HMIS® III Flammability Criteria for Aerosol Products.

0 Minimal Hazard None

1 Slight Hazard None

2 Moderate Hazard

- Aerosol products with a total chemical heat of combustion that is less than or equal to 20 kJ/g (8,600 Btu/lb). [Aerosols classified as Level 1 in NFPA 30B, Code for the Manufacture and Storage of Aerosol Products.]

3 Serious Hazard

- Aerosol products with a total chemical heat of combustion that is greater than 20 kJ/g (8,600 Btu/lb), but less than or equal to 30 kJ/g (13,000 Btu/lb). [Aerosols classified as Level 2 in NFPA 30B, Code for the Manufacture and Storage of Aerosol Products.]

4 Severe Hazard

- Aerosol products with a total chemical heat of combustion that is greater than 30 kJ/g (13,000 Btu/lb). [Aerosols classified as Level 3 in NFPA 30B, Code for the Manufacture and Storage of Aerosol Products.]

Chemical Heat of Combustion (As defined in Annex F to NFPA 30B, Code for the Manufacture and Storage of Aerosol Products - 2002 Edition)

Definition:
The amount of heat released, in kJ/g (Btu/lb), when a substance is oxidized to yield stable end products, including water as a vapor, as measured under actual fire conditions in a normal ambient (air) atmosphere.

Calculation:
Test data indicate that the overall fire hazard of an aerosol product is a function of the chemical heat of combustion. The chemical heat of combustion, Hc, in kiloJoules per gram, is the product of the theoretical heat of combustion, Hcomb, also in kiloJoules per gram, and a combustion efficiency, usually less than 1.0. A typical combustion efficiency is 0.95, or 95 percent. For a product that consists of a number of components, the chemical heat of combustion is the summation of the weighted heats of combustion for the individual components as follows:

$$\Delta H_c(product) = \sum [I\% \;\; X \;\; \Delta H_{c(I)}]$$

where:
Δ Hc = chemical heat of combustion (kJ/g)
I% = weight fraction of component I in product
Δ Hc(I) = chemical heat of combustion of component I (kJ/g)

Heats of combustion are available from standard chemical and chemical engineering references, such as Perry's Chemical Engineers' Handbook, and other standard references, such as the NFPA Fire Protection Handbook and The SFPE Handbook of Fire Protection Engineering.

Heats of combustion can also be determined by calculation or by appropriate test methods, such as ASTM D 240, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter.