

*Recommendation from Scientific Expert Group  
on Occupational Exposure Limits  
for Hydrogen bromide*

|                           |   |                                |
|---------------------------|---|--------------------------------|
| 8 hour TWA                | : | -                              |
| STEL (15 mins)            | : | 2 ppm (6.7 mg/m <sup>3</sup> ) |
| Additional classification | : | -                              |

Substance:

|                  |   |                  |                                 |
|------------------|---|------------------|---------------------------------|
| Hydrogen bromide |   | HBr              |                                 |
| Synonym          | : | hydrobromic acid |                                 |
| EINECS N°        | : | 233-113-0        |                                 |
| EEC N°           | : | 035-002-00-0     | Classification : C; R35 Xi; R37 |
| CAS N°           | : | 10035-10-6       |                                 |
| MWt              | : | 80.92            |                                 |

Conversion factor (20°C, 101kPa) : 3.37 mg/m<sup>3</sup> = 1 ppm

Occurrence/use:

Hydrogen bromide is a colourless gas at ambient temperature and pressure, with a strong irritating odour. It has a MPt of -89°C, a BPt of -67°C and a vapour pressure of 2177 kPa at 25°C. It has a vapour density of 2.8 times that of air. The odour threshold is about 2 ppm (6.7 mg/m<sup>3</sup>).

Hydrogen bromide is found only in chemical processes. The production rate of hydrobromic acid in the EEC is in the order of 50,000 tonnes per annum. It is produced by direct reaction of bromine and hydrogen, as a by-product during bromination of organic compound, and from seawater. It is used in production of inorganic and organic bromides as intermediates for many chemical syntheses. It is commercially available as an aqueous solution or as the liquefied gas.

Health Significance:

Data on occupational exposure and animal studies of the toxicity of hydrogen bromide are extremely limited. The critical effect is local irritancy of the skin, eyes and upper respiratory tract. Irritation of the nose and throat was reported in human volunteers, exposed to hydrogen bromide for "several" minutes at 3-4 ppm (10-13 mg/m<sup>3</sup>) (CSDH, 1955). A NOAEL of 2 ppm (6.7 mg/m<sup>3</sup>) was concluded.

There are no available animal toxicity data relevant for setting exposure levels. There is also an absence of mutagenicity data.

Recommendation:

The CSDH study of hydrogen bromide exposure to human volunteers was the only available basis for proposing exposure limits. This study identified a NOAEL of 2 ppm (6.7 mg/m<sup>3</sup>), with a LOAEL for irritation of 3-4 ppm (10-13 mg/m<sup>3</sup>). On the basis of this data the SEG recommended a STEL (15 mins) of 2 ppm (6.7 mg/m<sup>3</sup>) to prevent exposure to irritant levels. The lack of longer term exposure data, in either animals or man, does not permit proposal of a 8-hour TWA.

It should be noted that the recommended limit is close to the current limit of detection.

Bibliography:

Principal reference

~~SEG/CDO/9A~~ (1991). Criteria document for professional exposure limit for hydrogen bromide. Prepared by S. Basilico and T Garlanda, Milan. (COR 44532)

Key Study

CSDH (1955). Connecticut State Department of Health, Hartford, unpublished data (as cited in HSDB/DIMDI Data Bank on line, 1990).