

Discussion

Commentary on recent proposals for classification of dangerous goods for transportation

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A recent paper [1] in this journal is concerned with the prediction from small-scale tests of the transportation safety, from the spontaneous heating angle, of such substances as coals and manufactured carbon products. The paper is open to criticism in a number of very important ways. This letter will focus only on the major difficulties. It is hoped that readers of this will follow up with further comments.

First, the whole paper is based only on calculations which themselves are rather trivial, being simply scaling the size of an assembly of combustible material against the ambient temperature according to the principles of the F-K model of thermal ignition. Such a calculation can be found in an undergraduate text from 20 years ago [2].

Secondly, there has been a disregard of the huge amount of literature on this topic, which has appeared over the years. In an article such as that under discussion, the tome:

P.C. Bowes, *Self-Heating: Evaluating and Controlling the Hazards*, Elsevier, Amsterdam, 1984.

is a key reference, the absence of which from the references is surprising. If the authors prefer something more recent, they might have cited:

B.F. Gray, *SFPE Handbook of Fire Protection Engineering*, third ed., Spontaneous Combustion and Self-Heating, SFPE, 2002 (Chapter 2–10).

Thirdly, the authors whilst making recommendations concerning self-heating tests show no awareness that in the last few years two alternative approaches to the F-K model have been widely used. These are the crossing-point temperature

(CPT) method and the heat-release rate (HR) method. One citation of each from *numerous* possible ones will suffice for this letter:

CPT method:

P.Q.E. Clothier, H.O. Pritchard, *Combustion and Flame* 133 (2003) 207–210.

HR and CPT methods, comparisons made:

M. Malow, U. Krause, *J. Loss Prev. Process Ind.* 17 (2004) 51–58.

Finally, two articles by the present author are cited in a way which appears not to represent accurately their true content. These are references [4] and [5] in the paper under discussion, and are invoked in support of the use of particular values of the activation energy in F-K calculations. In fact, reference [4] is a suggestion for a new form of test using the HR method and reference [5] is a detailed critique of the current test method recommended by the UN.

There remain many questions to be answered in relation to the paper under discussion. This letter is intended to do no more than alert readers to that in the hope that further correspondence will follow.

References

- [1] S. Chervin, G.T. Bodman, *J. Hazard. Mater.* 115 (2004) 107–110.
- [2] J.A. Barnard, J.N. Bradley, *Flame and Combustion*, second ed., Chapman and Hall, London, 1984.

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