

March 28, 1968

Mr. C. R. Hillier
Chemical Technology Branch
Atomic Energy of Canada Ltd.
Pinawa, Manitoba, Canada

Dear Mr. Hillier:

We at Monsanto were pleased to have you as our guest February 23.

In reply to the four questions relating to auto-ignition temperature, we offer the following comments:

1. Monsanto does not have a specific written requirement or operating code for process temperatures to be lower than the AIT of materials processed, regardless of the technique used to determine AIT.

We do, however, face each physical characteristic of the material processed from the requirement of the process and take precautions deemed necessary to protect life and property. For example, if the process requires a material to be held above its flash point in a tank, we provide inert atmosphere to protect against flash fire.

2. We do process benzene far above its AIT in the manufacture of biphenyl. The AIT of benzene is listed between 990° and 1070°F., and the processing temperature is between 1300° and 1400°F. Occasionally a failure occurs and spontaneous ignition takes place; but personnel are protected by fire walls, and the benzene supply is valved off to allow fire to burn out.

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3. We do have other manufacturing processes where AIT of some chemicals is exceeded by process temperatures. These appear in our petroleum and hydrocarbon manufacturing operations.

For example, one operation combines methane above its AIT of 1170°F. with oxygen, but ignition does not occur because residence time is less than that required for ignition.

There are about nine different tests for determining AIT, and these are highly empirical and very sensitive to technique. A wide variation of results exists with these nine tests because of heating rates and induction times to effect ignition. I am advised that differences of 150°F. are reported for AIT of the same chemical because of differences in the various test techniques.

4. I have attached the texts of letters from two major industrial insurance companies concerning the AIT of hydrogenated terphenyl. We do not have specific information from Underwriters' Laboratories at this time on the subject of AIT.

I trust the above information will satisfy your requirements.

It is our pleasure to be of service, and if we can be of further assistance, please call. Give my regards to Stan Hatcher.

Very truly yours,

Donald E. Roush
Engineering Specialist
Functional Fluids

DER:lh
Attachment

cc: Mr. S. R. Hatcher
Atomic Energy of Canada Ltd.

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"Reply to your letter has been delayed by the press of other work and the writer's absence from his office.

"We would be of the opinion that for most of the situations in highly protected risk locations, the auto ignition temperature of a heat transfer fluid would not be of great concern to the fire protection engineer. In most situations of course, direct fired furnaces offer temperatures high enough to ignite most any material. In other situations it would be anticipated that the heat transfer material would be contained mostly in closed equipment.

"We do not have readily available information as to how authorities around the country might act on the subject. I would suggest that your Mr. _____ of your corporate safety department and at your address might have this material available to you. If you have not already contacted that group I suggest you do."

"Answering your letter, I can find no reason to object to the use of your heat transfer fluid HB-40. This is, of course, provided it is recognized by the user that the material is combustible and that the use is such that a non-flammable fluid is not required.

"Actually, heat transfer oils used to be of the paraffinic type. These oils had a relatively high flash point, but had low auto-ignition temperature because of their tendency to crack when exposed to air. The best heat transfer oils available from the oil refining industry have been those of a highly naphthenic character and their autoignition temperatures run around 725°F. On that basis, the 705°F. AIT of your oil would put it in the same general class. It would appear that the material you are proposing to market would be less subject to sludge formation and other troubles than the naphthenic oils now in general use. On that basis, we would be glad to sacrifice 20° in the AIT to obtain more trouble-free service."

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