



U. S. Chemical Safety and Hazard Investigation Board RECOMMENDATIONS STATUS CHANGE SUMMARY

Report:	Technic Vent Collection System Explosion
Recommendation Number:	2003-08-I-RI-R7
Date Issued:	August 20, 2004
Recipient:	American Conference of Governmental Industrial Hygienists (ACGIH)
New Status:	Closed- Acceptable Action
Date of Status Change:	September 30, 2013

Recommendation Text:

Update the preliminary steps in the chapter on exhaust system design in the next revision of the Industrial Ventilation Manual, emphasizing the need to evaluate potential incompatibilities between dusts, fumes or vapors that are likely to be intermixed in main header ducts of a ventilation system to ensure that they do not result in fire or explosion hazards, or destructive corrosion. Reference appropriate methods for such evaluation, such as the ASTM E 2012-00 standard.

Board Status Change Decision:

A. Rationale for Recommendation

On February 7, 2003, an explosion and fire occurred inside a vent collection system at the Technic plating chemicals manufacturing and research facility in Cranston, Rhode Island. One employee was critically injured and eighteen others were sent to the hospital for medical evaluations. The surrounding community was evacuated and facility operations were interrupted for several weeks.

The CSB concluded that the explosion was the result of a violent chemical reaction inside the vent collection system (VCS), which was likely initiated when an employee tapped a small hammer against a duct that sounded blocked. Technic did not evaluate the potential hazards of exhausts from multiple processes interacting in the VCS during its design, nor did they evaluate the potential impact of a number of significant changes made to the VCS over several years, which diminished transport velocity and allowed substances from a variety of different processes to accumulate inside the system. The CSB concluded that the incident was likely caused by either a violent reaction between two incompatible materials, or a violent reaction of a shock-sensitive material.

As part of its investigation, the CSB reviewed standards and guidelines applicable to the design and operation of industrial ventilation systems, including the 2001 edition of the American Conference of Governmental Industrial Hygienists (ACGIH) publication: *Industrial Ventilation: A Manual of Recommended Practice*.¹ The CSB found that the manual did not

¹ The American Conference of Governmental Industrial Hygienists (ACGIH), is a professional organization for industrial hygienists and "practitioners of related professions." The organization's *Industrial Ventilation* manual, first released in 1951, is used by industrial hygienists and engineers to design and evaluate industrial ventilation systems. In 2007, the manual was renamed *Industrial Ventilation: A Manual of Recommended Practice for Design*.

specifically recommend consideration of potential incompatibilities between materials that could interact in a ventilation system and therefore recommended that ACGIH update the manual to emphasize the need to identify and evaluate potential chemical incompatibilities during the design process. The recommendation also specifically called upon ACGIH to reference ASTM International's² *Standard Guide for the Preparation of a Binary Chemical Compatibility Chart* (E2012), which provides a systematic method for identifying incompatibility hazards between two substances.

B. Response to the Recommendation

In response to the CSB's recommendation, ACGIH revised its *Industrial Ventilation* manual³ to emphasize the need to evaluate potential incompatibilities between materials that may mix in ventilation systems, and also incorporated a reference to the ASTM E2012 standard.

C. Board Analysis and Decision

Because ACGIH reported actions that are consistent with the intent of this recommendation, the Board changed the status of this recommendation to "Closed- Acceptable Action."

² ASTM International, formerly known as the American Society for Testing and Materials, is a voluntary consensus standards developer.

³ See the 28th edition, Section 5.3.2.