News Bulletin

FLAMMABILITY NEWS BULLETIN
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In This Issue

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Editorial

Federal Motor Vehicle Safety Standard No. 302

Flammability of Interior Materials

BY: Joseph F. Zemaitis
U.S. Department of Transportation

The flammability performance of interior materials in motor vehicles has been the subject of considerable study, testing and review, leading ultimately to a Federal standard effective on September 1, 1972. As its immediative objective, this standard limits the burn rate of specified interior components and materials in motor vehicles to a maximum of 4 inches per minute in a horizontal test.

Historically, the action to consider issuance of a Federal motor vehicle safety standard on Flammability was first announced on October 11, 1967, with the issuance of an advance notice of proposed rulemaking indicating the Administrator's consideration for requiring the use of fire retardant materials, etc. Docket 3-3 was created to receive comments and to eventually become the public repository of a considerable amount of literature on flammability issues. On May 1, 1968, a discussion paper was presented, at a public meeting attended by the industry, proposing a horizontal test method and a 4 inches per minute burn rate. Following the completion of R&D study involving a review of automotive fires, potential test methods, and tests on a broad spectrum of automotive materials in use, a notice of proposed rulemaking was issued on December 19, 1969. After comments by the industry to this notice, the rule was issued on December 29, 1970, to be effective on September 1, 1972.

In the course of these actions, a number of petitions were received concerned primarily with the level of flammability performance, with requests for changes ranging from considerable relaxation to consideration tightening of flammability performance.

The establishment of the rule and the disposal of recent petition does not close the action on flammability issues. The National Safety Administration is always interested in receiving any new data and modifying any rule as may be appropriate based upon new data.

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Priorities For Fabric Flammability Investigations

To set priorities for allocating our resources to research and investigations of fabric flammability, accident data were analyzed. These activities are pursued as part of our responsibility of providing the technical base for standardization activities of the Department of Commerce, under the Flammable Fabrics Act.

Information of frequency, severity and the chain of causal events leading to accidents were reviewed in depth. Sources of information were: (a) Detailed analysis of over 1,000 cases received from the Department of Health, Education and Welfare (HEW) and processed into computerized form, and (b) Deatiled analysis of data available from other sources, principally National Fire Protection Association, National Center for Health Statistics, and state and local fire organizations.

HAZARDOUS CATEGORIES OF FABRIC PRODUCTS.

Study of the two grossly different sets of information led to identification of the same basic list of fabric products most frequently involved in accidents: Bedding; Upholstered Furniture; Outerwear - Shirts/Blouses, Dresses Pants/Slacks, Sleepwear

In addition, we are continuing to study the question of need for standards on draperies and curtains, because of their reputed importance in fires in general, and because of their known contributions to major fires, such as that of Coconut Grove.

From this list we have selected upholstered furniture and dresses for girls age 0-10 for further immediate investigations. This selection is based on our judgment of the frequency and severity of these accidents, our preliminary estimate of the technology available to meet a reasonable and appropriate standard, as well as consideration for the efficiency of using available resources to provide the public with the most protection most quickly.

Standards for these products, along with those already set or in preparation for carpets, rugs, mattresses, blankets, children's sleepwear and general apparel leaves for further consideration: blouses/ shirts, pants/slacks, sleepwear.

A finding that there may be need for revision of the apparel standard (CS 191-53) was published in the Federal Register in late 1968. Our test development and analysis of accident data have progressed to the stage that could soon allow proposal of an improved test for general apparel.

Furthermore, a program was initiated at NBS last year to provide the technical basis for flammability tests for floor covering materials to be used in medical facilities, nursing homes, hotels, apartments and the like. In such facilities, a higher level of protection than that afforded by Commerce Department Standard FF 1-70 (the "Pill Test") may be desirable. This program was initiated to investigate the spread of fires through corridors which are considered the most important safe exitways from such facilities. The program includes full-scale fire experiments in a corridor test structure as well as supporting laboratory investigations. The experiments are designed to characterize the environment to which floor coverings are subjected during a building fire, with the ultimate objective of developing laboratory test methods which accurately simulate this environment. While this research effort is underway, and until the technical data necessary for designing new tests and assessing present tests for corridor conditions are available, we suggest that increased attention be given to other means of fire defense where large areas of building design seems to be appropriate.

This recommendation leads into a description of other priorities in our program, which are not directly aimed at mandatory standards on fabric flammability and which reflect a broad view of the flammable fabrics problem under the NBS Fire Program.

IGNITION SOURCES

It is instructive, in seeking solutions to the fabric fire problem, to study the ignition source involved. Our analysis of accident reports sent to us from HEW provides significant information on the involvement of ignition sources with apparel and interior furnishings.

In clothing fires, the most frequent ignition sources are kitchen ranges and materials associated with smoking (primarily matches and lighters). Considering only sources which ignite clothing directly, without involvement of flammable liquids or other intermediary material, ranges are more frequently involved than matches or lighters. In 9 out of 10 cases involving ranges, ignition occurred through direct contact between the fabric product and the range. It is interesting that gas ranges account for 2 out of 3 cases involving ranges.

Cigarettes and other smoking materials, which constitute a very small proportion of garment cases, loom very large for furnishings and bedding; they represent about 60% of these cases.

With the cooperation of ANSI, the American National Standards Institute, groups are forming to study the engineering and safety design of these common ignition sources. Representatives of the various trade organizations concerned such as the Gas Appliance Manufacturers Association, and the American Home Appliance Manufacturers Association, have recently held meetings on the use of voluntary standards as a vehicle for increasing the safety of these products. For example, Underwriters' Laboratories and the American Gas Assocation, presently have voluntary standards for electrical and for gas ranges, respectively. The prospects are good that the probability of ignition by kitchen ranges can be decreased thru modifications of their standards.

FLAMMABLE LIQUIDS

Further examination of the accident data shows that flammable liquids or other intermediary materials are involved in nearly half of all cases in which garments were the first fabric product to ignite. Only about 15% of furnishings cases, and 5% of bedding cases involve intermediary materials including flammable liquids.

In about two cases out of three in which flammable liquids played a role, the ignition source was, in order: an open fire, match, or lighter, gasoline engine or hot water heater.

Joseph E. Clark
and Henry Tobey
National Bureau of Standards
Department of Commerce
Washington, D. C.

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RECENT TECHNICAL REVIEW

164th ACS National Meeting, Division of Cellulose, Wood and Fiber Chemistry, September 1, 1972.

Dr. C. E. Morris reported on cotton fabrics treated with phosphoric triamide, N,N-dimethylphosphoric triamide, N,N,N,N-tetramethylphosphoric triamide, or chloromethylphosphonic diamide (CMPD). The less highly substituted amides reacted with the cellulose more readily, but the fabrics treated with them lost N more rapidly on laundering. At add-on levels of 16-20%, the durability to laundering of all of these flame retardants was relatively low, but scouring with 1% acetic acid after laundering restored much of the lost flame resistance. Hypochlorite bleach during laundering accelerated loss of flame retardancy in some cases, but did not yellow the fabrics. All the phosphoramides imparted excellent wrinkle resistance, and CMPD-treated fabric had moderate wrinkle resistance. Retention of fabric strength and abrasion resistance was best for treatment with CMPD; of the phosphoramides, the more highly substituted amides tended to produce smaller losses of strength and abrasion resistance.

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Effect of Model Flame Retardants on the Flammability of Polyester and Nylon

Dr. R. M. Barker reported on a series of related phosphorus-containing organic compounds for flame retardance in polyester fabrics. The effect of the chemical nature of the phosphorus-containing function was investigated thermochemically. Combustion studies using oxygen and nitrous oxide atmospheres have been employed to determine the mode of action of the treatments. These

data can be interpreted in terms of a general mechanism of flame retardant action in polyester systems.

A parallel study has been carried out in which the effect of selected flame retardants on nylon 6 has been evaluated. These results are interpretable in terms of a mechanism of flame retardant action.

* * *

Effect of Phosphorus and Bromine on Burning Rates for Cotton and a Polyester/Cotton Blend.

Dr. J. R. Johnson of Burlington Industries reported on the rate-of-burning measurements conducted on a Flammability Analyzer for 100% cotton and for 50/50 polyester/cotton. Untreated samples were compared to samples impregnated with a phosphorus and/or a bromine flame retardant agent at low to moderate levels of treatment. Flammability measurements were carried out in the horizontal and the top-vertical burning modes for different levels of oxygen environment. The effects on burning rate of changes in the combustible system were discussed.

* * *

Characterization of the Flammability Hazard of Apparel Fabrics

Dr. C. Hugget of the National Bureau of Standards discussed currently used test methods for the characterization of the flammability of fabrics, they measure single properties such as ease of ignition or rate of burning under artificial laboratory experiments suggest that none of these methods, used alone, provide a satisfactory measure of hazard potential. As a result, the public does not receive optimum protection and the fabric manufacturer may be unfairly penalized. Accident data were reviewed with respect to the properties of the fabrics involved, new methods of characterizing flammability hazards were discussed, and a new approach to the establishment of a flammability hazard index for apparel fabrics was suggested.

Fabric Ignition

Dr. A. Alkidas of the Georgia Institute of Technology discussed the hazard potential of a fabric to produce burn injury stressing its probability of ignition under given exposure. This probability is related deterministically to the fabric's ignition time. The ignition time of selected pure and blended fabrics was measured under precisely controlled, radiative heating conditions and the thermophysical properties, which characterize the fabric heating process, were measured as functions of temperature. Data on enthalpy, thermal conductance, auto and pilot ignition temperatures, and optical properties were also presented. An ignition analysis was developed based on complete and partial modeling which indicated the relative significance of pyrolysis on the ignition process and which identified the relative groups required to predict fabric ignition. Error estimates appropriate for partial modeling were presented and modeling experiments were proposed to predict ignition time.

The research was supported by the National Service Foundation Grant No. GK-27189 under the RANN Program (Research Applied to National Needs), in association with the Government-Industry Research Committee on Fabric Flammability.

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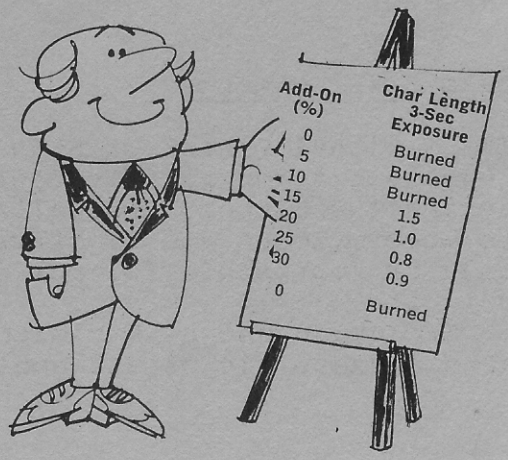

FEDERAL, CITY AND STATE NEWS

Los Angeles Consolidates Dispatching

The Los Angeles County Fire Department has one of the most complex communications problems of any fire agency.

With more than 4400 square miles to cover, the department is constantly seeking to improve communications and dispatching over an area with more than a dozen telephone exchanges, three telephone companies and area codes, and several mountain ranges.

The first step in consolidating five dispatch centers into two has been completed by the department. The Solidad dispatching center in the Saugus area of Northeast county was closed and all operations were moved to the Antelope Center in the Palmdale-Landaster area of the Antelope Valley.

Installation of selective-call radio receivers at 22 stations and fire department installations in the northeastern county area permitted the switchover from direct telephone dispatching.

Two men are now assigned to Antelope on 24-hour shifts with the head fire dispatcher on a 40-hour week, except during periods of high fire danger.

* * *

NBS Seeks Safer Matches

The National Bureau of Standards has contracted with Trident Engineering Associates, Annapolis, Md., to make matches and lighters difficult or impossible for children to ignite.

An NBS study shows that matches or lighters cause 24% of all accidental fabric fires, which cover garments, bedding, and other furnishings. Matches caused fabric fires five times more often than did lighters. Case studies of match ignition revealed that 44% of the victims were under 10 years of age. The remaining age groups, and mishaps tended to become more frequent as age increases above 36 years. Nearly all child victims were playing with the ignition sources, while adults tended to be using them properly.

* * *

Life Safety Systems To Be Put Into New Federal High Risers

Life safety will be an integral part of the design of future high rise buildings constructed for the US Government. This comes as a result of General Services Administration leadership in seeking solutions to the life hazards caused by fire in modern skyscrapers.

Environmental control systems, automatic sprinkler systems and a control center for taking over operation of the environmental control system during a fire or other emergency will be incorporated into all new high rise federal buildings.

The first building to be affected by this concern for life safety is the 36-story federal office building under construction in Seattle. This $43.5 million project has been redesigned to conform to the new GSA building requirements. In announcing the design changes, Commissioner Arthur F. Sampson of the Public Buildings Service, the building construction section of the GSA, explained that safety features have been incorporated without increasing the cost. This was done, he reported, by making trade-offs of some standard design features and building materials requirements to offset the cost of the life-safety features.

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FLAMMABILITY TESTS

Terminology in Small Scale Fire Tests

Committee E 505 met in Los Angeles, California on June 29, 1972. The Task Group was asked to review the proposals by the Flammability Task Group of ASTM D11.33 for revision of ASTM Plastics. This method classifies materials as "self-extinguishing by this test" if limited burning is observed. It is proposed by the Flammability Task Group os ASTM D11.33 to revise classifications to "flame propagating," and "auto-terminus." ASTM D1692 is under the jurisdiction of Committee D20 on plastics.

D20 has jurisdiction also of two other flammability test methods which, in common with D1962, are small scale tests using a bunsen burner as the ignition source. These are D568, Flammability of Flexible Plastics; and D635-68, Flammability of Self Supporting Plastics. D568 and D635 classify materials as "non-burning" by this test, "self-extinguishing by this test," and "burning by this test."

E5 members have expressed opinions that subjective terms such as these can be confusing because they are not definitive. For example, the term "self-extinguishing" may not indicate indentical behavior of a material in each of the three methods cited. Of further concern to E5 is the possible use of the terminology cited above in concepts of fire hazard classifications for building uses; even though D1692 disclaims its use as a method of fire hazard classification, and both D568 and D635 make reference to other test methods for flammability, including ASTM E84.

This Task Group recommends that the use of subjective terminology for classifying materials in small scale fire tests be discouraged, and that test results be stated in numerical values. It is further recommended that small scale fire test methods should not include classification systems. A classification system may properly be used in a material specifications but when adopted as part of a test method tends to encourage commercial misuse of the terminology.

Reference is made to ASTM designation D1361 a small scale flammability test method in which results are calculated and reported in finite values, including a burn index. Methods D757, D1433 and E2863 all report results in finite values rather than subjective terms.

With specific reference to the changes proposed by ASTM D11.33, we recommend adoption of flame propagation rate as the sole value to be reported, regardless of whether the flame front reaches the gauge mark or goes out at some lesser distance. Where it is desirable to distinguish between specimens on which the flame front reaches the gauge mark mark, from those on which it does not, a numerical "factor of inhibition" might be considered, proportionate to the unburned portion of the specimen.

In reporting numerical values for burning behavior in small scale flammability tests it is suggested that the ASTM designation become an integral part of the value reported, in a form of a subscript. For example; "Flame propagation rate: x mm/sec ASTM D1692

Although this subscript designation may appear to be redundant, it is believed its adiption would emphasize the source of the method used in data tabulations used for comparing results from different small scale flammability tests methods.

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BURN INJURIES IN THE STATE OF MICHIGAN 1970

A survey prepared by Klaus Hergt, M.D., with the assistance of Mount Carmel Mercy Hospital and Medical Center, Detroit, Michigan

FINAL REPORT AS OF FEBRUARY 1, 1972

AREA	#ADMISSIONS EXPECTED(1)	#ADMISSIONS EVALUATED	%EXP.ADM. EVALUATED	#BURN IN-JURIES	IN % OF ADM.EVAL.	#DEATHS FR.BURNS	AS % OF # BURNS
State of Michigan	1,346,358	1,237,356	92%	3,716	0.3%	138	3.7%
Wayne County (Detroit only)	468,347 (313,474)	443,451 (303,072)	95% (97%)	1,202 (884)	0.3% (0.3%)	61 (52)	5.1% (5.9%)
Tri-County (Wayne,Oakland, Macomb)	630,254	596,558	95%	1,599	0.3%	65	4.1%
*7 S.E.Counties (Wyn.,Macomb,Okld. Washt.,Monroe,St. Clair,Livingston)	717,962	680,378	95%	1,910	0.3%	100*	5.2%*
Rest of State (U.P.)	628,396 (58,800)	556,978 (53,057)	88% (90%)	1,806 (194)		38** (3**)	

Explanations:

The survey included all short-stay general hospitals in the state: approximately 700 beds representing about 20,000 admissions were excluded from the survey because of insufficient record keeping or closure of the institution. This represents about 2% of all expected admissions.

(1) The survey was based on the "Listing of Health Care Institutions," JAHA, 45/106-114/1971, Part II.

* The "7 S.E.Counties" include the University of Michigan, with approximately 22,000 admissions, receiving referrals from the entire state.

*** For the reason outlined under * these numbers are too high in relation to the "7 S.E. Counties" and are too low for "Rest of the State and U.P." as patients from these areas are frequently transferred to the U. of M. Burn Unit, Ann Arbor (Washtenaw County), when their injuries are more severe.

FLAME RETARDANT PATENTS

Ethylene Oxide - Phosphoric Acid Polyesters

When 2-bromoethanol is treated with P_2O_5, ethylene oxide and small amounts of Na_2HPO_4, flame retardant polymers having P_2O_5 content 21%, Br 21.5% and OH no. 188-212 were obtained. Ger. 2,036,587.

* * *

Flame Retardant Finish For Nylon Textiles

When a 5 oz. nylon tarpaulin fabric was padded to a wet pick up of 31% with a soln. contg. CH_2O, thiourea and NH_4Cl, dried at 225°F and cured at 350°F a non-burning material resulted. U. S. 3,639,232.

* * *

Flame Retardant Polypropylene

The incorporation of 4-10% chlorinated polyisobutylene and 0-5% Sb_2O_3 into stereoregular polypropylene produced compositions with an OI of 24. The product was non-burning (ASTM D-635). U. S. 3,640,946.

Polyols Containing Phosphorus and Halogens

Fire retardant polymers were prepared by the reaction of tris (2-chloroethyl) phosphate, polyphosphoric acid, P_2O_5 and ethylene oxide. The mixture was stabilized with Na_2HPO_4. The resulting polymer having 1.44 g/cm^3 density, 23.7% Cl content, P_2O_5 content 29.5% and OH no. 114 was flame retardant. Ger. 2,036,595.

* * *

Flame Retardant Fibers

When fabrics such as cotton, rayon, nylon or polyester were coated with amino acids or natural proteins and then fixed with CH_2O salts, heated for 5 minutes at 130°C, they were rendered self-extinguishing. Japan 71 (19,757).

* * *

Flame Retardants From Aq. Solutions of Metal Borates and Polyvinyl Alcohol

The simultaneous application of converging streams of 0.5 - 6% poly (vinyl alcohol) and 0.5 - 6% alkali metal borate suppresses forest fires. This application showed little vegetation damage. Ger. 2,136,671.

* * *

Self-Extinguishing Plastic Materials

Polyurethane foams and epoxy resin moldings were rendered self-extinguishing by the addition of 60 parts of melamine to the crude polymer mixture. Molded samples extinguished within one second. (ASTM 635-63). Ger. 2,043,917.

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Non-Flammable Rubber Compositions

Natural rubber compositions, useful for coatings on conveyor belts and hoses were prepared from natural rubber or SBR, carbon black, SiO_2 a chlorinated plasticizer and a flame-inhibiting mixture consisting of $Ca_3(BO_3)_2$, $Zn_3(BO_3)_2$ and FeO_3. Ger. 2,120,490.

* * *

Flame Retardant Polyolefins Split Fibers

Polyolefin split tapes were treated with a solution of tris (2-bromo-3-chloropropyl) phosphate and passed through heated round dies to form fused skin layers; fibers so obtained had good flame retardancy retention and elasticity as well. Japan 71 18,319.

* * *

Flame Retardant Polyester Fibers

When drawn polyester fibers were heat-treated at 155°C in Me_2SO and treated with a 10% solution of tris (2,3-dibromopropyl) phosphate in Me_2SO, followed by steam and scouring the fibers were self-extinguishing within one second. The untreated fibers burned completely at a rate of >3 sec/cm. Japan 71 19,759.

* * *

Flame Retardant Linear Polyesters

Poly (ethylene terephthalate) was mixed at 280° with 4% reaction product of PCl_3 and ethylene glycol (containing 25.7% P); the total mixture was spun into a fabric, rated self-extinguishing even after 10 washes. Japan 71 19,183.

* * *

Flame Retardants for Thermoplastic Polymers

A series of phosphonium halide derivatives were prepared by the general procedure of heating 25 parts $(CN\ CH_2\ CH_2)_3P$ with 30 parts MeCHBrCN in MeCN for 4 hours at 80°C.

Polyethylene, polypropylene, Nylon 66, polystyrene paraformaldehyde and 90 more of homo and copolymers were rendered self-extinguishing by the incorporation of these phosphonium halide derivatives. U.S. 3,654,342.

* * *

Flame Retardants for Polymer Systems

2,3-Dibromopropyl esters of benzene polycarboxylic acids were found useful as flame retardant agents for natural or synthetic polymers. Bis(2,3-dibromopropyl) phthalate, prepared by bromination of diallyl phthalate in CCl_4, was added to a polyester resin at 17.5 wt. % to give self-extinguishing products. U.S. 3,642,870.

* * *

Polymeric Organic Phosphorus Compounds as Flame Retardants

The reaction of a polymeric carbonyl group with a trivalent P halide and a trivalent P ester gave polymeric compounds, which showed good biodegradability and flame retardancy characteristics. U.S. 3,655,593.

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Flame Retardants for Polyurethane Foams

Polyurethane foams containing 1-20 parts of red phosphorus, surface-treated with a fatty acid salt,

and 5-20 parts of an insolubilized ammonium phosphate were made flame retarded. The polyurethane foam used was a sorbitol polyether-diphenylmethane 4,4-diisocyanate, chain extended with triethylene diamine and $FCCl_3$ as blowing agent.
Japan 71 24,154.

* * *

Heat-Resistant Polyamides

Polyamide fiber prepared by mixing polyamide with benzimidazolium iodide and Cu stearate, before melt spinning, was found to possess improved heat resistance.
Japan 71 18,625.

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Self-Extinguishing Textiles

Textiles were made self-extinguishing when spun from solutions containing halogen polymers, e.g. 64:36 acrylonitrile-vinylidene chloride copolymer; e.g. 95:5% acrylonitrile-methyl acrylate containing chloroparaffin and $ZnCl_2$-hexamethyl phosphoric triamide complex (1:2).
Ger. 2,043,403.

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Flame-Retardant Paper

A zeolite powder when applied to paper rendered it fire resistant.

A mixture of zeolite powder, paste and water was applied to a vellum paper, which when placed over a candle flame it charred in about 11 seconds without flame. When zeolite is absent, the paper catches fire within 2 seconds under same conditions.
Japan 71 26,883.

**Copies of individual patents are available at 50¢ each from Commissioner of Patents, Washington, D.C. 20231 Order by number only.

MARKETING & COMMERCIAL NEWS

American Viscose(FMC) unveils flame retardant acetate filament yarn. Guilford Mills, Greensboro, N. C., will produce the yarn.

The two firms and Nationwide Testing Laboratories, Inc., Union City, N. J., have inaugurated a "triple test system, known as Resolution III, designed to meet the demands of the U. S. Government flammability standard for children's sleepwear," according to Charles A. Hayes, president of Guilford.

American Viscose, FMC Corp., division, is marketing the yarn, trade named Sayfr, to Guilford, but plans call for selling it to other firms. In 55 denier, the yarn is 74¢/lb. It is also available in 75 denier and the firm is capable of producing it in 100 and 150 denier.

John N. Gregg, vice-president and director of marketing for American Viscose, said the new yarn has been produced in brushed constructions for sleepwear, looped constructions for the loungewear and robe market.

Gregg said the acetate is the first in a family of flame retardant products and that its PFR rayon is still in the works.

Guilford is producing a brushed warp knit called Slumber Mate, from the acetate and is marketing it to J.B.Brand Co., in Oregon and Terry Products Co., in N. Carolina.

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New Smoke Suppressant Additive

Ferrocene, FE 55, is claimed to reduce smoke by 70% in rigid and semi-rigid PVC systems. This organometallic iron compound is said to be completely soluble in PVC at 0.25 - 0.5% and it is low in toxicity.

Arapahoe Chemicals, Dept. 219
Boulder, Colorado.

Flame Retardant Sleepware

J. C. Penney Co's 1972 fall-winter catalog has seven pages merchandising nonflammable sleepware in sizes up to 18. The pajamas, gowns and robes are made from 100% modacrylic fiber, polyester or flame retardant cottons.

Modacrylics are from Du Pont (Dynel) and Monsanto (SEF) but no reference is given for polyester and the all-cotton numbers.

In girls' numbers cotton flannelette and modacrylics appear in pajamas and gowns, and fleece robes are made of modacrylic.

Most girls' FR items are produced with ruffles, bows and prints: boys' sleepwear in prints and solids.

Infants' sleepwear, such as sleepers and oversleepers are produced from modacrylic fabrics.

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Flame-Retardant Vinyl Fiber

A flame-retardant vinyl fiber developed by Japan's Kohjin Co., is now being marketed in the U.S. by Amerimex Corporation, Charlotte, N.C. Amerimex says the fiber, called Cordelan, meets federal flammability standards for children's sleepwear. Amerimex also claims that Cordelan is the only flame-retardant fiber suitable for sewing threads. The fiber is a 50-50 mixture of vinal (polyvinyl alcohol) & vinyon (polyvinyl chloride) produced by co-extrusion of the resins.

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Combustion Additive

Magnesium oxide-based additive combines with a combustion catalyst, neutralization and slag control agents to reduce air pollution, eliminate fireside corrosion, reduce localized heating in combustion zones, and minimize concentrations of unburned residues and fly ash. Dearborn Chemical Div.

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Flame Retardant For Nylon

Hamilton-Auslander Mfg. Co. has a new flame retardant for woven, nonwoven and molded nylon called Nylo-Gard FR. It is said to be compatible in one-bath applications with fluorochemical repellencies, antistatic treatments and fluorinated soil release finishes and to have permanency to drycleaning and washing. Vertical resistance tests, made after a minimum of 10 home launderings or 15 drycleanings, reportedly show char lengths of no more than 3.5 inches and that drippings are self-extinguishing.
Hamilton-Auslander Mfg. Co.,
Box 88
West Warwick, R.I. 02893.

* * *

Flame Retardant Backcoating

K. J. Quinn & Co., has a new co-polymer emulsion called TE-3011 designed for backcoating flammable fabrics. Its suggested used are for carpet backings, upholstery fabrics and drapery fabrics. The coating is said to have the following special properties: (1) non-burning polymeric coating and binder; (2) highly water resistant; (3) no catalyst or high temperature required; and (4) good flexibility. It can be used as is or it can be used with thickeners, fire retardant additives or plasticizers.
K. J. Quinn & Company
195 Canal Street
Malden, Massachusetts 02148

* * *

Three New F.R. ABS Resins

ABS 500 FR-1, 48¢/lb., combines impact resistance with flame retardancy. The resin is said to possess inherent stability and retentions of tensile and elongation properties after extended heat aging
Rexene Polymers Co., Paramus, N.J.

ABS Cycolac KTB, 54¢/lb., is meant to replace present KJ and KL grades. The new grade is said to possess improved molding stability and higher surface gloss.

ABS/polycarbonate alloy resin, 60¢/lb., is the third resin reported to offer SE-O rating. It also provides high temperature dimensional stability surface hardness and high modulus.
Marbon Div., Borg-Warner Corp.
Washington, West Virginia

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Flame Retardant Marine Adhesive

Developed for bonding vinyl fabrics to glass fiber-reinforced interiors, it will also bond rigid and flexible foams, and PVC film to metal, wood, hardboard, and particleboard. The sprayable adhesive is a proprietary resin-reinforced elastomer that utilizes chlorinated solvents. It is said to be resistant to salt water, oils, greases and detergents.
Swift Chemical Company
Adhesives and Coatings.
Chicago, Illinois

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Meetings and Events

National Fire Protection Assoc. Fall Conference - Jung Hotel, New Orleans, LA. November 14-16.
Write: Charles S. Morgan, NFPA, 60 Batterymarch Street, Boston, Mass. 02110.

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Fire Safety

Eastern Section - Combustion Inst.
Princeton University
Princeton, NJ
December 7-8, 1972.
Write: Dr. F. J. Wright
Esso Research and Engineering Company
P.O. Box 45
Linden, NJ 07036

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November 10-13 - International Society of Fire Service Instructors.

Fall workshop, Nevada Test Site, Nevada. For further information, contact John W. Hoglund, Secretary-Treasurer, ISFSI, Box 382, College Park, MD. 20740.

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November 15 - Fire Marshalls Association of North America.

Annual Round Table Conference, Sheraton Cleveland Hotel, Cleveland, Ohio. For further information, contact Deuel Richardson, Director, Public Information Services, NFPA, 60 Batterymarch St., Boston, Mass. 02110.

MISCELLANEOUS

Portable Water Tanks

Safety yellow is being featured as the new color of Dump & Pump portable water tanks from Firl Industries. The tanks are used to help maintain a continuous water supply at a fire. They are unfolded at the scene and filled from tankers.

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Cotton Fabrics Retain Better Flame Retardancy under conditions of severe alkaline laundering if a glycouril derivative and dibasic solution phosphate are added to the basic treatment formulation of phosphonium chloride and urea. Treated fabrics also have a moderate degree of wrinkle resistance, according to Dr. Darrel J. Donaldson and several associates at USDA's Southern Marketing and Nutrition Research Division.

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A $2,355 Fee paid to adjusters to appraise fire damage to an apartment was ruled deductible by the Tax Court. The court decided the appraisal was not directly connected with an insurance claim; its purpose was substantiating a casualty loss deduction. Thus, the fee was deductible like any other expense incurred in figuring income tax liability.

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Smoke Meter

Smoke density monitor gives Ringelmann values from stacks on direct reading meter. Safety feature ensures that any malfunction will energize smoke alarm system. Milton Roy Co.

Fire Performance of Plastics

The Rubber and Plastics Association (RAPRA) of Great Britain has published a review of its work relating to ignitability and behavior of plastics in a fire environment. The first two reports are literature reviews of ignitability and flammability tests and of production of smoke and toxic products. The other four deal with RAPRA research on these tests, and an investigation of the smoke and toxic products generated by unplasticized PVC.

The report (1972), is available from RAPRA, Shawbury SY4 4NR, England.

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Fire Retardants

A multiple-client study on flame retardants for textiles, plastics and foams is being prepared by Skeist Laboratories. For details...see back inside cover of this issue

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New Fire-Safety Rules Set By U.S. for All Coal Mines

WASHINGTON - The Interior Dept. said it will require all underground coal mines to install automatic fire-safety equipment within six months.

The new Bureau of Mines regulations require automatic fire alarms on conveyor belts and automatic fire suppressors in coal haulage ways. Fire drills for miners will also be required.

Mines that have not complied with the rules after six months will be subject to fines of up to $10,000.

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LETTERS TO THE EDITOR

Dear Sir:

I would like to take this opportunity to reply to the comments made by Mr. Edward Schwartz to the government legislative commission on flammable fabrics.

In my opinion, this is another of a great number of cases of the uninformed giving misleading information to the ill advised. The picture of flammable fabrics is clouded enough without the addition of illogical conclusions by special interest groups.

I have no idea where Mr. Schwartz obtained his information on the technology available in this field, but is is obvious from his statements that he does not understand the complexity of this problem.

Unfortunately, most technology in this area exists only on a laboratory scale under controls and conditions which would be impossible in a production operation. The flame retardant products which are available on the market today are the result of years of research and development and are still far from completely satisfactory.

In closing, I can only say that I feel sorry for the parent who listens to statements like Mr. Schwartz's and believe in overnight miracles.

My coworkers and I have devoted three years of study to this most pressing problem and I am confident that the solution will one day be found. But, there will be no quick or easy answers and constant badgering and backridding will do little to hasten research.

Mr. Robban K. Keys
Salisbury, North Carolina

Dear Editor:

Your attempts to assemble all pertinent information regarding flammability aspects in one single publication deserves high praise.

In an industry where a chaotic condition exists, from nomenclature, to flame tests, to toxic flame retardants, your News Bulletin will find a large industrial acceptance.

F. Mancini
Larchmont, New York

* * *

Dear Sir:

I have been involved in the study of combustion phenomena of polymers for at least 12 years. Even though this field is very difficult and complex, I feel that not much progress will be made until substantial amounts of money will be spent in this area of research by the U.S. government.

After all this is the way we got the high temperature fibers, space program successes, etc.

Since when can we get things accomplished without spending huge amounts of money?

A. J. Kritzler
Westland, Michigan

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An Invitation from the Editor

You are invited to submit letters, opinions and any other pertinent information for inclusion in this newsletter.