A Short Course on Dilutions

operator notes

There are two types of dilutions: direct dilutions and serial dilutions. When performing a direct dilution you need to know the following:

- **How much standard you want to prepare**
- **The ending concentration**
- **The beginning concentration**

Then use the following formula to calculate the mL of the original standard to use:

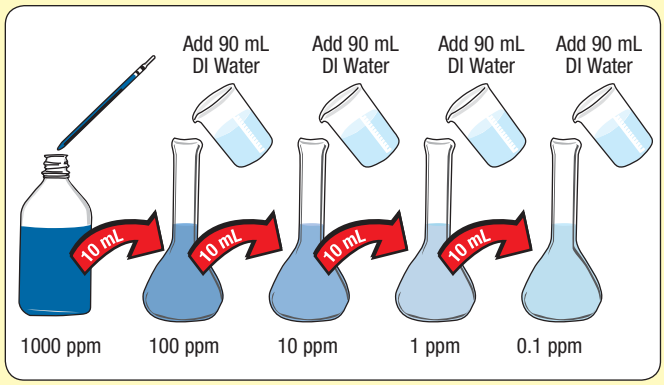
$$\text{mL of original to use} = \frac{\text{(Volume to prepare) x (Desired concentration)}}{\text{(Concentration of original standard)}}$$

For example, if you have a 1000-ppm standard and you want to make 100 mL of a 10-ppm standard:

$$\text{100 mL x 10 ppm} \quad \frac{\text{= 1 mL}}{\text{1000 ppm}}$$

Pipet 1 mL of the original 1000-ppm standard into a 100-mL volumetric flask. Fill to the line with deionized water and mix.

Performing serial dilutions allows you to make a variety of standards in decades, for applications such as ion selective electrode standards. Below is an illustration of a serial dilution:



In the above illustration, you are creating multiple standards by pipetting 10 mL of the original 1000 ppm standard into a 100-mL volumetric flask and filling to the line with deionized water. This process is then repeated using the new 100 ppm standard as your starting point.

Murexide

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APHA for Calcium (3500-B)

MFR #	SIZE	CONTAINER	STOCK #	EACH
INDICATOR, IN NaCl (POWDER)				
5220-100	100 g	Glass Bottle	**16059**	$
5220-500	500 g	Glass Bottle	**16081**	
0.15% (W/W) IN ETHYLENE GLYCOL				
5221-4	120 mL	Amber Glass	**16082**	$
5221-16	500 mL	Amber Glass	**16083**	

Muriatic Acid: see Hydrochloric Acid

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Nitrate Standard as N

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MFR #	SIZE	CONTAINER	STOCK #	EACH
1.0 mg/L (ppm)				
—	500 mL	Poly	**29690**	$
—	1 L	Poly	**29691**	
2.0 mg/L (ppm)				
—	500 mL	Poly	**74104**	$
—	1 L	Poly	**74105**	
10 mg/L (ppm)				
—	500 mL	Poly	**29692**	$
—	1 L	Poly	**29693**	
100 mg/L (ppm)				
—	500 mL	Poly	**29694**	$
—	1 L	Poly	**29695**	
1000 mg/L (ppm)				
—	500 mL	Poly	**29696**	$
—	1 L	Poly	**29697**	

Nitrate ISA Buffer

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APHA for Nitrate (4500-C)

MFR #	SIZE	CONTAINER	STOCK #	EACH
—	500 mL	Poly	**29698**	$
—	1 L	Poly	**29699**	

Nitric Acid

USABlueBook NIST

MFR #	SIZE	CONTAINER	STOCK #	EACH
1.0 M				
—	500 mL	Amber Glass	**29703***	$
—	1 L	Amber Glass	**29704***	
40% (W/W), CAS NO. 7697-37-2 • HNO_3 • FW=63.01				
—	500 mL	Amber Glass	**74106***	$
—	1 L	Amber Glass	**74107***	
CONCENTRATED, ACS GRADE (APPROX 70% AS HNO_3) CAS NO. 7697-37-2 • HNO_3 • FW=63.01				
—	500 mL	Amber Glass	**29700***	$
—	1 L	Amber Glass	**29701***	
—	2.5 L	Amber Glass	**29702***	

Note: Concentrated, ACS grade nitric acid is not NIST-traceable.

Nitric Acid, 0.1 N

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APHA for Chloride, Cyanide (4500-C, 4500-M)

MFR #	SIZE	CONTAINER	STOCK #	EACH
5400-16	500 mL	Poly	**16085**	$
5400-32	1 L	Poly	**16084**	

Nitric Acid, 50% (v/v) (1:1)

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MFR #	SIZE	CONTAINER	STOCK #	EACH
5350-32	1 L	Poly-Coated Amber Glass	**86380***	$
5350-5PT	2.5 L	Poly-Coated Amber Glass	**86381***	

Nitric Acid

JT Baker J.T.Baker

CAS No. 7697-37-2 • HNO_3 • FW=63.01

MFR #	SIZE	CONTAINER	STOCK #	EACH
INSTRA-ANALYZED, 69.0-70.0%				
9598-00	(6) 500 mL	Poly-Coated Glass	**202534***	$
9598-34	(4) 2.5 L	Poly-Coated Glass	**200811***	
9598-34	2.5 L	Glass	**40974***	
ULTREX II, 67-70%				
6901-05	500 mL	Fluoropolymer	**203633***	$
6901-01	1 L	Fluoropolymer	**202202***	
6901-02	2 L	Fluoropolymer	**203252***	

ORP Standard

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SIZE	VALUE	CONTAINER	STOCK #	EACH
500 mL	200 mV	Glass	**40423**	$
500 mL	400 mV	Glass	**40424***	
500 mL	600 mV	Glass	**40425***	

Organic Carbon Standard, 1000 mg Carbon/L

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APHA for TOC (5310-B)

MFR #	SIZE	CONTAINER	STOCK #	EACH
1847-4	120 mL	Glass	**86367**	$
1847-16	500 mL	Glass	**86368**	
1847-32	1 L	Glass	**86369**	