

**Derivation of a lifetime drinking-water guideline for 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoic acid (FRD-903) – Revised version January 2017**

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Advice requested by:	Jelka Appelman (Ministry landE)
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Advice preparation by:	Paul Janssen (RIVM/VSP)
Advice review by:	André Muller (RIVM/VSP), Marco Zeilmaker (RIVM/VPZ)
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**Remark:**

This is a revised version of the original advice from 17-11-2016. In the original advice the codenames of FRD902 and FRD903 were used incorrectly for the acid and the salt respectively. In fact FRD-902 is the ammonium salt and FRD-903 is the acid. This has now been corrected.

**Introduction**

In view of the possible contamination of drinking-water by the chemical 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoic acid (codename FRD-903), the Ministry of Infrastructure and the Environment has requested the RIVM to derive a drinking-water guideline for this chemical.

The acid FRD-903 is the conversion product of the corresponding ammonium salt (code name FRD-902), which is applied in the so-called GenX-technology as developed by the chemical producer Chemours in Dordrecht. This technology leads to emissions of the acid FRD-903 to air and surface water.

The available health effects information on the GenX-related substances FRD-903, FRD-902 and E1 is evaluated by Beekman et al (Beekman; 2016).

**Tolerable Daily Intake (TDI) for FRD-903**

As explained by Beekman et al (2016), all available toxicological studies were carried out with FRD-902 as the test substance. Read-across from FRD-902 to the acid FRD-903, however, is feasible (see paragraphs 4.3 and 4.6 of the report).

The basis in the derivation of the general population inhalation limit value for FRD-903 as reported by Beekman et al., was an overall oral NOAEL of 0.1 mg/kg/day. This NOAEL is from a chronic rat study with FRD-902. This value can also be used for deriving an oral TDI for FRD-903.

In agreement with the REACH guidance the following assessment factors are applied to the oral NOAEL:

- Standard interspecies for difference in kinetics 4
- Additional factor for potential kinetic difference 66
- Interspecies remaining toxicodynamic difference 1.8

- Intraspecies factor human

This leads to a provisional TDI for FRD-903 of 21 ng/kg bw/day. Using the additional toxicokinetic factor of 66 represents a pragmatic worst-case approach based on the data as currently available. Additional information on the bioaccumulation of FRD-902 in humans would allow derivation of a final TDI.

#### **Guideline value for drinking-water**

A guideline value for FRD-903 in drinking-water is derived from the provisional TDI. In agreement with the usual method for deriving drinking-water guidelines, 20% of the TDI is allocated to drinking-water. Using a standard adult body weight of 70 kg and a standard drinking-water consumption of 2 L per day, leads to a drinking-water guideline value of 0.15 µg/L.

Calculation: 
$$\frac{\text{TDI (21 ng/kg bw/day)} \times 20\% \times \text{body weight (70 kg)}}{\text{Consumption (2 L/d)}}$$

#### **Provisional guideline value: 0.15 µg/L drinking-water**

This is a provisional value because it is based on a provisional TDI.

The provisional guideline value for drinking-water was derived based on toxicological data for FRD-902, the ammonium salt of FRD-903. This means read across from FRD-902 to FRD-903. In water both chemicals (FRD-902 and FRD-903) will be present as the anion. The provisional guideline for drinking-water also applies to the anion.

#### **Reference**

Beekman M, Zweers P, Muller A, de Vries W, Janssen P en Zeilmaker M. (2016). Evaluation of substances used in the GenX technology by Chemours, Dordrecht. RIVM letter report 2016-0174.