

The toxic potency of the smoke generated from most materials in a fire is very similar. The toxicity of fire atmospheres in those fires causing most fatalities (large flaming fires with ventilation control) is principally associated with the presence of carbon monoxide (CO). In those particular fires (which are of greatest concern for fire hazard assessment) there is, moreover a very poor correlation between carbon monoxide concentrations and fuel chemistry. This is due to CO yields being dominated by the conditions in the fire compartment and bearing little relation to the chemical structure of the materials being burned. Toxic potencies measured in bench scale tests are often dominated by combustion products other than carbon monoxide, since these tests generally do not give adequate carbon monoxide yields. Thus, analytical results from such tests have no value, either scientific or for fire hazard assessment.

Bench scale toxicity tests can be used for two purposes, although in both cases measurement of animal lethality is essential. First, they can be used to search for (the very rare occurrence) of smokes containing supertoxicants. Second, they can be used to generate data for fire hazard assessment. In both cases, the objective is to address those fire scenarios which cause the highest fire hazard. Thus it is essential, for both purposes, to correct carbon monoxide yields by postcomputation so as to not unduly penalize materials generating gases other than carbon monoxide.

A simplified means of carrying out toxic fire hazard assessment is by using the product toxic hazard parameter, a combination of toxic potential, mass loss rate and time to ignition (surrogate for flame spread rate). The toxic potential is measured using products (rather than materials) and by "starting the clock" when the product is inserted in the apparatus, rather than when it starts generating smoke.