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NATIONAL BUREAU OF STANDARDS REPORT

10 800

ISO/TC 92 SUBCOMMITTEE MEETINGS WG4 AND 7
MARCH 1971



U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

NATIONAL BUREAU OF STANDARDS

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U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

REPORT OF MEETING OF TC92-WG4

ROME, ITALY - MARCH 22 and 23, 1971

Present were:

Dr. P. H. Thomas (Chairman)	United Kingdom
Dr. A. Di Biase	Italy
H. Zorgman	Netherlands
Mr. Van Elteren	Netherlands
Mr. ir R. Minne	Belgium (March 23 only)
Mr. Becker	Germany
Mr. Teichgraber	Germany
Dr. Amy	France
Dr. G. Bellison	France
Irwin A. Benjamin	United States
Dan Sheehan	United States
N. W. Lemley	United States
Mrs. Bruce (Secretariat)	United Kingdom (BSI)

Documents presented were:

Secretariat (17)90 - Minutes of last meeting in Hague
Germany ()92 - Relative Toxicity of Thermal Decomposition Products of Expanded Polystyrene.
United Kingdom (12)93 - The Thermal Decomposition Products of Phenol Formaldehyde Laminates, Part 1.
France (13)95 - (No title) Report of tests by CSTB on radiant levels of exposure in proposed flame spread test.
United States (21)96 - Further Tests on Non-Combustibility of Materials Using the Crucible Method.

1.0

The first item of business was a report on the relation of TC92 to other ISO committees. Dr. Becker is the TC92 liaison on the plastic committee TC61. He mentioned that TC61 had stated in their annual report that they had finished work on R 1326, "Determination of Flammability and Burning Rate of Plastics in the Form of Film."

This recommendation "describes a method for determining the relative flammability and the burning rate of plastics in the form of sheets or films of thickness between 0.6 inches and .002 inches. The method uses a 25 x 450 mm

vertical specimen ignited at the bottom with a bunsen burner. The burning rate is measured between two marks 300 mm apart. The significant statement in the method is:

"this method provides a means of comparing the flammability of plastics in sheet or film form. The data should be compared with data for a control material of known performance and comparable thickness, as is generally observed that burning rate increases markedly as film thickness is reduced. Correlation with flammability under actual use conditions is not necessarily implied."

Mention was made of R 1210, also in final form, which covers the burning of plastic bars 3 to 5 mm thick. This test uses a horizontal clamped specimen with a Bunsen burner at one end and again measures burning rate. A draft test for Rigid Cellular Plastics is under development and appears to be a modification of D 1692 with the specimen on a 30 degree angle.

A discussion followed on the use of "self-extinguishing" and other terms which were considered to be misleading to the public. The group decided to draft a policy statement to be presented to the plenary for adoption. This was prepared with inputs by several people and the next afternoon was agreed on in principle. The statement is to be completed by Dr. Thomas and it will ask the other ISO groups to point out that their fire tests are not applicable to building materials and also the terms such as "self-extinguishing" may be misleading to the public (about the same as the discussion we have held in ASTM.)

2.0 Ignitability Test

The United Kingdom has been building heating elements for the ignitability apparatus (described in previous reports). Belgium, Munich, Rohm & Haas and TNO have agreed to buy units. England and Australia now have ones. France stated no interest and Italy is undecided. Australia also offered to build heating units if needed. The German plastics industry also asked to buy 5 sets of apparatus. Australia has a new standard based on this test and is also using it for generating smoke for their smoke test. The United Kingdom has already sent out materials for a round robin.

In conjunction with the test JFRO has taken the initiative in supplying a standard radiometer for everyone to calibrate against. The data is in a JFRO note to be sent out.

There was an expression of the need for an immediate test for ignitability and Becker suggested using BS476-Part 1 as temporary expedient. This is a go or no-go type ignition test for screening materials. The United Kingdom and Germany were to look into this further.

3.0 Flame Spread Test (France 13)95

CSTB reported work on the suggested ISO flame spread apparatus with specimens vertical and at 30 degrees with the radiant panel. They favor a vertical specimen and have studied the radiation on the specimen when it is at an

of 22½, 45 and 90 degrees with the radiator. With the specimen at an acute angle the radiation received does not fall off so fast. Benjamin mentioned the trouble NBS had had with observations on vertical specimens because of the uneven flame front.

JFRO, NBS and RINA agreed to try to reproduce the French data and send it to Bellison for correlation. Di Biases and Bellison were to see if electric panels could be considered equivalent to gas fired panels. Work is to be done prior to June, with an informal meeting at the plenary session. There was a discussion about specimen orientation and a general feeling that the orientation should change with the material usage. Previous NBS data showed that the rank ordering of specimens could change with the specimen orientation.

In the report to the plenary session on this subject WG4 will say that we are considering tests which will allow the specimen to be mounted in various orientations. Also we are hoping to develop an "arsenal" of tests to describe "reaction to fire" so that the enforcing agency will have the opportunity to use the most pertinent one.

Benjamin agreed to follow up on the collection and correlation of data of flame spread from CSTB and TNO, as described in the last minutes.

4.0 Exterior Flame Spread (Netherlands 8)97

TNO reported on work they had done on full scale tests using vertical exterior wall panels in straight and corner positions. The results of the flame spread up exterior walls did not correlate with their standard spread of flame tests. Materials that had passed the test did poorly. Further information on this problem is to be sent to Mr. Amy.

5.0 Heat Release Test

NBS gave a brief report on work being done on the Creusot test (USA 21)96 and indicated lack of correlation with CSTB calibration data. There was a discussion on what WG 4 should do for a rate of heat test release. Benjamin reported on two studies now going on in USA (NBS and Ohio State University). NBS mentioned that their primary interest in the test had been as a measurement tool. Most of the members felt that it was one on the "reaction to fire" tests and should be included as a test for materials controls.

The question arose as to whether we should at this time take a scientific or a pragmatic approach to the test - measure BTU output, or just rate materials. The consensus was that WG 4 do a "quick and dirty" approach now and as more information becomes available they can switch to a more sophisticated type of test.

Thomas said that the rate of heat release test should be a new one, not duplicating an existing apparatus. Benjamin raised the question of philosophy in regard to whether we are evaluating for an incipient fire or a fully developed one. Mention was made of a preference to use a high intensity fire since it

differentiates materials better. Thomas showed a schematic of the British thought on the subject (see Appendix I). Thomas suggested three papers for the next meeting outlining an approach for an immediate rating test. JFRO, NBS and CSTB were to prepare a draft titled "Relative Rate of Heat Release Test" for development of a "quick and dirty" approach.

The plenary report will mention that we are studying rate of heat release; but in the meantime we will develop an interim test.

6.0

Discussion of proposed change in structure of TC92 was brought up - see WG7 report for more detail.

7.0 Smoke Test

Teichgraber described work he had been doing with the German smoke test, which uses a tube. He reported that, they had found that smoke development was not a continuous function but came in pulses - for the range of generating temperatures from 200° to 550°C. He suggested that there might be some advantage to measuring discreet smoke generation rather than integrated quantities.

Thomas reported that the use of the fire box and the large room in which to collect the smoke was becoming a British standard. This procedure follows their philosophy of looking at what smoke and toxicity would occur on the escape routes.

The plenary report will point out that WG 4 does not accept any existing smoke tests now available and is working on the development of a new one.

The chairman asked various people to state what they felt we should measure in smoke tests. TNO said that they are still trying to decide whether quantity or rate is more important - stating that lack of visibility traps people and they don't know anything about toxicity. Amy said that we should look at opacity and toxicity separately since toxicity is tied to length of exposure. Also WG 4 would need toxicologists to help in this field. Benjamin mentioned that he feels that opacity can be used as a measure of toxicity since all smoke is toxic and as a first approach if you have smoke there will be some toxic products. The NBS chamber is used to evaluate both quantity and rate of opacity development. Thomas said that he felt that if we measure the total quantity of smoke, a large room is needed. For a small test we might do better measuring discrete quantities.

Teichgraber reported that Germany was starting construction on a smoke apparatus of the type suggested in the last meeting.

8.0 Discussion of Toxicity

United Kingdom 12 (93) was distributed with no discussion. For document Germany (92), Dr. Becker reported on their study of the toxicity of polystyrene and claimed that the paper showed that in equal weights it was no more toxic to mice than cellulosic products. Comments were made that the test procedure did not reflect the rate of smoke generation between the two materials.

9.0

Next meeting of WG 4 committee will be in Munich the week of March 2, 1972.

Summary

Work continues in the three areas that WG 4 has been previously engaged in:

ignitability - furnace elements are being fabricated and at least 6 countries will build the apparatus for a round robin.

spread of flame - further work to be done by four countries on the arrangement of the radiant panel and the specimen.

smoke - progress slow in this area but general research is continuing on test methods.

Also in a new area:

rate of heat release - is being looked into with three countries to present views for next meeting.

REPORT OF MEETING OF TC92-WG7

ROME, ITALY - March 24, 1971

Present were:

Prof. ir Herpol (Chairman)	Belgium
Mr. ir R. Minne	Belgium
Mr. H. L. Málhotra	United Kingdom
Dr. P. H. Thomas	United Kingdom
Mr. Van Elteren	Netherlands
Dr. Rumberg	Germany
Dr. Amy	France
Mr. Belisson	France
Mr. Piermarini	Italy
Mr. Petterson	Sweden
Mr. Benjamin	United States
Mr. N. W. Lemley	United States
Mr. D. an Sheehan	United States
Mrs. Bruce (Secretariat)	United Kingdom

Papers submitted were:

Secretariat (10) 21 - Minutes of the last meeting of WG7, held September 1970.
Netherlands (2) 23 - Comments on Non-combustibility
United Kingdom (3) 24 - Non-combustibility and Fire Protection.
Secretariat (12) 25 - Tentative Proposals for the Formation of Sub-Committees Under ISO/TC92.
Sweden (4) 26 - The Possibilities of Predicting the Fire Behavior of Structures on the Basis of Data from Standard Fire Resistance Tests.

1.0

CSTB reported on the work they have been doing with a calorimeter in measuring the heat being transferred to a wall specimen in the fire test furnace. They hope to report by the next CIB meeting. TNO mentioned they had not yet built the device that the seven countries were going to use to compare radiation in their furnaces.

2.0 The Non-Combustibility Test

Papers were submitted (Netherlands 2)23 and (United Kingdom 3)24 to discuss non-combustibility (NC) as a concept. Van Elteren stated that absolute NC was probably only needed for chimneys and other special cases. However he felt that there was a need for a test right now for regulation purposes till a new one could be designed. Malhotra also questioned the need for an absolute

definition of NC. He mentioned that it was not directly related to life safety and room linings could be better controlled by the BS 476 test. He also mentioned that the United Kingdom requires NC when buildings need over 1 hour fire resistance - but this could be covered by just specifying inorganic materials.

Amy suggested that if we do not have a NC test, then we need an equivalent "reaction to fire" test for a substitute since the code people want some kind of NC evaluation. Herpol mentioned that when TC92 was formed the first assignment was the drafting of a NC test. He also mentioned that WG2 was formed to study the combustibility and not NC. Benjamin mentioned that low combustibility rather than absolute NC is used in the USA and this primarily applies to the high rise building and the exterior walls of closely spaced buildings. Also mentioned was the concealed spaces - such as attics- are a problem. Rumberg mentioned that the German approach was similar to that of the United States. Amy indicated that France would consider 500 cal/gr as satisfactory NC if other properties on reaction to fire were adequate. Belisson disagreed with the idea that calorific content was the only property to be considered. Malhotra said that he disagreed with the idea of absolute NC because he feels that the tests could better be replaced with calorific tests and other reactions to fire tests - but agreed we have to keep the NC tests for now. Petterson suggested that we should report to the plenary that the NC test should be kept for now but eventually replaced with a better and more definitive test.

3.0 Questionnaire on National Requirements for Fire Tests

The chairman requested that Benjamin, Thomas and Cabret prepare a draft of a questionnaire to investigate the needs of the various countries in fire testing (this is a carry over from the last meeting). The draft is to be submitted to him. He will ask the plenary for permission to send out the questionnaire as soon as it is available.

4.0 Fire Tests for Roofs and Walls

The report submitted by TNO in WG4 on the vertical flame spread on exterior walls was discussed. No new information was available on this subject. The chairman decided to not do any test development work in this area until more information on performance is available.

5.0 Fire Severity (Sweden 4)26

Petterson was given paper at June CIB meeting on design for fire loading. He has transferred gas temperatures data in a room into equivalent fire severity based on the standard time-temperature curve. Thomas mentioned that he had not been able to check CIB data with Petterson's formulas.

6.0 Reorganization of TC92 (Secretariat 12)25

AFNOR, the French standards group had proposed TC92 adopt permanent committees. BSI came up with the proposal of setting up permanent subcommittees with task groups in the subs. The current working groups are temporary and have their mandate renewed each plenary meeting. The working group members are individuals, representing their own expertise. The subcommittees would be organized by

countries and votes would be by delegations. BSI is in favor of the proposal since it would require them to provide the Secretariat for only the two subcommittees instead of the seven current working groups. Herpol indicated that it would be adding a layer of red tape since delegations would now have to be polled in subcommittees as well as in the plenary. Benjamin mentioned that it would decrease USA participation. At present WG2, WG4 and WG7 meet together and WG3, WG5, and WG8 meet together. Under the new scheme Subcommittees 1 and 2 would meet periodically and the multiple task groups in the subcommittees would be meeting in between on their own, so that the USA attendance in task group work would become impossible. Mention was made that better liaison would result between the working group; but it was felt that WG7 could readily handle the liaison problem.

There was no strong feeling in favor of the proposal.

(The three people from the USA who listened to the discussion feel that the USA should vote against the proposal at the plenary meeting.)

7.0

The working group discussed the report to the plenary and decided:

- to report that WG7 is split on the need for a NC test but suggests that we keep the current one until WG4 can work out an alternate.
- notes that the other ISO committees are working on fire tests and suggest the need for liaison with other committees. Sees a problem of misuse in certain terminology and suggests other committees come to TC92 for fire tests.
- request the terms of reference of WG6 be extended to include coordination of instrumentation.
- get permission to send out questionnaire on needs for tests in various countries.
- mention work on structural reaction to fire and its relation to fire severity.

8.0

The next meeting of WG7 will be in Munich on March 5, 1972

Summary

WG7 is primarily a coordinating group and does not itself develop any test methods. In the coordinating sphere the development of the questionnaire on fire test needs may be a useful guide to the other committees.

