

## Salinity Data

Note: conversions from g/kg assume a density of 1.0260, which is the density of salt water at a salinity of 35 ‰. Data from various oceans. Data in g/kg rounded to three decimal places.

### Calcium in seawater

0.399 g/kg of water, or **409 mg/L** (Kawasaki and Sugawara 1958)

0.400 g/kg of water, or **410 mg/L** (Hem 1985)

0.403 g/kg of water, or **413 mg/L** (Kawasaki and Sugawara 1958)

0.404 g/kg of water, or **414 mg/L** (Voipio 1959)

0.407 g/kg of water, or **417 mg/L** (Kawasaki and Sugawara 1958)

0.408 g/kg of water, or **418 mg/L** (Tsunogai et al. 1971)

0.408 g/kg of water, or **419 mg/L** (Dittmar recalculated by Lyman and Fleming 1940)

0.410 g/kg of water, or **420 mg/L** (Thompson and Wright 1930)

0.410 g/kg of water, or **420 mg/L** (Tsunogai et al. 1971)

0.410 g/kg of water, or **421 mg/L** (Tsunogai et al. 1971)

0.411 g/kg of water, or **421 mg/L** (Kawasaki and Sugawara 1958)

0.411 g/kg of water, or **421 mg/L** (Lebel and Poisson 1976)

0.411 g/kg of water, or **421 mg/L** (Miyake 1939)

0.411 g/kg of water, or **422 mg/L** (Carpenter 1957)

0.412 g/kg of water, or **423 mg/L** (Carpenter 1957)

0.412 g/kg of water, or **423 mg/L** (Culkin and Cox 1966)

0.412 g/kg of water, or **423 mg/L** (Dittmar 1884)

0.412 g/kg of water, or **423 mg/L** (Fukai and Shiokawa 1955)

0.412 g/kg of water, or **423 mg/L** (Millero 1982)

0.412 g/kg of water, or **423 mg/L** (Riley and Tongudai 1967)

0.413 g/kg of water, or **423 mg/L** (Matida and Yamauchi 1951)

0.413 g/kg of water, or **424 mg/L** (Culkin 1965)

0.413 g/kg of water, or **424 mg/L** (Pate and Robinson 1958)

0.413 g/kg of water, or **424 mg/L** (Tsunogai et al. 1968)

0.414 g/kg of water, or **424 mg/L** (Kirk and Moberg 1933)

0.417 g/kg of water, or **428 mg/L** (Fukai and Shiokawa 1955)

0.418 g/kg of water, or **429 mg/L** (Gripenberg 1937)

0.424 g/kg of water, or **435 mg/L** (Chow and Thompson 1955b)

**Average = 421.250,  $\sigma$  = 5.282**

**Midpoint = 422**

Thus for Aqua Vitro Salinity, we can state that our target for calcium is 422 mg/L.

Three per cent of this is 12.66 units, rounded to 13. Our allowable range thus becomes 409 – 435 mg/L calcium at a salinity of 35 ‰.

**409 mg/L  $\leq$  Ca  $\leq$  435 mg/L; target 422 mg/L**

### **Magnesium in sea water**

1.284 g/kg of water, or **1317 mg/L** (Fukai and Shiokawa 1955)

1.284 g/kg of water, or **1317 mg/L** (Millero 1982)

1.285 g/kg of water, or **1318 mg/L** (Fukai and Shiokawa 1955)

1.292 g/kg of water, or **1326 mg/L** (Carpenter 1957)

1.292 g/kg of water, or **1326 mg/L** (Lebel and Poisson 1976)

1.292 g/kg of water, or **1326 mg/L** (Riley and Tongudai 1967)

1.293 g/kg of water, or **1327 mg/L** (Tsunogai et al. 1968)

1.294 g/kg of water, or **1328 mg/L** (Culkin 1965)

1.296 g/kg of water, or **1330 mg/L** (Miyake 1939)

1.296 g/kg of water, or **1330 mg/L** (Pate and Robinson 1961)

1.297 g/kg of water, or **1331 mg/L** (Culkin and Cox 1966)

1.297 g/kg of water, or **1331 mg/L** (Dittmar recalculated by Lyman and Fleming 1940)

1.297 g/kg of water, or **1331 mg/L** (Matida and Yamauchi 1951)

1.297 g/kg of water, or **1331 mg/L** (Thompson and Wright 1930)

1.297 g/kg of water, or **1331 mg/L** (Voipio 1957)

1.306 g/kg of water, or **1340 mg/L** (Voipio 1959)

1.310 g/kg of water, or **1344 mg/L** (Miyake 1939)

1.315 g/kg of water, or **1349 mg/L** (Matthews and Ellis 1928)

1.316 g/kg of water, or **1350 mg/L** (Hem 1985)

1.318 g/kg of water, or **1352 mg/L** (Dittmar 1884)

1.320 g/kg of water, or **1354 mg/L** (Matthews and Ellis 1928)

**Average = 1332.810,  $\sigma$  = 10.909**

**Midpoint = 1335.500**

Thus for Aqua Vitro Salinity, we can state that our target for magnesium is 1336 mg/L.

Three per cent of this is 40.065 units, rounded to 40. Our allowable range thus becomes 1296 – 1376 mg/L magnesium at a salinity of 35 ‰.

**1296 mg/L ≤ Mg ≤ 1376 mg/L; target 1336 mg/L**

## Strontium in sea water

Data in g/kg rounded to four decimal places.

0.0129 g/kg of water, or **13.2 mg/L** (Thomas and Thompson 1932)

0.0136 g/kg of water, or **13.9 mg/L** (Dittmar recalculated by Lyman and Fleming 1940)

0.0137 g/kg of water, or **14.1 mg/L** (Miyake 1939b)

**[tentative value of 10 mg/L (Smales 1951)]**

Using a combination of flame photometry and radiochemistry, Smales put forward a tentative value of 10 mg/L for strontium, drastically reducing the accepted value of 14 mg/L. All subsequent analytical work has confirmed that the old figure was much too high, and that the proper figure is approximately 8 mg/L. The four values listed above are not included in determining the mean, standard deviation, or midpoint.

0.0077 g/kg of water, or **8.0 mg/L** (Culkin and Cox 1966)

0.0079 g/kg of water, or **8.1 mg/L** (Millero 1982)

0.0080 g/kg of water, or **8.2 mg/L** (Culkin 1965)

0.0080 g/kg of water, or **8.2 mg/L** (Kawasaki and Sugawara 1958)

0.0081 g/kg of water, or **8.3 mg/L** (Chow and Thompson 1955a)

0.0081 g/kg of water, or **8.3 mg/L** (Hummel and Smales 1956)

0.0081 g/kg of water, or **8.3 mg/L** (Odum 1951)

0.0081 g/kg of water, or **8.3 mg/L** (Riley and Tongudai 1967)

0.0082 g/kg of water, or **8.4 mg/L** (Chow and Thompson 1955a)

0.0082 g/kg of water, or **8.4 mg/L** (Chow and Thompson 1955a)

0.0083 g/kg of water, or **8.5 mg/L** (Bowen 1956).

0.0086 g/kg of water, or **8.8 mg/L** (Kawasaki and Sugawara 1958)

0.0091 g/kg of water, or **9.3 mg/L** (Kawasaki and Sugawara 1958)

**Average = 8.392,  $\sigma$  = 0.322**

**Midpoint = 8.650**

Thus for Aqua Vitro Salinity, we can state that our target for strontium is 8.6 mg/L.

Three per cent of this is 0.260 units, rounded to 0.3. Our allowable range thus becomes 8.3 – 8.9 mg/L strontium at a salinity of 35 ‰.

**8.3 mg/L ≤ Sr ≤ 8.9 mg/L; target 8.6 mg/L**

**May wish to consider replacing midpoint with mean (8.4) to achieve range of 8.1 to 8.7**

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