" "	x 0.01745	= Radians
" "	x 3600	= Seconds
Degrees/sec.	x 0.01745	= Radians/sec.
" / "	x 0.1667	= Revolutions/min.
" / "	x 0.002778	= Revolutions/sec.
Dekagrams	x 10	= Grams
Dekaliters	x 10	= Liters
Dekameters	x 10	= Meters
Drams	x 27.34375	= Grains
"	x 0.0625	= Ounces
"	x 1.771845	= Grams
Fathoms	x 6	= Feet
Feet	x 30.48	= Centimeters
"	x 12	= inches
"	x 0.3048	= Meters
"	x 1/3	= Yards
Feet of water	x 0.02950	= Atmospheres
" " "	x 0.8826	= Inches of mercury
" " "	x 304.8	= Kgs./sq. meter
" " "	x 62.43	= Lbs./sq. ft.
" " "	x 0.4335	= Lbs./sq. inch
Feet/min.	x 0.5080	= Centimeters/sec.
" / "	x 0.01667	= Feet/sec.
" / "	x 0.01829	= Kilometers/hr.
" / "	x 0.3048	= Meters/min.
" / "	x 0.01136	= Miles/hr.
Feet/sec.	x 30.48	= Centimeters/sec.
" / "	x 1.097	= Kilometers/hr.
" / "	x 0.5921	= Knots
" / "	x 18.29	= Meters/min.
" / "	x 0.6818	= Miles/hr.
" / "	x 0.01136	= Miles/min.
Feet/sec./sec.	x 30.48	= Cms./sec./sec.
" / " / "	x 0.3048	= Meters/sec./sec.
Foot-pounds	x 1.286×10^{-3}	= British Thermal Units
" "	x 5.050×10^{-7}	= Horse-power-hrs.
" "	x 3.241×10^{-4}	= Kilogram-calories
" "	x 0.1383	= Kilogram-meters
" "	x 3.766×10^{-7}	= Kilowatt-hrs.
Foot-pounds/min.	x 1.286×10^{-3}	= B.T. Units/min.
" " / "	x 0.01667	= Foot-pounds/sec.
" " / "	x 3.030×10^{-5}	= Horse-power
" " / "	x 3.241×10^{-4}	= Kg.-calories/min.
" " / "	x 2.260×10^{-5}	= Kilowatts
Foot-pounds/sec.	x 7.717×10^{-2}	= B.T. Units/min.
" " / "	x 1.818×10^{-3}	= Horse-power
" " / "	x 1.945×10^{-2}	= Kg.-calories/min.
" " / "	x 1.356×10^{-3}	= Kilowatts
Gallons	x 3785	= Cubic centimeters
"	x 0.1337	= Cubic feet
"	x 231	= Cubic inches

"	x 3.785×10^{-3}	= Cubic meters
"	x 4.951×10^{-3}	= Cubic yards
"	x 3.785	= Liters
"	x 8	= Pints (liq.)
"	x 4	= Quarts (liq.)
Gallons, Imperial	x 1.20095	= U.S. gallons
" U.S.	x 0.83267	= Imperial gallons
Gallons water	x 8.3453	= Pounds of water
Gallons/min.	x 2.228×10^{-3}	= Cubic feet/sec.
" / "	x 0.06308	= Liters/sec.
" / "	x 8.0208	= Cu. ft./hr.
" / "	x 8.0208 Area (sq. ft.)	= Overflow rate (ft./hr.)
Gallons water/min.	x 6.0086	= Tons water/24 hrs.
Grains (troy)	x 1	= Grains (avoir.)
" "	x 0.06480	= Grams
" "	x 0.04167	= Pennyweights (troy)
" "	x 2.0833×10^{-3}	= Ounces (troy)
Grains/U.S. gal.	x 17.118	= Parts/million
" /U.S. gal.	x 142.86	= Lbs./million gal.
" /Imp. gal.	x 14.286	= Parts/million
Grams	x 980.7	= Dynes
"	x 15.43	= Grains
"	x 10^{-3}	= Kilograms
"	x 10^{3}	= Milligrams
"	x 0.03527	= Ounces
"	x 0.03215	= Ounces (troy)
"	x 2.205×10^{-3}	= Pounds
Grams/cm	x 5.600×10^{-3}	= Pounds/inch
Grams/cu. cm.	x 62.43	= Pounds/cubic foot
" / " "	x 0.03613	= Pounds/cubic inch
Grams/liter	x 58.417	= Grains/gal.
" / "	x 8.345	= Pounds/1000 gals.
" / "	x 0.062427	= Pounds/cubic foot
" / "	x 1000	= Parts/million
Hectares	x 2.471	= Acres
"	x 1.076×10^{5}	= Square feet
Hectograms	x 100	= Grams
Hectoliters	x 100	= Liters
Hectometers	x 100	= Meters
Hectowatts	x 100	= Watts
Horse-power	x 42.44	= B.T. Units/min.
" "	x 33,000	= Foot-lbs./min.
" "	x 550	= Foot-lbs./sec.
" "	x 1.014	= Horse-power (metric)
" "	x 10.70	= Kg.-calories/min.
" "	x 0.7457	= Kilowatts

" "	x 745.7	= Watts
Horse-power (boiler)	x 33,479	= B.T.U./hr.
" " "	x 9.803	= Kilowatts
Horse-power-hours	x 2547	= British Thermal Units
" " "	x 1.98×10^6	= Foot-lbs.
" " "	x 641.7	= Kilogram-calories
" " "	x 2.737×10^5	= Kilogram-meters
" " "	x 0.7457	= Kilowatt-hours
Inches	x 2.540	= Centimeters
Inches of mercury	x 0.03342	= Atmospheres
" " "	x 1.133	= Feet of water
" " "	x 345.3	= Kgs./sq. meter
" " "	x 70.73	= Lbs./sq. ft.
" " "	x 0.4912	= Lbs./sq. inch
Inches of water	x 0.002458	= Atmospheres
" " "	x 0.07355	= Inches of mercury
" " "	x 25.40	= Kgs./sq. meter
" " "	x 0.5781	= Ounces/sq. inch
" " "	x 5.202	= Lbs./sq. foot
" " "	x 0.03613	= Lbs./sq. inch
Kilograms	x 980,665	= Dynes
"	x 2.205	= Lbs.
"	x 1.102×10^{-3}	= Tons (short)
"	x 10^3	= Grams
Kilograms-calories	x 3.968	= British Thermal Unit
" "	x 3086	= Foot-pounds
" "	x 1.558×10^{-3}	= Horse-power-hours
" "	x 1.162×10^{-3}	= Kilowatt-hours
Kilograms-calories/min.	x 51.43	= Foot-pounds/sec.
" " / "	x 0.09351	= Horse-power
" " / "	x 0.06972	= Kilowatts
Kgs./meter	x 0.6720	= Lbs./foot
Kgs./sq./meter	x 9.678×10^{-5}	= Atmospheres
" / " / "	x 3.281×10^{-3}	= Feet of water
" / " / "	x 2.896×10^{-3}	= Inches of mercury
" / " / "	x 0.2048	= Lbs./sq. foot
" / " / "	x 1.422×10^{-3}	= Lbs./sq. inch
Kgs./sq. millimeter	x 10^6	= Kgs./sq. meter
Kiloliters	x 10^3	= Litters
Kilometers	x 10^5	= Centimeters
"	x 3281	= Feet
"	x 10^3	= Meters
"	x 0.6214	= Miles
"	x 1094	= Yards
Kilometers/hr.	x 27.78	= Centimeters/sec.
" / "	x 54.68	= Feet/min.
" / "	x 0.9113	= Feet/sec.
" / "	x 0.5396	= Knots
" / "	x 16.67	= Meters/min.

" / "	x 0.6214	= Miles/hr.
Kms./hr./sec.	x 27.78	= Cms./sec./sec.
" / " / "	x 0.9113	= Ft./sec./sec.
" / " / "	x 0.2778	= Meters/sec./sec.
Kilowatts	x 56.92	= B.T. Units/min.
"	x 4.425×10^4	= Foot-lbs./min.
"	x 737.6	= Foot-lbs./sec.
"	x 1.341	= Horse-power
"	x 14.34	= Kg.-calories/min.
"	x 10^3	= Watts
Kilowatt-hours	x 3415	= British Thermal Units
" "	x 2.655×10^6	= Foot-lbs.
" "	x 1.341	= Horse-power-hrs.
" "	x 860.5	= Kilogram-calories
" "	x 3.671×10^5	= Kilogram-meters
Liters	x 10^3	= Cubic centimeters
"	x 0.03531	= Cubic feet
"	x 61.02	= Cubic inches
"	x 10^{-3}	= Cubic meters
"	x 1.308×10^{-3}	= Cubic yards
"	x 0.2642	= Gallons
"	x 2.113	= Pints (liq.)
"	x 1.057	= Quarts (liq.)
Liters/min.	x 5.886×10^{-4}	= Cubic ft./sec.
" / "	x 4.403×10^{-3}	= Gals./sec.
Lumber Width (in.) x Thickness (in.) / 12	x Length (ft.)	= Board Feet
Meters	x 100	= Centimeters
"	x 3.281	= Feet
"	x 39.37	= Inches
"	x 10^{-3}	= Kilometers
"	x 10^3	= Millimeters
"	x 1.094	= Yards
Meters/min.	x 1.667	= Centimeters/sec.
" / "	x 3.281	= Feet/min.
" / "	x 0.05468	= Feet/sec.
" / "	x 0.06	= Kilometers/hr.
" / "	x 0.03728	= Miles/hr.
Meters/sec.	x 196.8	= Feet/min.
" / "	x 3.281	= Feet/sec.
" / "	x 3.6	= Kilometers/hr.
" / "	x 0.06	= Kilometers/min.
" / "	x 2.237	= Miles/hr.
" / "	x 0.03728	= Miles/min.
Microns	x 10^{-6}	= Meters
Miles	x 1.609×10^5	= Centimeters
"	x 5280	= Feet
"	x 1.609	= Kilometers
"	x 1760	= Yards

Miles/hr.	x 44.70	= Centimeters/sec.
" / "	x 88	= Feet/min.
" / "	x 1.467	= Feet/sec.
" / "	x 1.609	= Kilometers/hr.
" / "	x 0.8684	= Knots
" / "	x 26.82	= Meters/min.
Miles/min.	x 2682	= Centimeters/sec.
" / "	x 88	= Feet/sec.
" / "	x 1.609	= Kilometers/min.
" / "	x 60	= Miles/hr.
Milliers	x 10^3	= Kilograms
Milligrams	x 10^{-3}	= Grams
Milliters	x 10^{-3}	= Liters
Millimeters	x 0.1	= Centimeters
"	x 0.03937	= Inches
Milligrams/liter	x 1	= Parts/million
Million gals./day	x 1.54723	= Cubic ft./sec.
Miner's inches	x 1.5	= Cubic ft./min.
Minutes (angle)	x 2.909×10^{-4}	= Radians
Ounces	x 16	= Drams
"	x 437.5	= Grains
"	x 0.0625	= Pounds
"	x 28.349527	= Grams
"	x 0.9115	= Ounces (troy)
"	x 2.790×10^{-5}	= Tons (long)
"	x 2.835×10^{-5}	= Tons (metric)
Ounces, troy	x 480	= Grains
" "	x 20	= Pennyweights (troy)
" "	x 0.08333	= Pounds (troy)
" "	x 31.103481	= Grams
" "	x 1.09714	= Ounces, avoir.
Ounces (fluid)	x 1.805	= Cubic inches
" "	x 0.02957	= Liters
Ounces/sq. inch	x 0.0625	= Lbs./sq. inch
Overflow rate (ft./hr.)	$\frac{1}{\text{x 0.12468 x area (sq. ft.)}}$	= Gals./min.
Overflow rate (ft./hr.)	x 8.0208	= Sq. ft./gal. min.
Parts/million	x 0.0584	= Grains/U.S. gal.
" / "	x 0.07016	= Grains/Imp. gal.
" / "	x 8.345	= Lbs./million gal.
Pennyweights (troy)	x 24	= Grains
" "	x 1.55517	= Grams
" "	x 0.05	= Ounces (troy)
" "	x 4.1667×10^{-3}	= Pounds (troy)
Pounds	x 16	= Ounces
"	x 256	= Drams
"	x 7000	= Grains
"	x 0.0005	= Tons (short)
"	x 453.5924	= Grams
"	x 1.21528	= Pounds (troy)

"	x 14.5833	= Ounces (troy)
Pounds (troy)	x 5760	= Grains
" "	x 240	= Pennyweights (troy)
" "	x 12	= Ounces (troy)
" "	x 373.24177	= Grams
" "	x 0.822857	= Pounds (avoir.)
" "	x 13.1657	= Ounces (avoir.)
" "	x 3.6735×10^{-4}	= Tons (long)
" "	x 4.1143×10^{-4}	= Tons (short)
" "	x 3.7324×10^{-4}	= Tons (meteric)
Pounds of water	x 0.01602	= Cubic feet
" " "	x 27.68	= Cubic inches
" " "	x 0.1198	= Gallons
Pounds of water/min.	x 2.670×10^{-4}	= Cubic ft./sec.
Pounds/cubic foot	x 0.01602	= Grams/cubic cm.
" / " "	x 16.02	= Kgs./cubic meter
" / " "	x 5.787×10^{-4}	= Lbs./cubic inch
Pounds/cubic inch	x 27.68	= Grams/cubic cm.
" / " "	x 2.768×10^4	= Kgs./cubic meter
" / " "	x 1728	= Lbs./cubic foot
Pounds/foot	x 1.488	= Kgs./meter
Pounds/inch	x 178.6	= Grams/cm.
Pounds/sq. foot	x 0.01602	= Feet of water
" / " "	x 4.883	= Kgs./sq. meter
" / " "	x 6.945×10^{-3}	= Pounds/sq. inch
Pounds/sq. inch	x 0.06804	= Atmospheres
" / " "	x 2.307	= Feet of water
" / " "	x 2.036	= Inches of mercury
" / " "	x 703.1	= Kgs./sq. meter
Quadrants (angle)	x 90	= Degrees
" "	x 5400	= Minutes
" "	x 1.571	= Radians
Quarts (dry)	x 67.20	= Cubic inches
Quarts (liq.)	x 57.75	= Cubic inches
Quintal, Argentine	x 101.28	= Pounds
" Brazil	x 129.54	= Pounds
" Castile, Peru	x 101.43	= Pounds
" Chile	x 101.41	= Pounds
" Mexico	x 101.47	= Pounds
" Metric	x 220.46	= Pounds
Quires	x 25	= Sheets
Radians	x 57.30	= Degrees
"	x 3438	= Minutes
"	x 0.637	= Quadrants
Radians/sec.	x 57.30	= Degrees/sec.
" / "	x 0.1592	= Revolutions/sec.
" / "	x 9.549	= Revolutions/min.
Radians/sec./sec.	x 573.0	= Revolutions/min./min.
" / " / "	x 0.1592	= Revolutions/sec./sec.

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Reams	x 500	= Sheets
Revolutions	x 360	= Degrees
"	x 4	= Quadrants
"	x 6.283	= Radians
Revolutions/min.	x 6	= Degrees/sec.
" / "	x 0.1047	= Radians/sec.
" / "	x 0.01667	= Revolutions/sec.
Revolutions/min./min.	x 1.745×10^{-3}	= Rads./sec./sec.
" / " / "	x 2.778×10^{-4}	= Revs./sec./sec.
Revolutions/sec.	x 360	= Degrees/sec.
" / "	x 6.283	= Radians/sec.
" / "	x 60	= Revolutions/min.
Revolutions/sec./sec.	x 6.283	= Radians/sec./sec.
" / " / "	x 3600	= Revolutions/min./min.
Seconds (angle)	x 4.848×10^{-6}	= Radians
Square centimeters	x 1.076×10^{-3}	= Square feet
" "	x 0.1550	= Square inches
" "	x 10^{-4}	= Square meters
" "	x 100	= Square millimeters
Square feet	x 2.296×10^{-5}	= Acres
" "	x 929.0	= Square centimeters
" "	x 144	= Square inches
" "	x 0.09290	= Square meters
" "	x 3.587×10^{-8}	= Square miles
" "	x 1/9	= Square yards
1 / Sqt. ft./gal./min.	x 8.0208	= Overflow rate (ft./hr.)
Square inches	x 6.452	= Square centimeters
" "	x 6.944×10^{-3}	= Square feet
" "	x 645.2	= Square millimeters
Square kilometers	x 247.1	= Acres
" "	x 10.76×10^{6}	= Square feet
" "	x 10^{6}	= Square meters
" "	x 0.3861	= Square miles
" "	x 1.196×10^{6}	= Square yards
Square meters	x 2.471×10^{-4}	= Acres
" "	x 10.76	= Square feet
" "	x 3.861×10^{-7}	= Square miles
" "	x 1.196	= Square yards
Square miles	x 640	= Acres
" "	x 27.88×10^{6}	= Square feet
" "	x 2.590	= Square kilometers
" "	x 3.098×10^{6}	= Square yards
Square milimeters	x 0.01	= Square centimeters
" "	x 1.550×10^{-3}	= Square inches
Square yards	x 2.066×10^{-4}	= Acres
" "	x 9	= Square feet
" "	x 0.8361	= Square meters
" "	x 3.228×10^{-7}	= Square miles

Temp. (°C.) + 273	x 1	= Abs. temp. (°C.)
" " + 17.78	x 1.8	= Temp. (°F.)
" (°F.) + 460	x 1	= Abs. temp. (°F.)
" " − 32	x 5/9	= Temp. (°C.)
Tons (long)	x 1016	= Kilograms
" "	x 2240	= Pounds
" "	x 1.12000	= Tons (short)
Tons (metric)	x 10^{3}	= Kilograms
" "	x 2205	= Pounds
Tons (short)	x 2000	= Pounds
" "	x 32000	= Ounces
" "	x 907.18486	= Kilograms
" "	x 2430.56	= Pounds (troy)
" "	x 0.89287	= Tons (long)
" "	x 29166.66	= Ounces (troy)
" "	x 0.90718	= Tons (metric)
1 / Tons dry solids/24 hrs.	x Area (sq. ft.)	= Sq. ft./ton/24 hrs.
Tons of water/24 hrs.	x 83.333	= Pounds water/hour
" " " / "	x 0.16643	= Gallons/min.
" " " / "	x 1.3349	= Cu. ft./hr.
Watts	x 0.05692	= B.T. Units/min.
"	x 44.26	= Foot-pounds/min.
"	x 0.7376	= Foot-pounds/sec.
"	x 1.341×10^{-3}	= Horse-power
"	x 0.01434	= Kg.-calories/min.
"	x 10^{-3}	= Kilowatts
Watt-hours	x 3.415	= British Thermal Units
"	x 2655	= Foot-pounds
"	x 1.341×10^{-3}	= Horse-power-hours
"	x 0.8605	= Kilogram-calories
"	x 367.1	= Kilogram-meters
"	x 10^{-3}	= Kilowatt-hours
Yards	x 91.44	= Centimeters
"	x 3	= Feet
"	x 36	= Inches
"	x 0.9144	= Meters

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8. 國際原子重量表 INTERNATIONAL ATOMIC WEIGHTS TABLE

Source: The Journal of the American Chemical Society. Atomic weight is the average weight of an atom compared to an average atom of ordinary terrestial oxygen as 16. Starred values are the mass numbers of the longest-lived of the known forms of elements, usually synthetic, which are radioactive in all forms.

Chemical element	Symbol	Atomic number	Atomic weight	Year discovered
Actinium	Ac	89	*227	1899
Aluminum	Al	13	26 98	1828
Americium	Am	95	*[illegible]	1944
Antimony	Sb	51	121 76	1450
Argon	A	18	39 944	1894
Arsenic	As	33	74 91	13th C.
Astatine	At	85	*210	1940
Barium	Ba	56	137 36	1808
Berkelium	Bk	97	*249	1949
Beryllium	Be	4	9 013	1798
Bismuth	Bi	83	209 00	15th C.
Boron	B	5	10 82	1808
Bromine	Br	35	79 916	1826
Cadmium	Cd	48	112 41	1817
Calcium	Ca	20	40 08	1808
Californium	Cf	98	*249	1950
Carbon	C	6	12 011	B. C.
Cerium	Ce	58	140 13	1803
Cesium	Cs	55	132 91	1861
Chlorine	Cl	17	35 457	1774
Chromium	Cr	24	52 01	1797
Cobalt	Co	27	58 94	1735
Copper	Cu	29	63 54	B. C.
Curium	Cm	96	*245	1944
Dysprosium	Dy	[illegible]	162 46	1886
Erbium	Er	[illegible]	167 2	1843
Europium	Eu	[illegible]	152 0	1901
Fluorine	F	[illegible]	19 00	1771
Fraudium	Fr	[illegible]	*223	1939
Gadolinium	[illegible]	64	156 9	1886
Gallium	[illegible]	31	69 72	1875
Germanium	[illegible]	32	72 60	1886
Gold	Au	79	197 0	B. C.
Hafnium	Hf	72	178 6	1923
Helium	He	2	4 003	1895
Holmium	Ho	67	164 94	1879
Hydrogen	H	1	1 0080	1766
Indium	In	49	114 76	1863
Iodine	I	53	126 91	1811
Iridium	Ir	77	192 2	1804
Iron	Fe	26	55 85	B. C.
Krypton	Kr	36	83 80	1898
Lanthanum	La	57	138 92	1839

Lead	Pb	82	207 21	B. C.
Lithium	Li	3	6 940	1817
Lutetium	Lu	71	174 99	1907
Magnesium	Mg	12	24 32	1830
Manganese	Mn	25	54 94	1774
Mercury	Hg	80	200 61	B. C.
Molybdenum	Mo	42	95 95	1782
Neodymium	Nd	60	144 27	1885
Neon	Ne	10	20 183	1898
Neptunium	Np	93	*237	1940
Nickel	Ni	28	58 69	1751
Niobium (Form. Columbium)	Nb	41	92 91	1801
Nitrogen	N	7	14 008	1772
Osmium	Os	76	190 2	1804
Oxygen	O	8	16 0000	1774
Palladium	Pd	46	106 7	1803
Phosphorus	P	15	30 975	1669
Platinum	Pt	78	195 23	1735
Plutonium	Pu	94	239	1940
Polonium	Po	84	210	1898
Potassium	K	19	39 100	1807
Praseodymium	Pr	59	140 92	1885
Promethium	Pm	61	*145	1945
Protactinium	Pa	91	*231	1917
Radium	Ra	88	226 05	1898
Radon	Rn	86	222	1900
Rhenium	Re	75	186 31	1925
Rhodium	Rh	45	102 91	1803
Rubidium	Rb	37	85 48	1861
Ruthenium	Ru	44	101 1	1845
Samarium	Sm	62	150 43	1879
Scandium	Sc	21	44 96	1879
Selenium	Se	34	78 96	1817
Silicon	Si	14	28 09	1823
Silver	Ag	47	107 880	B. C.
Sodium	Na	11	22 991	1807
Strontium	Sr	38	87 63	1790
Sulfur	S	16	32 066	B. C.
Tantalum	Ta	73	180 95	1802
Technetium	Tc	43	* 99	1937
Tellurium	Te	52	127 61	1782
Terbium	Tb	65	158 93	1843
Thallium	Tl	81	204 39	1861
Thorium	Th	90	232 05	1828
Thulium	Tm	69	168 94	1879
Tin	Sn	50	118 70	B. C.
Titanium	Ti	22	47 90	1789
Tungsten (Alternate Wolfram)	W	74	183 92	1783
Uranium	U	92	238 07	1789
Vanadium	V	23	50 95	1830
Xenon	Xe	54	131 3	1898
Ytterbium	Yb	70	173 04	1878
Yttrium	Y	39	88 92	1794
Zinc	Zn	30	65 38	B. C.
Zirconium	Zr	40	91 22	1789

K.C.I.P

FORMULAE, ATOMIC, MOLECULAR AND EQUIVALENT WEIGHTS AND CONVERSION FACTORS TO $CaCO_3$ OF SUBSTANCES FREQUENTLY APPEARING IN THE CHEMISTRY OF WATER SOFTENING

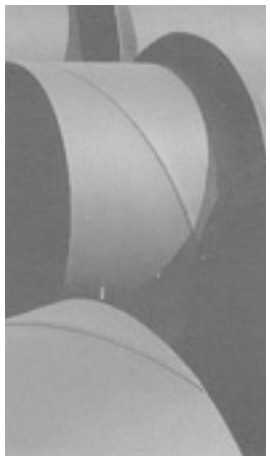
Substance	Formula	Atomic or Molecular weight	Equivalent weight	Multiplying Factor (Considering molecular wt. of $CaCO_3$ as 100.) Substance to $CaCO_3$ equivalent	Multiplying Factor (Considering molecular wt. of $CaCO_3$ as 100.) $CaCO_3$ equivalent to substance
Aluminum	Al	27.0	9.0	5.56	0.18
Aluminum Chloride	$AlCl_3$	133.	44.4	1.13	0.89
Aluminum Chloride	$AlCl_3{\cdot}6H_2O$	241.	80.5	0.62	1.61
Aluminum Sulfate	$Al_2(SO_4)_3{\cdot}18H_2O$	666.4	111.1	0.45	2.22
Aluminum Sulfate	$Al_2(SO_4)_3$ (anhydrous)	342.1	57.0	0.88	1.14
Aluminum Hydrate	$Al(OH)_3$	78.0	26.0	1.92	0.52
Alumina	Al_2O_3	101.9	17.0	2.94	0.34
Sodium Aluminate	$Na_2Al_2O_4$	163.9	27.3	1.83	0.55
Ammonium Alum	$Al_2(SO_4)_3{\cdot}(NH_4)_2SO_4{\cdot}24H_2O$	906.6	151.1	0.33	3.02
Potassium Alum	$Al_2(SO_4)_3{\cdot}K_2SO_4{\cdot}24H_2O$	948.8	156.1	0.32	3.12
Ammonia	NH_3	17.0	17.0	2.94	0.34
Ammonium (Ion)	NH_4	18.0	18.0	2.78	0.36
Ammonium Chloride	NH_4Cl	53.5	53.5	0.94	1.07
Ammonium Hydroxide	NH_4OH	35.1	35.1	1.43	0.70
Ammonium Sulfate	$(NH_4)_2SO_4$	132.	66.1	0.76	1.32
Barium	Ba	137.4	68.7	0.73	1.37
Barium Carbonate	$BaCO_3$	197.4	98.7	0.51	1.97
Barium Chloride	$BaCl_2{\cdot}2H_2O$	244.3	122.2	0.41	2.44
Barium Hydroxide	$Ba(OH)_2$	171.	85.7	0.59	1.71
Barium Oxide	BaO	153.	76.7	0.65	1.53
Barium Sulfate	$BaSO_4$	233.4	116.7	0.43	2.33
Calcium	Ca	40.1	20.0	2.50	0.40
Calcium Bicarbonate	$Ca(HCO_3)_2$	162.1	81.1	0.62	1.62
Calcium Carbonate	$CaCO_3$	100.08	50.1	1.00	1.00
Calcium Chloride	$CaCl_2$	111.0	55.5	0.90	1.11
Calcium Hydrate	$Ca(OH)_2$	74.1	37.1	1.35	0.74
Calcium Hypochlorite	$Ca(ClO)_2$	143.1	35.8	0.70	1.43
Calcium Oxide	CaO	56.1	28.0	1.79	0.56
Calcium Sulfate	$CaSO_4$ (anhydrous)	136.1	68.1	0.74	1.36
Calcium Sulfate	$CaSO_4{\cdot}2H_2O$ (gypsum)	172.2	86.1	0.58	1.72
Calcium Nitrate	$Ca(NO_3)_2$	164.1	82.1	0.61	1.64
Calcium Phosphate	$Ca_3(PO_4)_2$	310.3	51.7	0.97	1.03
Carbon	C	12.0	3.00	16.67	0.06
Chlorine (Ion)	Cl	35.5	35.5	1.41	0.71
Copper (Cupric)	Cu	63.6	31.8	1.57	0.64
Copper Sulfate (Cupric)	$CuSO_4$	160.	80.0	0.63	1.60
Copper Sulfate (Cupric)	$CuSO_4{\cdot}5H_2O$	250.	125.	0.40	2.50
Iron (Ferrous)	$Fe^{\cdot\cdot}$	55.8	27.9	1.79	0.56
Iron (Ferric)	$Fe^{\cdot\cdot\cdot}$	55.8	18.6	2.69	0.37
Ferrous Carbonate	$FeCO_3$	116.	57.9	0.86	1.16
Ferrous Hydroxide	$Fe(OH)_2$	89.9	44.9	1.11	0.90
Ferrous Oxide	FeO	71.8	35.9	1.39	0.72
Ferrous Sulfate	$FeSO_4$ (anhydrous)	151.9	76.0	0.66	1.52
Ferrous Sulfate	$FeSO_4{\cdot}7H_2O$	278.0	139.0	0.36	2.78
Ferrous Sulfate	$FeSO_4$ (anhydrous)	151.9	151.9	oxidation	
Ferric Chloride	$FeCl_3$	162.	54.1	0.93	1.08
Ferric Chloride	$FeCl_3{\cdot}6H_2O$	270.	90.1	0.56	1.80
Ferric Hydroxide	$Fe(OH)_3$	107.	35.6	1.41	0.71
Ferric Oxide	Fe_2O_3	160.	26.6	1.88	0.53
Ferric Sulfate (Ferrisul)	$Fe_2(SO_4)_3$	399.9	66.7	0.75	1.33
Ferrous or Ferric	Fe or Fe	55.8	55.8	oxidation	
Ferrous Sulfate	$FeSO_4$	151.9	151.9	oxidation	
Fluorine	F	19.0	19.0	2.66	0.38
Hydrogen (Ion)	H	1.01	1.01	50.0	0.02
Iodine	I	127.	127.	0.40	2.54
Lead	Pb	207.	104.	0.48	2.08
Magnesium	Mg	24.3	12.2	4.10	0.24
Magnesium Oxide	MgO	40.3	20.2	2.48	0.40
Magnesium Bicarbonate	$Mg(HCO_3)_2$	146.3	73.2	0.68	1.46
Magnesium Carbonate	$MgCO_3$	84.3	42.2	1.19	0.84
Magnesium Chloride	$MgCl_2$	95.2	47.6	1.05	0.95
Magnesium Hydrate	$Mg(OH)_2$	58.3	29.2	1.71	0.58
Magnesium Nitrate	$Mg(NO_3)_2$	148.3	74.2	0.67	1.48
Magnesium Phosphate	$Mg_3(PO_4)_2$	262.9	43.8	1.14	0.88
Magnesium Sulfate	$MgSO_4$	120.4	60.2	0.83	1.20
Manganese (Manganous)	$Mn^{\cdot\cdot}$	54.9	27.5	1.82	0.55
Manganese (Manganic)	$Mn^{\cdot\cdot\cdot}$	54.9	18.3	2.73	0.37
Manganese Chloride	$MnCl_2$	125.8	62.9	0.80	1.26
Manganese Dioxide	MnO_2	86.9	21.7	2.30	0.43
Manganese Hydrate	$Mn(OH)_2$	89.0	44.4	1.13	0.89
Manganic Oxide	Mn_2O_3	158.	26.3	1.90	0.53
Manganous Oxide	MnO	70.9	35.5	1.41	0.71

(continued on next page)

Substance	Formula	Atomic or Molecular weight	Equivalent weight	Multiplying Factor Considering molecular wt. of $CaCO_3$ as 100. Substance to $CaCO_3$ equivalent	$CaCO_3$ equivalent to substance
Nitrate (Ion)	NO_3	62.0	62.0	0.81	1.24
Nitric Acid	HNO_3	63.0	63.0	0.79	1.26
Nitrogen (Valence 3)	N'''	14.0	4.67	10.8	0.093
Nitrogen (Valence 5)	N'''''	14.0	2.80	17.9	0.056
Oxygen	O	16.0	8.00	6.25	0.16
Phosphorus (Valence 3)	P'''	31.0	10.3	4.76	0.21
Phosphorus (Valence 5)	P'''''	31.0	6.20	8.33	0.12
Potassium	K	39.1	39.1	1.28	0.78
Potassium Carbonate	K_2CO_3	138.	69.1	0.72	1.38
Potassium Chloride	KCl	74.6	74.6	0.67	1.49
Potassium Hydroxide	KOH	56.1	56.1	0.88	1.12
Silver Chloride	AgCl	143.3	143.3	0.35	2.87
Silver Nitrate	$AgNO_3$	169.9	169.9	0.29	3.40
Silica	SiO_2	60.1	30.0	1.67	0.60
Silicon	Si	28.1	7.03	7.14	0.14
Sodium	Na	23.0	23.0	2.18	0.46
Sodium Bicarbonate	$NaHCO_3$	84.0	84.0	0.60	1.68
Sodium Bisulfate	$NaHSO_4$	120.			
Sodium Bisulfite	$NaHSO_3$	104.			
Sodium Carbonate	Na_2CO_3	106.	53.0	0.94	1.06
Sodium Carbonate	$Na_2CO_3 \cdot 10H_2O$	286.	143.	0.35	2.86
Sodium Chloride	NaCl	58.5	58.5	0.85	1.17
Sodium Hypochlorite	NaClO	74.5	37.3	0.67	1.49
Sodium Hydrate	NaOH	40.0	40.0	1.25	0.80
Sodium Nitrate	$NaNO_3$	85.0	85.0	0.59	1.70
Sodium Nitrite	$NaNO_2$	69.0	34.5	0.73	1.38
Sodium Oxide	Na_2O	62.0	31.0	1.61	0.62
Tri-sodium Phosphate	$Na_3PO_4 \cdot 12H_2O$ (18.7% P_2O_5)	380.2	126.7	0.40	2.53
Tri-sodium Phos. (anhydrous)	Na_3PO_4 (43.2% P_2O_5)	164.0	54.7	0.91	1.09
Di-sodium Phosphate	$Na_2HPO_4 \cdot 12H_2O$ (19.9% P_2O_5)	358.2	119.4	0.42	2.39
Di-sodium Phos. (anhydrous)	Na_2HPO_4 (50% P_2O_5)	142.0	47.3	1.06	0.95
Mono-sodium Phosphate	$NaH_2PO_4 \cdot H_2O$ (51.4% P_2O_5)	138.1	46.0	1.09	0.92
Mono-sod. phos. (anhydrous)	NaH_2PO_4 (59.1% P_2O_5)	120.0	40.0	1.25	0.80
Meta-Phosphate (Hagan)	$NaPO_3$ (69% P_2O_5)	102.0	34.0	1.47	0.68

Sodium Sulfate	$Na_2SO_4 \cdot 10H_2O$	322.1	161.1	0.31	3.22
Sodium Sulfate	Na_2SO_4	142.1	71.0	0.70	1.42
Sodium Thiosulfate	$Na_2S_2O_3$	158.1	158.1	0.63	1.59
Sodium Tetrathionate	$Na_2S_4O_6$	270.2	135.1	0.37	2.71
Sodium Sulfite	Na_2SO_3	126.1	63.0	0.79	1.27
Sulfur (Valence 2)	S''	32.1	16.0	3.13	0.32
Sulfur (Valence 4)	S''''	32.1	8.02	6.25	0.16
Sulfur (Valence 6)	S''''''	32.1	5.34	9.10	0.11
Sulfur Dioxide	SO_2	64.1	32.0		
Tin	Sn	119.			
Water	H_2O	18.0	9.00	5.56	0.18
Zinc	Zn	65.4	32.7	1.54	0.65
ACID RADICALS					
Bicarbonate	HCO_3	61.0	61.0	0.82	1.22
Carbonate	CO_3	60.0	30.0	1.67	.60
Carbon Dioxide	CO_2	44.0	22.0	2.27	.44
Chloride	Cl	35.5	35.5	1.41	.71
Iodide	I	126.9	126.9	0.40	2.54
Nitrate	NO_3	62.0	62.0	0.81	1.24
Hydrate	OH	17.0	17.0	2.94	0.34
Phosphate	PO_4	95.0	31.7	1.58	0.63
Phosphorous Oxide	P_2O_5	142.0	23.7	2.11	0.47
Sulfide	S	32.1	16.0	3.11	0.32
Sulfate	SO_4	96.1	48.0	1.04	0.96
Sulfur Trioxide	SO_3	80.1	40.0	1.25	0.80
ACIDS					
Hydrogen	H	1.0	1.0	50.00	0.02
Acetic Acid	$HC_2H_3O_2$	60.1	60.1	0.83	1.20
Carbonic Acid	H_2CO_3	62.0	31.0	1.61	0.62
Hydrochloric Acid	HCl	36.5	36.5	1.37	0.73
Phosphoric Acid	H_3PO_4	98.0	32.7	1.53	0.65
Sulfurous Acid	H_2SO_3	82.1	41.1	1.22	0.82
Sulfuric Acid	H_2SO_4	98.1	49.0	1.02	0.98
Hydrogen Sulfide	H_2S	—	—	—	—
Manganous Acid	H_2MnO_3	104.9	52.5	0.95	1.05

XII. 수도 용어



수도 용어

가 압 펌 프	Booster pump	압력을 증가시킬 목적으로 관로 도중에 설치하는 펌프.
가 정 용 수	Domestic use	음료 · 요리 · 세탁 · 수세식변소 · 목욕 등 일반가정에서 쓰는 물.
감 압 밸 브	Pressure reducing valve.	관로의 송중(送中)에 장치하여 상류부 고압의 물을 저압의 물로 변화시켜 하류에 보내는 밸브.
개 수 로	Open channel	고체성 주벽(周壁)에 의하여 완전히 폐합되지 않고 대기압을 받는 자유 수면을 가진 수로.
결 합 염 소	Combined available chlorine	수중에서 크로오라민(Choramine)과 같은 결합상태로서 존재하는 유효염소.
결합잔류염소	Combined available chlorine residual.	물을 염소처리한 경우 일정시간 후 소멸되지 않고 남아있는 「결합염소」
경 수 (硬 水)	Hard water	마그네슘이나 칼슘염의 용해물이 수중에 70P.P.M.(CaO로 환산)이상인 물(Ca로는 100P.P.M.이상)
계획급수구역	Proposed Service area	계획년도까지 배수관을 부설하여 급수하는 구역.
계획급수인구	Estimated population using water	계획년도에 있어서의 급수인구

계획배수량	Proposed rate of distribuiton	배수펌프나 배수관의 계획에 쓰이는 수량을 말하며 일반적으로 평시는「계획시간 최대급수량」수재시에 있어서는「계획 1일 최대급수량」에 소화용수를 가산한 수량(인구 50만인 이상인 도시에서는 소화용수량을 고려치 않음)
계획송수량	Proposed rate of Transmission	정수장에서 배수지까지 송수하는 계획수량
계획시간	Proposed hourly	배수관 계획에 사용되는 시간
최대급수량	Maximum consumtion	최대급수량
계획1일최대 급수량	Proposed daily maxium consumption	수도시설의 규모를 규정하는데 사용되는「1일 최대 급수량」
계획정수량	Proposed in take rate	수원에서 취수하는 계획수량이며 일반적으로「계획 1일 최대 급수량」의 110~115%를 취함.
고가수조 (고가탱크)	Elevated tank	취수량이나 수압을 조절하기 위하여 높은 지지대위에 설치한 물탱크.
고속응집	High rate solie	약품주입 · 혼화 · 응집 및 침전 등이 동일지내에서 이루어지게 하는 기계.
곡관	Bent tube (Bent pipe)	어떠한 반경을 가지고 굽은 관.
공공용수	Public use	일반 관공서 · 학교 · 병원 · 병영의 급수, 도로의 분수, 철수, 하수세조용, 소화용수 등의 일반 공용용수.

관로	Pipe line	관으로 된 수로
관리실	Control room	시설의 전체 또는 대부분을 관리하는 곳.
평균계수	Uniformity Co-efficiency	모래의 체분석곡선(입도가적곡선)에 있어서 60% 통과율의 사립의 크기와 유효경과 비.
급속여과지	Rapid band filter basin.	급속도(1일 약 100~150m)로서 여과를 행하는 못.
급속혼화기	Flash mixer	약품을 기계적으로 급속히 혼화하는 기계.
급수관	Service pipe	배수지관으로부터 분기하여 각 가정에 급수하는 관.
급수구역	Service area	배수관을 부설하여 급수가 가능하게 되는 구역.
급수보급율	Rates of water usage.	급수구역내 총인구의 백분율.
급수인구	Population using water.	급수구역내 인구중 급수를 받고 있는 인구.
급수전	Service connection tap.	급수관의 말단에 설치하는 수도꼭지.
급수주	Stand pipe	내부가 관 · 부동전 및 급수전 등이 하나로 만들어진 기둥.
날개식양수기	Interential water meter.	통과하는 물의 유속을 이용하여 날개를 회전시켜 그 회전수에 의하여 간접으로 수량을 계측하는「양수기」
노즐	Nozzle	물이 분사되어 나오는 관의 일단에 붙은 끝이 뾰족한 관구.
다단식여과법	Multiple filtration	같은 원수를 3중(예비여과 · 중간여과 · 최후여과 등으로 처리)이상으로 여과하는 방식.