

Fluoride Conversions

How do I interpret and convert the fluoride concentrations of fluoride products?

Commonly, fluoride concentration on products are expressed as percentages or parts per million (ppm). The following table shows how ppm, mg/g and % concentrations of fluoride toothpastes relate to each other.

In Toothpastes	Fluoride Compound		Fluoride Ion	
	%	mg/g	mg/g	ppm
Sodium Monofluorophosphate (MFP)	0.76	7.6	1	1000
Sodium Fluoride (NaF)	0.1	1	0.45	450*
Sodium Fluoride (NaF)	0.11	1.1	0.5	500
Sodium Fluoride (NaF)	0.22	2.2	1	1000
Sodium Fluoride (NaF)	0.243	2.43	1.1	1100
Sodium Fluoride (NaF)	0.32	3.2	1.45	1450
Sodium Fluoride (NaF)	1.1	11	5	5000
Stannous Fluoride (SnF_2)	0.4	4	1	1000

*This can be combined with 1000ppm MFP to make 1450ppm i.e. 0.76% MFP + 0.1 NaF = 1450ppm Fluoride

Molecular weights of elements

Fluoride 19 Oxygen 16 Phosphorus 31 Sodium 23 Tin (stannous ion) 118.7

Fluoride Compound	Formula	Molecular Weight	% F Ion	Conversion Ratio
Sodium Monofluorophosphate	$\text{Na}_2\text{PO}_3\text{F}$	144	13.2	7.6
Sodium Fluoride	NaF	42	45	2.2
Stannous Fluoride	SnF_2	156.7	24	4.1

Conversion formula (3 easy steps)

1. % F compound into mg/g F compound (multiply by 10)
2. mg/g F compound into mg/g F ion (divide by conversion ratio)
3. mg/g F ion into ppm (multiply by 1000)

Maximum allowable fluoride concentration for toothpastes sold in supermarkets in Australia: 1500ppm

Calculating cost per brushing of toothpaste

Calculations will vary with the density of various pastes. However, use the following generalisations:

a small pea sized amount of toothpaste = 0.4g
a 1cm length of toothpaste = 0.8g
a 2cm length of toothpaste = 1.7g
a 3cm length of toothpaste = 2.5g

Example

Divide the weight of the tube of paste by the estimated weight per brushing.

110g tube divided by 0.8g = 137 brushings per tube

If a 110g tube costs \$3.99 divided by 100 brushings = \$0.029 or 2.9 cents cost per brushing