a reasonable testing program.

3. The pre-marketing testing program to be established by the Department of Commerce under its rules and regulations should afford an opportunity to industry and other interested parties to present their views. It was well established at the hearings before the Senate Consumer Subcommittee and the House Subcommittee on Commerce and Finance that any such program would have to take into account many considerations, not only sampling statistics and technology, but also the problems of possible inflationary results and the possible subverting of the very purposes of the Act. Industry would be in a position to lend substantial assistance, guidance and advice to the Department of Commerce in formulating such reasonable testing program.

4. Any reasonable testing program should not be discriminatory against imports. As was stated on page 6 of Senate Report No. 91–1039, dated July 29, 1970 accompanying S 3765, the amendment of Section 3(a) of the Act "should not be used to erect nontariff trade barriers". As presently proposed in Section 3(a) of S 3765 the reasonable testing program is to be approved by the Federal Trade Commission.

As stated above, this should be amended to provide that the reasonable testing program is to be promulgated by the Secretary of Commerce.

On page 6 of Senate Report 91–1039 referred to above, it is also stated that "it is expected that the Commission (FTC) would periodically monitor the approved testing program to insure its continuing effectiveness." This comment would appear to be the very nontariff trade barrier referred to on the same page of this report. Foreign manufacturers presently test their products in accordance with the prescribed testing procedures set forth in CS 191–53. This testing is done by the foreign manufacturer during or immediately following the manufacturing process and prior to exportation to the United States. An informal opinion has been previously rendered by the Federal Trade Commission to the effect that the reasonable and representative tests under Section 8 of the Act may be conducted pursuant to Rule 7 of the Commission's Rules under the Act, in a foreign country, provided the testing is done in accordance with the legally prescribed test procedure.

If the FTC were required to monitor the proposed reasonable pre-marketing testing program, it would automatically rule out and prevent foreign manufacturers from conducting such reasonable pre-marketing testing program under regulations prescribed by the Federal Trade Commission, which would include such monitoring, as the Commission would not monitor such test procedures outside of the United States. This is totally discriminatory against imports. Any pre-marketing testing procedure to be promulgated by the Secretary of Commerce must permit such testing procedure to be conducted at either the domestic or foreign place of manufacture provided the testing itself is conducted pursuant to the legally established test procedures.

If foreign testing was not provided for and were importers required to conduct a pre-marketing test procedure in the United States, there would be chaos in the marketplace. As above stated, there are only two recognized independent testing laboratories qualified to conduct flammability tests in the United States. If all importers were required to have their tests conducted by these two laboratories, there would be an incredible delay in testing preparatory to clearing the products through Customs and delivering the same to the United States customers. In addition, such a testing program would place an unreasonable economic burden on the imports. The importer would have substantial warehousing costs pending test results. The domestic manufacturers would be able to conduct their tests during and immediately following production. This, in itself, would assist in their quality control. If the foreign manufacturer was not permitted to conduct the same reasonable testing program during and immediately following production, but was forced to export the products to the United States at which time they would then be tested, the foreign manufacturer would be placed in a disadvantaged position in having completed production and exportation before such legal testing program was accomplished. It is self evident that such a system would be a nontariff trade barrier, would violate the concepts of free trade and would, in turn, dramatically and substantially increase the cost to the foreign manufacturer and importer which, in turn, would increase the cost to the consumer. We are sure that this Committee, being vitally concerned with the protection of the consumer, does not intend to create such an inflationary trend.

Under the procedure presently in use, the Bureau of Customs samples a large number of imports and submits such samples to the Federal Trade Commission for testing. This procedure itself now subjects imports to closer scrutiny and more frequent testing than domestically produced articles.

The Commerce Department, in its statement read into the record before the Senate Consumer Subcommittee on August 18, 1970, stated that there were in excess of 3½ billion linear yards of fabrics alone imported into the United States in 1969. This does not include garments and other made up goods. If the importer were required to test in the United States but one percent of the fabrics alone (not including the garments and made up goods) it would mean over 35 million linear yards would have to be tested. Even if the number of tests required of the importer were reduced to one-tenth of one percent, there would still be 3½ million yards to be tested. There can be no question but that any such provision would be discriminatory and a nontariff trade barrier.

5. Any pre-marketing test program should not become effective until one year from the date on which the rules and regulations governing such test procedures are finally promulgated. Industry must be given an opportunity to adjust its production, testing and marketing under such new regulations.

If the House Committee on Interstate and Foreign Commerce ultimately determines that the proposed bill must include a pre-marketing test procedure, *which we strongly oppose*, we recommend the following language for the amendment to Sec. 3(a) of the Act:

"Prohibited Transactions

"SEC. 3 (a). The manufacture for sale, the sale, or offering for sale, in commerce, or the importation into the United States, or the introduction, delivery for introduction, transportation or causing to be transported, in commerce, or the sale or delivery after a sale or shipment in commerce, of any product, fabric, or related material, or any product made of fabric or related material, as to any of which an applicable standard of flammability has been issued or amended under the provisions of Section 4 of the Act, which product, fabric, or related material has not been certified by the manufacturer or importer thereof to meet the requirements of the applicable standards or other regulations issued or amended under the provisions of Section 4 of this Act, shall be unlawful and shall be an unfair method of competition and unfair and deceptive act or practice in commerce under the Federal Trade Commission Act. Such certification shall be based upon a reasonable testing program to be promulgated by the Secretary of Commerce in the same manner as provided in Section 4 of this Act for the promulgation of standards, and shall be effective one year from the date such reasonable testing program is finally promulgated by the Secretary of Commerce. Any person who will be adversely affected by the promulgation of any such testing program shall have the same remedies as provided in Section 4 of this Act for persons adversely affected by the promulgation of any standard or

regulation. The reasonable testing program as promulgated by the Secretary of Commerce may be conducted by the manufacturer at the place of manufacture, whether in the United States or abroad, provided the tests are conducted in accordance with the test procedure legally established by the Secretary of Commerce and the testing program is conducted in accordance with the program promulgated by the Secretary of Commerce. Provided, that this subsection shall not apply to such product, fabric or related material, or any product made of fabric or related material, which has been exempted from this subsection by rule or regulation issued by the Commission pursuant to the provisions of Section 5 (c) of this Act."

While our Association is opposed to any pre-marketing test procedure as being unnecessary and an unreasonable burden on commerce, the above quoted proposed amendment would insure equal treatment of both domestic and foreign products.

The purpose of any pre-marketing testing program is to prevent the introduction into commerce of non-conforming articles. There is no possible way to absolutely insure that every item entering the marketplace does not violate the Act. This was statistically proven by the testimony of the Department of Commerce. Therefore, we urge that no pre-marketing test procedure be included in this Bill.

Should any non-conforming articles, whether of domestic or foreign manufacture, be entered into commerce, the Federal Trade Commission would still have complete enforcement procedures at its command; that is, injunction and condemnation as well as criminal and civil penalties for violation. The Commission already has, under the present Act, sufficient tools to protect the public interest.

CARPET AND RUG INSTITUTE,
Dalton, Ga., September 18, 1970.

Congressman HARLEY O. STAGGERS,
Chairman, Committee on Interstate and Foreign Commerce, House of Representatives, Washington, D.C.

DEAR CONGRESSMAN STAGGERS: The Carpet and Rug Institute, Dalton, Georgia, whose members manufacture 95 per cent of the carpets and rugs produced in the United States, is pleased to have this opportunity to comment on the proposed amendments to the Flammable Fabrics Act contained in H.R. 16824, and the proposed substantive changes to that Act represented by S. 3765 as reported by the Senate Committee on Commerce and contained in Senate Report No. 91–1039.

The Carpet and Rug Institute supports H.R. 16824, as introduced on April 7, 1970, which would authorize appropriations not to exceed $6 million for fiscal years 1971 and 1972 to carry out the purposes of the Flammable Fabrics Act. However, S. 3765, as reported by the Senate Committee on Commerce, represents a totally unwarranted extension of the requirements of the Act and the penalty provisions thereof. We oppose that bill for the following reasons:

PROPOSED AMENDMENTS TO SECTION 3 OF THE FLAMMABLE FABRICS ACT (15 U.S.C. 1192) CONTAINED IN S. 3765 AS REPORTED

The proposed amendments to section 3 reflected in S. 3765 as reported are said to be based upon the testimony of then FTC Chairman Casper Weinberger, presented before the Consumer Subcommittee of the Senate Commerce Committee on June 10, 1970.

Subsequent to that testimony, the Committee published proposed legislation in the form of a revised S. 3765, which represented a significant departure from the Weinberger proposals. That bill would require *certification* of pre-testing prior to the sale or distribution of products subject to the Act, which certification would be in accordance with a "reasonable testing program," approved by the Federal Trade Commission.

The Flammable Fabrics Act, as amended, currently contemplates that the Federal Trade Commission will develop "reasonable and representative tests," the terms used to describe the frequency with which the product in question must be subjected to the test required by each of the standards promulgated under the Act.

While pre-testing for compliance is not currently *required* by the Act, the issuance of guaranties under section 8(a) is predicated upon pre-testing in accordance with * * * reasonable and representative tests made in accordance

with standards issued or amended under the provisions of section 4 of this Act. * * *

Issuance of a guaranty without pre-testing for compliance is a violation of section 8(b) of the Act.

Such tests have been developed with respect to the standards for general wearing apparel and are found in the Federal Trade Commission's Rules 7–11. Similarly, pre-test frequencies for carpets and rugs are currently being developed, to be applied once DOC FF 1–70 becomes effective on April 16, 1971. These two flammability standards are the only standards promulgated under the Act to date.

As a practical matter, manufacturers of products subject to the Act will pre-test because distributors and retailers insist upon guaranties for protection against prosecution in the event of the sale of non-complying products, and because of their own self-interest in insuring against violation of the Act. Any increase in the civil or criminal sanctions under the Act, whether or not to the extent sought by S. 3765, would produce an even increased demand for the issuance of guaranties under section 8(a).

There is no conceivable reason why the "reasonable testing program" referenced in section 2 of S. 3765 (amending section 3(a) of the Flammable Fabrics Act) should not be in all respects identical to the "reasonable and representative tests" contemplated by section 8(a) of the Act.

Therefore, if pre-testing is to be made mandatory with respect to certain products subject to the Act, the proper course would appear to be coordination of these concepts, avoiding certain confusion in its implementation.

The Carpet and Rug Institute supports the concept of pre-testing to assure protection of the consuming public. It further agrees that pre-testing must, to be practical, be based upon "reasonable and representative tests" such as those contemplated by section 8(a) and the presumably identical concept of a "'reasonable testing program" described in section 2 of S. 3765. Representative rather than 100 per cent production tests are essential under all existing flammability standards because each calls for destructive tests.

However, effective pre-testing does not depend upon mandatory pre-certification. Nor does effective protection of the American public in any way depend upon mandatory certification.

In fact, FTC Chairman Weinberger's testimony before the Consumer Subcommittee of the Senate Commerce Committee addressed itself to pret-esting, not the pre-certification concept contained in S. 3765, as reported. That he did not contemplate mandatory pre-certification as the means of assuring compliance with pre-testing requirements is undisputable:

We recommend that Section 3 of the Act ("Prohibited Transactions") be amended to provide that, unless exempted by rule of the Commission, it shall be unlawful to manufacture for sale, offer for sale, import or distribute any products, fabric or related material *which has not been successfully tested to determine its flammability* pursuant to the applicable flammability standards issued under Section 4 of the Act.

* * * * * * *

Under Section 5(c) the Commission would have the authority to issue rules *exempting certain fabrics, for example those which we know do not represent a serious threat, from the pre-testing requirements.* Conversely, the Commission *could require certification prior to sale or distribution that certain fabrics, which in the Commission's experience demonstrate a propensity for flammability,* have been tested and meet the standards of the Act. (Emphasis added.)

Confirming this testimony, he sent draft legislation to that subcommittee, which would have amended section 3 of the Flammable Fabrics Act, as amended (67 Stat. 111, 15 U.S.C. 1192), to read as follows:

The manufacture for sale, the sale, or offering for sale, in commerce, or the importation into the United States, or the introduction, delivery for introduction, transportation or causing to be transported, in commerce, or the sale or delivery after a sale or shipment in commerce, of any product, fabric, or related material, or any product made of fabric or related material, as to any of which an applicable standard of flammability has been issued or amended under the provisions of section 4 of this Act, *which product, fabric, or related material has not been tested prior thereto and determined to be non-flammable in accordance with the applicable flammability standards issued or amended* under the provisions of section 4 of this Act, shall be unlawful and shall be an unfair method of competition and an unfair and deceptive act or practice in commerce under the

Federal Trade Commission Act: *Provided*, That this section shall not apply to such product, fabric, or related material or any product made of fabric or related material, which has been exempted from this subsection by rule or regulation issued by the Commission pursuant to the provisions of section 5(c) of this Act. (Emphasis added.)

It is clear from the record that certification was contemplated in the exceptional case only, or where the product has a demonstrated "propensity for flammability."

Notwithstanding this state of the record, and for reasons unknown to us, the substantive amendment proposed by the Senate Commerce Committee places principal emphasis upon pre-certification. The changes in language are so noticeable that it is by no means clear that the "exception" provision in S. 3765 would be subsequently interpreted consistent with the "propensity for flammability" concept enunciated by Mr. Weinberger, the supposed source of the proposal. In fact, the rejection by that Committee of language clearly contemplated by the witness is likely to be interpreted to mean mandatory pre-certification was intended to be the rule, rather than the exception.

Our concern is with a statute which would impose burdensome compliance requirements without any corresponding benefit to the consumer. In the case of carpets and rugs, the overwhelming majority of such products will not, in the words of Chairman Weinberger, represent "a serious threat." Or conversely, they will not exhibit a "propensity for flammability." Consequently, we would anticipate that, under the concepts enunciated at the original hearing, substantial portions of our industry's products would be clearly eligible for exemption—not from certification alone but from pre-testing as well.

However, under the bill as reported, it is not clear that any exemption from *pre-testing* is possible. Furthermore, the marked variation between the language of S. 3765 and the testimony strongly implies rejection of extensive exemption from what would now be a certification requirement.

So interpreted, the amendments would be costly to fabric manufacturers, create an unmanageable paper burden at the Federal Trade Commission and as such, interfere with effective enforcement of the Act. At the same time, no offsetting public benefit would appear to result from such requirements.

There is an additional aspect of the current regulatory scheme which deserves your Committee's consideration in light of recommendations contained in S. 3765 that a "reasonable testing program" be developed by the Federal Trade Commission for the purpose of implementing the pre-test (and certification) requirements. Responsibility for determining whether flammability standards "may be needed to protect the public against unreasonable risk of the occurrence of fire leading to death or personal injury" and the promulgation of such standards is imposed by virtue of the Flammable Fabrics Act upon the Secretary of Commerce. In so doing, the Congress recognized the technical competence and resources of that Department in the area of standards development.

Enforcement of these standards, once developed, is, and properly so, vested in the Federal Trade Commission.

However, a critical interim step, authority for establishing the "reasonable and representative test" requirements referred to in section 8(a), is also vested in the Commission. Thus, the existing statutory framework overlooks the fact that the technical competence of the Department of Commerce in standards development generally, and the experience gained as a result of its promulgation of the particular standard under section 4 of the Act, is an essential ingredient in determining the frequency with which products should be subjected to the standard to assure a reasonable, yet technically sound, testing program.

The Flammable Fabrics Act, as it now exists, should be amended to require participation of the Department of Commerce in the development of the "reasonable and representative tests" contemplated by section 8(a). Similarly, any extension of pre-testing requirements, such as that contemplated in S. 3765, should specifically provide, at a minimum, for consultation between these two agencies.

Because the language of section 2 of S. 3765, as reported, is deficient in the above respects, the Carpet and Rug Institute urges its rejection, unless substantial modifications consistent with these views are adopted in the Senate prior to it passage and referral to your Committee.

PROPOSED AMENDMENTS TO SECTION 7 OF THE FLAMMABLE FABRICS ACT (15 U.S.C. 1196) RELATING TO SANCTIONS

The Flammable Fabrics Act, as amended, currently provides that "willful" violations of the provisions respecting the manufacture and sale of non-complying materials or products or the issuance of false guaranties, shall constitute a misdemeanor, subjecting the offender to a fine of not more than $5,000 or imprisonment for not more than one year.

Section 3 of S. 3765, as reported, provides for significant revisions to the existing Act, each of which will hereafter be specifically discussed. In summary, these revisions are the addition of substantial civil penalties; fines and imprisonment for no-fault violations; elevation of the existing "willful" violation provision from the level of misdemeanor to felony; and reduction of the level of culpability required for conviction of such an offense from "willfulness" to "knowledge." These proposed statutory revisions, based upon recommendations made by FTC Chairman Weinberger, who held that position for little more than six months and who has since left the Commission, are absolutely without foundation.

S. 3765 would elevate penalties for what are now considered willful violations from $5,000 per violation to $10,000, increase the maximum period of imprisonment, and make such a violation a felony. Such action cannot be justified by past enforcement experience, comparison with other statutes enforced by the Commission, or analyses of the statute offered as the basis for revision of the Flammable Fabrics Act.

The proposed revision of the Flammable Fabrics Act with respect to fines and imprisonment represents a marked departure from the other Acts administered by the Commission. For example, *willful* violation of the Textile Fiber Products Identification Act (15 U.S.C.A. 70(i)), the Wool Products Labeling Act (15 U.S.C.A. 68(h)), the Fur Products Labeling Act (15 U.S.C.A. 69(i)), and the present Flammable Fabrics Act (15 U.S.C.A. 1196) is, in each instance, a misdemeanor. Similarly, violation of the Federal Cigarette Labeling and Advertising Act, as amended by the Public Health Cigarette Smoking Act of 1969 (15 U.S.C.A. 1331), is a misdemeanor.

This dramatic increase in sanction is sought without the slightest semblance of factual support in the record. In fact, your Committee has received testimony from the Department of Commerce that the proposals to increase sanctions are "premature."

Additionally, and perhaps even more significant than the level of penalty, is the cavalier way in which the scope of criminal provision has been expanded—virtually without comment.

In advocating enhancement of the Commission's enforcement tools, then FTC Chairman Weinberger testified before the Consumer Subcommittee of the Senate Commerce Committee, as follows: If any person commits a *willful* and knowing violation of the Act, that person should be subject to a felony conviction.

The emphasis upon "willful" is a part of the original text. Reference to "knowing" appears to have been a casual addition, without any appreciation of the significant differences between the two concepts, or of the fact that the latter expression does not appear in the existing statute.

The Commission's legislative proposal, subsequently transmitted to that Subcommittee, confirms the fact that no such expansion of scope was intended. It read in applicable part:

"Any person who willfully violates section 3 or 8(b) of this Act shall be guilty of a [misdemeaner] *felony*, and upon conviction thereof shall be fined not more than [$5,000] *$10,000* or be imprisoned not more than [one] *three* years in the discretion of the court: *Provided*, That nothing herein shall limit other provisions of this Act."

It is noted that the expression "knowing" is omitted. Yet, Senate Report No. 91–1039, at page 6, states:

"In addition, the Chairman requested that the penalty provisions of the Flammable Fabrics Act be improved by providing strong criminal penalties for any violation *with knowledge*. * * *" (Emphasis added.)

Correspondingly, S. 3765, as reported, provides for an amended act which would read:

"Whoever performs any act in violation of section 3 or section 8(b) *with knowledge* that such act is in violation of that section shall be guilty of a felony and upon conviction shall be fined not more than $10,000, imprisoned for not more than three years, or both, in addition to any other penalties, civil or criminal, imposed for such violation." (Emphasis added.)

While the distinction between the level of culpability associated with the terms "willful" and "knowing" is by no means uniformly applied by the courts, the impropriety of substitution of such terms *sub silentio*, which was the case here, is evidenced by the following passage from *United States* v. *Murdock*, 290 U.S. 389 (1933), in which the Supreme Court said:

"The word ["willfully"] often denotes an act which is intentional, or knowing, or voluntary, as distinguished from accidental. But, when used in a criminal statute, it generally means an act done with a bad purpose * * *; without justifiable excuse * * *; stubbornly, obstinately, perversely. * * *

By contrast, the Working Papers of the National Commission on Reform of Federal Criminal Laws suggests that the category of mental state described as "knowingly" is "a high, but not the highest degree of culpability. * * *" (Vol. 1, p. 124.)

We submit that it serves no useful purpose to inject an additional element of confusion in the enforcement of the Flammable Fabrics Act by an unexplained alteration in the apparent level of culpability which would serve as the basis for a felony conviction under that Act.

Turning now to the matter of civil penalties and fines, then Chairman Weinberger urged, and the Senate Commerce Committee approved, amendments which would make "*any violation of the Act*" a misdemeanor. His basic premise was that such a concept is embodied in the Food, Drug, and Cosmetic Act (21 U.S.C. 333), and that both statutes relate to "public health and safety." By analogy, the Chairman advocated two levels of criminal culpability, one for no-fault violations and the other in the event of "willfulness."

However, the Chairman failed to note that the Food, Drug, and Cosmetic Act does not apply increased penalties, even for "willful" violations, unless "the violation is committed after a voncition of such person . . . has become final" (21 U.S.C.A. 333) or "in the case of a violation . . . with intent to defraud or mislead . . . ." (21 U.S.C.A. 333(b)). Equally, if not more significant, is the fact that section 333(c) of that Act *provides for exemption from all penalty for receipt or delivery "made in good faith . . ."!*

Clearly, if manufacturers of carpets and other products subject to the Flammable Fabrics Act, as amended, are to be criminally and civilly liable for unknowing violations of the Act, there should be a provision for exemption from such penalities, fines, and imprisonment in cases involving "good faith" compliance with the reasonable testing programs prescribed by regulations promulgated pursuant to the Act.

It must be kept in mind that the Flammable Fabrics Act is violated upon the manufacture for sale, the sale, or the offering for sale of a fabric, material, or product "which fails to conform to an applicable standard" issued under the Act. Because testing for compliance with the flammability standards developed to date requires destruction of the product, such testing must be done on a representative sample basis. In the case of a product, such as carpeting, the manufacture of which results in variations in the final product, be they minor ones, pre-testing in accordance with "reasonable and representative tests" carries with it the mathematical certainty that some non-conforming product will reach the market. Hence, some violations of the Act will occur although the manufacturer fully complies with technically and mathematically sound pre-testing requirements established by the Federal Trade Commission.

Such violations should not subject the so-called offender to either the civil or criminal penalties under the Flammable Fabrics Act. Good faith compliance with "reasonable testing programs" established under the Act should be the basis for an exemption from both civil penalties and the criminal misdemeanor offense. To impose civil and criminal penalties in such instances serves no purpose for which the statute was designed.

The penalty provisions of the Act in it present form are subject to the further objection—which objection will be compounded by the proposed revisions—in that the expression "violation" is so ambiguous as to invite complete arbitrariness in the Act's enforcement.

Carpet manufacturers market a product which is subdivided into an indeterminant number of segments as a consequence of normal distribution. Even with pre-testing conducted with officially prescribed frequencies, a non-complying product reaching the market would most likely be in multiple pieces. The number of "violations" found in a given case could, but should not, depend upon the fortuitous subdivision of a product once it leaves the place of manufacture. Consequently, civil penalties, or fines, or imprisonment for violation of the Act should be tied to good faith compliance with the reasonable and representative

testing program prescribed. Similarly, the concept of "violation" should be tied to compliance with requirements for pre-testing, not the number of eventual or potential purchasers of a non-complying product.

The Carpet and Rug Institute further objects to the inclusion within the penalty framework of this statute, of provisions for extreme civil penalties *and* fines for the identical acts. The record is devoice of a demonstrated need for such multiple sanctions to insure adequate protection of the public.

The absence of a satisfactory delineation of the concept of "violation" under the Act, combined with the possibility of multiple sanctions, can only lead to arbitrariness in enforcement.

CONCLUSION

For the above-described reasons, we submit that S. 3756, as reported by the Senate Committee on Commerce, should be rejected by your Committee. In doing so, we do not imply that the matter of mandatory pre-testing and expansion of the enforcement mechanisms should be a closed issue.

The Flammable Fabrics Act is currently applicable to articles of wearing apparel and interior furnishings. Flammability standards have been promulgated with respect to general wearing apparel and large carpets and rugs. The latter standard does not become effective until April of 1971. The eventual scope of the statute and of the standards actually developed thereunder is yet uncertain.

Needless to say, experience will undoubtedly reveal that the degree of public risk associated with a violation of each such standard will vary widely. To determining upon the basis of this limited experience that adequate enforcement requires more stringent penalties is to make needlessly complicated an already complex problem. Accordingly, we feel that substantive revision of the enforcement provisions of the Flammable Fabrics Act is premature and urge the adoption of H.R. 16824 as originally introduced.

Respectfully submitted.

J. WALLACE ADAIR.

(The following bill, S. 3765, was subsequently referred to the committee and if further hearings had been held this bill would have been included. A report on S. 3765 from the Department of Commerce is also attached:)

[S. 3765, 91st Cong., second sess., referred to the Committee on Interstate and Foreign Commerce September 24, 1970]

AN ACT To amend the Flammable Fabrics Act to increase the protection afforded consumers against injurious flammable fabrics

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Flammable Fabrics Act Amendments of 1970".

SEC. 2. Section 3 of the Flammable Fabrics Act (15 U.S.C. 1192) is amended by redesignating subsections (a) and (b) as subsections (b) and (c), respectively, and inserting the following new subsection (a) immediately after "SEC. 3.":

"(a) (1) The manufacture for sale, the sale, or offering for sale, in commerce, or the importation into the United States, or the introduction, delivery for introduction, transportation or causing to be transported, in commerce, or the sale or delivery after a sale or shipment in commerce, of any product, fabric, or related material, or any product made of fabric or related material, as to any of which an applicable standard of flammability has been issued or a mended under the provisions of section 4 of this Act, which product, fabric, or related material has not been certified by the manufacturer or importer thereof to meet the requirements of the applicable standards or other regulations issued or amended under the provisions of section 4 of this Act, shall be unlawful and shall be an unfair method of competition and an unfair and deceptive act or practice in commerce under the Federal Trade Commission Act. Such certification shall be based upon a reasonable testing program conducted by the manufacturer or importer which has been approved by the Secretary of Commerce in accordance with procedures established in section 4 of this Act.

"(2) This subsection and the penalties provided in section 7 of this Act, insofar as they would prohibit sale of a product without certification based

upon an approved testing program, shall not take effect as to any product for which an application for approval of a testing program has been timely filed with the Secretary of Commerce until thirty days after such application has been finally acted upon by the Secretary of Commerce, or in the case of a rule prescribing a testing program under section 4(g)(6) of this Act, until thirty days after such rules have become effective.

"(3) In approving or prescribing a testing program under section 4(g) of the Act, the Secretary of Commerce may for a good cause shown allow an applicant or person required to perform such prescribed testing an additional period of not more than six months within which to implement the approved or prescribed testing program. During such period applicability of the certification requirement of this section and the penalty provisions of section 7 of this Act as they relate to the requirement of certification shall be stayed.

"(4) Neither this subsection nor the penalties provided in section 7, insofar as they relate to the requirement of certification shall apply to any product, fabric, or related material, or any product made of fabric or related material which has been exempted from this subsection by rule or regulation issued by the Commission pursuant to the provisions of section 5(c) of this Act."

SEC. 3. Section 4 of the Flammable Fabrics Act is amended by inserting the following subsection (g):

"(g)(1) The Secretary of Commerce may approve any testing program upon application by any manufacturer or importer pursuant to the certification requirements of section 3(a) of this Act (i) if such application is submitted in a proper form under regulations established by the Secretary of Commerce and published in the Federal Register, and (ii) if the testing program is reasonably designed to prevent or minimize the manufacture and introduction in commerce of any product, fabric, or related material, or any product made of fabric or related material, which is not in compliance with an applicable standard of flammability established pursuant to this section.

"(2) Unless the Secretary of Commerce has determined to proceed under paragraph (6) of this subsection, then upon promulgation of any new or amended standard of flammability under the provisions of this section, the Secretary of Commerce shall give notice that any person required to make a certification under section 3(a) of this Act and desiring approval of a testing program must submit an application for approval for such testing program within six months after the date of promulgation of such standard or amendment.

"(3) All applications for approval of testing programs must be approved or denied within a reasonable time. The Secretary of Commerce may consolidate similar applications for joint consideration and joint approval or denial.

"(4) A denial of an application for approval of a testing program shall set forth with particularity the reasons for denial.

"(5) Any person who will be adversely affected by such approval or denial may seek judicial review in accordance with procedures set forth in subsection (e) of this section.

"(6) In lieu of approving or denying applications for approval of testing programs, the Secretary of Commerce may promulgate rules prescribing the testing program to be used in the manufacture of any product, fabric, or related material for which a standard of flammability has been promulgated. Rules prescribing a testing program for fabrics, products, or related materials for which a standard of flammability has been promulgated prior to the effective date of this subsection shall become effective within one year from the effective date of this subsection, or six months after the date of promulgation of such rules, whichever is later. Otherwise, rules prescribing a testing program shall become effective on the effective date of any standard of flammability promulgated, or six months after the date of promulgation of such rules, whichever is later."

SEC. 4. Section 7 of the Flammable Fabrics Act is amended to read as follows:

"PENALTIES

"SEC. 7. (a) Whoever performs any act in violation of section 3 or section 8(b) of this Act with knowledge that such act is in violation of such sections shall be guilty of a felony and upon conviction shall be fined not more than $10,000, imprisoned for not more than three years, or both, in addition to any other penalties, civil or criminal, imposed for such violation.

"(b) Whoever performs any act in violation of section 3 or section 8(b) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $1,000, imprisoned for not more than one year, or both, in addition to any

other penalties, civil or criminal, imposed for such violation. However, no person shall be held in violation of this subsection if such person establishes that he exercised due care in the application of an approved testing program required under section 3(a) of this Act and that such application disclosed that the product, fabric, or related material was in conformity with applicable standards of flammability established pursuant to section 4 of this Act.

"(c)(1) Whoever performs any act in violation of section 3 or section 8(b) of this Act, in addition to any other penalties imposed for such violation, shall be subject to a civil penalty imposed by the Commission of not to exceed $10,000 for each such violation. However, no person shall be held in violation of this subsection if such person establishes that he exercised due care in the application of an approved testing program required under section 3(a) of this Act and that such application disclosed that the product, fabric, or related material was in conformity with applicable standards of flammability established pursuant to section 4 of this Act.

"(2) Upon failure of the offending party to pay the civil penalty, the Commission may request the Attorney General to commence an action in a court of the United States for such relief as may be appropriate.

"(3) Prior to referral to the Attorney General for appropriate action, the Commission may compromise such civil penalty.

"(d) No person shall be subject to prosecution or penalty under this section for a violation of section 3 of this Act if such person establishes that he (1) has received in good faith a fabric, related material, or product certified as required by section 3(a) of this Act signed by and containing the name and address of the person by whom the product, fabric, or related material was certified, and (2) has not, by further processing, affected the flammability of the fabric, related material, or product covered by the certification which he received.

"(e) Notwithstanding the provisions of subsection (d) of this section and section 8 of this Act, an importer who chooses to rely on the certification of a foreign manufacturer under section 3(a) of this Act shall be responsible as a manufacturer under this section for any violation of section 3 of this Act."

SEC. 5. (a) Section 8(a) of the Flammable Fabrics Act is amended by adding the word "prosecution" in the first sentence the words "or penalty".

(b) Section 8(b) of the Flammable Fabrics Act is amended by adding after the word "guaranty", wherever it appears, the phrase "or certification required under Section 3(a) of this Act".

SEC. 6. Section 13 of the Flammable Fabrics Act is amended to read as follows:

"AUTHORIZATION OF APPROPRIATIONS

"SEC. 13. There is authorized to be appropriated a sum not to exceed $9,000,000 for the period beginning July 1, 1970, and ending June 30, 1972, to carry out the provisions of this Act."

SEC. 7. Sections 2, 4, and 5 of this Act shall become effective one year after the date of enactment. All other provisions of this Act shall be effective upon enactment.

Passed the Senate September 23, 1970.

Attest:

FRANCIS R. VALEO, *Secretary.*

DEPARTMENT OF COMMERCE,
OFFICE OF THE GENERAL COUNSEL,
Washington, D.C., December 31, 1970.

Hon. HARLEY O. STAGGERS,
Chairman, Committee on Interstate and Foreign Commerce,
House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request for the views of this Department concerning S. 3765, an act to amend the Flammable Fabrics Act to increase the protection afforded consumers against injurious flammable fabrics. This bill would require persons selling goods covered by the Act to certify that the goods meet applicable standards established pursuant to the Act and further would require that such certification be based upon a reasonable testing program. Criminal and civil penalties are provided for failure to comply with the testing and certification requirements. This Department supports the general purpose of the bill.

While the bill provides additional criminal and civil penalties, we note that a person who exercises due care in following an approved testing program is permitted to establish that fact as a defense against a charge that he has violated the provisions of the Act. Until such time as a reliable nondestructive test method can be devised, testing must be accomplished by destructive methods based on a statistical sampling of production runs of fabric or fabric products and the application of statistical quality control principles. This means that some slight number of items that do not meet the requirements of the test method may reach the public. In view of the current state of the art in fabric flammability retardation, we believe that "no fault" criminal and civil penalties are clearly inappropriate. We, therefore, support the provisions of the bill which require "due care in the application of an approved testing program."

S. 3765 also provides a solution to the problem of imported foreign fabrics or fabric products. The bill permits the importer either to test such items himself, thereby ensuring compliance with the Act or, if he is convinced that the foreign manufacturer has adequately tested the goods, to rely on this testing. If he chooses the latter course, he is responsible should there be some violation. Thus, the importer may avoid the expense and time of needless retesting. At the same time, the bill would assure that the person responsible for compliance with the Act is amenable to the jurisdiction of the FTC and that the Act is not enforced in a manner which would place domestic manufacturers at a disadvantage.

Responsibility for approval of testing programs under the bill is vested in the Department of Commerce. We recommend the bill be amended to vest this responsibility in the Federal Trade Commission which has enforcement responsibilities under the Flammable Fabrics Act.

With this change, we support the version of S. 3765 passed by the Senate.

We have been advised by the Office of Management and Budget that there would be no objection to the submission of our report to the Congress from the standpoint of the Administration's program.

Sincerely,

JAMES T. LYNN, *General Counsel.*

(Whereupon, at 12:40 p.m., the subcommittee adjourned, subject to the call of the Chair.)

(Further hearings were tentatively set for later in the session but because of other legislative demands time did not permit.)

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