# Literature Survey Report on Niobium (CAS No. 7440-03-1)

**Sponsor:**

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**Survey sources**

The following databases and search engines were screened for relevant physicochemical, toxicological and pharmacological information on either CAS No. or synonyms (niob, niobium, columbium):

- STNeasy
- Toxnet
- BGIA-Gestis-Stoffdatenbank
- HSDB data bank
- ChemID database
- Toxic Substance Control Act Test Submission Database (TSCATS)
- Scorecard Chemical Profiles
- HERA Homepage
- FDA Homepage
- EPA Homepage
- NHIS Homepage
- Agency for toxic Substances (ATSDR) Homepage
- Dept. of Env., Water, Heritage and the Arts Homepage (Australia)
- Center for Disease Control (CDC)
- Drug Master File Search
- PAN – Pesticide Database
- BIBRA Tox Profiles
- National Toxicology program (NTP)

By request of the sponsor literature about Niobium-95, a radioactive isotope of niobium, was not evaluated.

**Conclusions**

Despite the large amount of databases and search engines literature providing guideline-conform data to cover the different endpoint required by REACh could not be found. In most cases the number of animals, the exposure duration or the accurateness of the examinations were the reason for disqualification.

The conclusions which can be drawn from the existing literature are the following:

a) The daily oral intake of niobium in adult man by food and water amounts to approx. 620 µg[1]. Assuming an average body weight of 70 kg this estimation can be converted into a daily oral dose of approx. 0.01 mg/kg bw/day.

b) Oral administration of niobium over longer periods is only conducted with doses which correspond to the natural oral intake and reveals no adverse effects[2].

c) Intraperitoneal administration of niobium in the rat reveals $LD_{50}$ of 14 mg/kg bw (niobium chloride) and 86 mg/kg bw (potassium niobate)[3] but it can be assumed that this route is more effective than the oral one.

d) A read-across from vanadium or tantalum seems possible because of the atomic structure and similar chemical properties[1,3,4].

e) Niobium has been found in rat breast milk and newborn rat tissue following high dose maternal ingestion[1]. This observation supports the transplacental support of niobium when maternal exposure is great.

**Physico-chemical parameters:**

A search on the web generated the following results:

Source: **Rutherord-online (http://www.uniterra.de/rutherford/)**

Density: 8,58 g/cm³
Melting Point: 2468 °C
Boiling Point 4927 °C

Source: **Los Alamos National Laboratory (2001), Crescent Chemical Company (2001), Lange's Handbook of Chemistry (1952), CRC Handbook of Chemistry & Physics (18th Ed.)**

Density (g/cc): 8.57
Melting Point (K): 2741 = 2468 °C
Boiling Point (K): 5015 = 4741 °C

[1] Schroeder and Balassa (1965). Abnormal Trace Metals in Man: Niobium. J Chron Dis 18:229-241

[2] Schroeder *et al.* (1970). Zirconium, Niobium, Antimony and Fluorine in Mice: Effects on growth, survival and tissue levels. J Nutr 100(1):59-68

[3] Cochran *et al.* (1950). Acute toxicity of zirconium, columbium, strontium, lanthanum, cesium, tantalum and yttrium. Arch Ind Hyg Occup Med 1(6):637-50

[4] Hathcock *et al.* (1964). Vanadium Toxicity and Distribution in Chicks and Rats. J Nutr 82:106-110