

cc: File - Sub1985
NFF - P. Gandhi
NFF - Writer

January 31, 1991

Vinyl Institute C/O
B. F. Goodrich Technical Center
Dr. Marcelo M. Hirschler
P. O. Box 122
Moore & Walker Roads
Avon Lake, OH 44012

Our Reference: Sub. 1985

Subject: Corrosivity Of Combustion Products

Dear Mr. Hirschler:

This is in response to your conversation with Leon Przybyla in which you requested that we provide the Vinyl Institute information concerning a preliminary investigation of plastic materials for determining the corrosive potential of combustion products utilizing the CNET and NIBS chamber corrosion test methods.

PRODUCT:

Based on our conversation we understand you have a number of plastic materials you wish tested.

GENERAL INFORMATION:

It is understood that you will agree not to use the name of Underwriters Laboratories Inc., and the abbreviation thereof, or symbol thereof, nor to permit such use by others in connection with the release, publication or other disseminations of the information obtained under this application, unless specifically authorized in writing by Underwriters Laboratories Inc.

PRELIMINARY INVESTIGATION:

SCOPE

The scope of this investigation would be as follows:

1. Conduct corrosion tests using the test method detailed by CNET. As we discussed, due to the contract that has been established with CNET for use of the apparatus at our facility, it is required that we receive a letter from E. I. DuPont to conduct these tests and report the results directly to the Vinyl Institute.

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2. Conduct corrosion tests using the test method and apparatus under development by the ASTM Task Group E-5.21.70.

SAMPLES

Underwriters Laboratories Inc. will not witness production of test samples nor will we request information relative to the formulation or identification of component materials used in the manufacture of test samples. Accordingly, reference to these materials in the test Report will be by laboratory code reference, such as material A, material B, etc.

METHOD

Tests will be conducted in accordance with the test procedure detailed by CNET (ISO/TC61/SC4/WG2 N57 dated 12-14-90) and the method under development by ASTM Task Group E-5.21.70.

ASTM

The following data will be collected during the ASTM tests:

1. Sample weight loss.
2. Corrosion values of a 2500 Angstrom Rohrbach corrosion probe at the start of the test, at one minute intervals during the 60 min exposure, and at one day increments during a post test exposure under high and low humidity conditions.
3. Data from a bridging/fouling probe (please note: we understand the probe and associated instrumentation will be supplied by you).
4. Gas analysis (CO, CO₂, and O₂) of combustion products in the chamber may also be performed at 5 minute intervals upon request.

CNET

The following data will be collected during the CNET tests:

1. Corrosion values of a CNET corrosion probe at approximately 2-1/2 min intervals.
2. Sample ignition time.

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The CNET corrosion value obtained at the end of 60 minute test exposure will be used to derive a Corrosion Index.

REPORT

A letter report summarizing results of this preliminary investigation will be prepared upon completion of the project and will terminate our investigation.

COST:

To cover the cost of conducting this work, we have established the following cost schedule.

1. NIBS test - \$580.00 per test.
2. CNET test - \$375.00 per test.

The cost limit will be based upon the following:

1. Vinyl Institute will supply the samples and bridging/fouling probes and instrumentation.
2. One corrosion probe will be used per test. If more than one probe is required, an additional cost per probe will be \$75.00.
3. Gas analysis is for the ASTM method is supplemental. Should you wish to monitor gases (CO, CO₂ and O₂), the cost per test will be \$200.00.

Should you decide to proceed with the investigation please contact us at your earliest convenience and we will forward the application forms.

If you have any questions concerning the above, please feel free to contact us.

Very truly yours,

Reviewed by:

ROBERT BACKSTROM (EXT. 2250)
Engineering Associate
Fire Protection Department

P. GANDHI
Staff Engineer
Fire Protection Department

RB:kh/bm
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Appendix 2

To: C.N. Bush, R.T. Gottesman
From: Marcelo M. Hirschler

January 30, 1991

New York City Toxicity Meeting

The New York City Building Congress and NIBS organized a meeting to discuss the smoke toxicity issue. The attendees, ca. 60 people, included representatives of all major interests (producers of various plastics, wood, wool, steel, etc.) as well as some architects, but no university and almost no government people, other than the organizers and speakers.

Before the presentations David Harris (president of NIBS) explained that they support the test, but also feel very strongly that it should go through the consensus standards process, in ASTM or NFPA.

Bill Chien, (New York State) discussed the data base, obtained with the UPITT test. A total of 150 product classes, 14900 Department of State numbers, representing 750,000 end use products. I am putting down these numbers to give an indication of the magnitude of the problem if we want to cause a change, due to the need to overcome the natural tendency of those people who have already paid for some testing to avoid wanting to pay again. These are mainly wallcoverings and electrical products. It is interesting, although not surprising, that the data are all very close (see graph): 96 % of all products have LC_{50} s between 5 and 28 g.

Gordon Hartzell (consultant to Atcor) discussed that no single test can address all issues and that problems need to be solved by using calculations of fractional effective dose. This sounds very reasonable. Unfortunately, he discusses all of it with an example using 4 materials: PVC, polyurethane, wood and steel and concludes that PVC and polyurethane cause 40% of the toxic hazard, wood causes 20% and steel nothing.

Hank Roux (consultant) gave his standard talk about the NIBS test, with the IT_{50} concept. He sees this as the answer to the maiden's prayers, based on "a little bit of science, but not too much". Nothing new there, but it formed the centerpiece of the day. It is unclear who is behind this, since Armstrong (Hank Roux's former employer) does not pay him to attend these meetings and are somewhat worried about the test.

Dick Gann (NIST) discussed that the radiant SwRI apparatus, used for the NIBS test, was great, but that the IT_{50} concept was unacceptable. Unfortunately, by trying to be too exact in his pronouncements and not simplifying he confused some people who did not understand what he was proposing differently from Hank Roux's test. The distinction is crucial for us: the NIBS test, using the IT_{50} is bad science and, moreover, makes PVC look very bad. The NIST proposal will be able to be used for fire hazard assessment, for product screening and it will make those materials, like PVC, which have good fire performance, look good. The work that formed the basis of the conclusions Dick Gann reached were the full scale and small scale tests for which BFGoodrich contributed a large proportion of money. One of the examples of where we spent money wisely. He stressed that differences of factors of 3 in toxicity are irrelevant.

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John Hall (NFPA) explained the statistics of fire deaths. Our death rate per capita improved by a factor of 3 since the beginning of the century, but we are still the worst Western developed nation and there has been no statistically significant change in the 1980's. Between 60-80% of all fire deaths can be attributed to smoke inhalation, although this usually is a result of a large (very hot) fire. Most deaths (80%) are residential and 79% of all fire fatalities occur with the victim away from the room of fire origin and the fire leaving its room of origin. All of this indicates that the fires that are of main concern are those where it virtually does not matter how toxic the smoke from a material is, since the deaths are mostly from CO, which does not depend on fuel chemistry. He stressed, just like Dick Gann did, that final calculations need to be made using fire hazard or fire risk assessment techniques, where toxicity has a place, but very small.

In the discussion period several questions were addressed at Chien, trying to understand who polices, who can access, etc. the New York State data base, all of which was something he could not discuss.

A very important announcement was made during lunch by the New York City Deputy Commissioner of Buildings. They are setting up an advisory committee to study the way forward in terms of changing the city Building code, including its provisions on smoke toxicity, and he is asking for volunteers to help the city. At the same time, the bureaucrat who was in charge of administering the smoke toxicity testing, based on the UPITT test, Marvin Hassmann, has been given another job and will no longer be involved. Debbie Neale will love this, since when she went to see him to discuss BFG CPVC sprinkler pipe, the PR man who accompanied her had a heart attack and died a few moments after leaving Hassmann's office. This new development means that there is an opportunity for a better type of testing to be done, where it no longer depends on the whim of Rosalind Anderson or Yves Alarie whether a material "passes".

The overall feeling I get is that the UPITT test in New York is on its last legs. These may still go on for 3-5 years and will hurt us for some time to come but will stop being a major headache. It is essential to ensure, now, that the NIBS test, with very little chance of passing ASTM, does not become an even worse albatross around our necks. I feel pretty sure that this is achievable, and that we are quite a way towards that goal. However, we must make sure that we continue working.

An unassociated piece of bad news: we have lost the BOCA code appeal on vinyl siding, which we thought we had won. This refers to a radiant fire test which vinyl siding has difficulty passing and it means that the business is again under a great deal of difficulty.